



ENTREPRENEURSHIP:

The Impact of Human Capital, a Social Network and Business Resources on Start-up

by

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Preface

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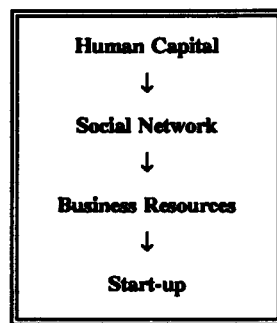
At the University of North Carolina at Chapel Hill I also enjoyed the hospitality of the Institute for Research in Social Science where Gary Gaddy, Ken Harding and Walt Davis offered excellent advice on model building and statistical analysis - as did Ken Bollen and Hannah Brückner in the Department of Sociology and Stuart McDonald in the Department of Political Science. Thanks are also due to Peter Bearman and Kate Stoevel for interesting discussions on the theories and methods of network analysis.

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Abstract

How does a prospective entrepreneur's personal network help him/her in the process of venture creation? In this study the social network is hypothesized to be affected by the entrepreneur's own individual capabilities. Further, social network is hypothesized to generate business resources, which again is hypothesized to be the mediator to start-up.



In this path model which includes an interplay between individual and structural factors as conducive for start-up, the main hypothesis is that factors appearing later in temporal order transmit all of the impact of prior factors. The model is tested on a sample of "real" potential entrepreneurs who had received a license for starting a business in one industry, farming of cod in Norway. The individuals sent a questionnaire asking for their background characteristics, networking behavior and resource acquisition prior to start-up. The survey had a 59% response rate. Of the 289 returned questionnaires, 103 were defined as non-starters and 186 as starters. The empirical analysis revealed the following findings: Human capital is only able to explain 2-7% of the variance in the social network dimensions. Social network, on the other hand, predicts business resources very well (17-40% variance explained). Also, business resources predict start-up well (36%). In controlling for prior variables in temporal order, an interesting picture is revealed. Business resources are not able to transmit all of the effects from prior variables. Human capital has a strong direct impact on the probability of start-up, even when social network and business resources are controlled. Structural factors late in temporal order are therefore not able to mediate all of the effects from individual factors early in temporal order. However, the hypothesis that social network's effect on start-up is fully mediated by business resources received support. Social network in the entrepreneurial process is important only indirectly by generating business resources needed for start-up.

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1. Introduction

An emerging perspective within the entrepreneurship literature has been the theory of social network, in which entrepreneurship is defined as a process of gathering and exploiting resources to start a new enterprise (Aldrich, Rosen and Woodward, 1986). Social network theory predicts that individuals are making contact with other individuals, groups and institutions in order to obtain resources for start-up. The early contributions in this field focused on the issue that actors at different stages in the entrepreneurial process appeared to have different network characteristics such as size, density, diversity, share of business relationships, and time spent in developing and maintaining contacts (Aldrich, Rosen and Woodward, 1986; Johannisson and Johnsson, 1988; Greve and Foss, 1990; Gatikker and Greve, 1992). The empirical results give mixed support to the hypothesis that social network differs through the entrepreneurial process. The findings indicate that individuals who are in the entrepreneurial process (in the process of starting, planning to start or already running a firm) have a larger network, use more time to develop (and sometimes also maintain) contact with network members, and have a larger degree of weak ties and professional contacts/business relationships compared to individuals who are not interested in starting a business. Other contributions have focused on the association between structural characteristics of network and business profitability or survival (Aldrich, Rosen and Woodward, 1987; Kolvereid and Skår, 1987; Johannisson, 1990; Aldrich and Reese, 1993). The empirical findings give less support to the hypothesis that social networks also have a positive impact on the firm's probability of making high profits and survival.

This study aims to develop a more comprehensive causal model to test the significance of social network for entrepreneurship. Prior research indicates that the main distinction in terms of network characteristics seems to be between those who have not started on the entrepreneurial process and those who are in it. If social network theory shall add anything to the entrepreneurship field, in that it should be able to predict factors which help to move a prospective entrepreneur from idea to start-up, then the focus should be directed on the process from when the business

idea is generated to the stage of implementation of a business. The conceptual model in this thesis therefore focuses on the factors that bring a prospective entrepreneur with a business idea to the point of start-up of the venture. In explaining networks' impact on entrepreneurship, a question that is still unanswered is how social networks actually affect start-up. What does a social network generate that is conducive for start-up ? What does contact with other actors actually give the entrepreneur that increases his chances for moving further in the process ? With one exception (Reese, 1992), network researchers have until now not specified the business resources that are hypothesized to be channeled through the social network. **The contribution of this study is to specify what business resources are needed for start up and test if/how well the social network does generate these resources.** Since business resources are assumed to be the intervening variable in between social network and start-up, the analytically important question to ask in this study is: **to what extent the social network are the cause of business resources' impact on start-up.** If the importance of business resources varies with the social network and the individual capabilities of the entrepreneur, then business resources alone do not account for the variation in start-up. Some of the effect may be spurious, i.e. that variables earlier than resources in temporal order are causing some of this effect.

A pure network perspective explains entrepreneurship as a result of entrepreneurs being embedded in a favourable structural environment where the social network increases the flows of information, trust, exchange of services, i.e. resources needed for starting a firm. This is a structuralistic approach where the explanation of a phenomenon is connected to the environment rather than to the individual. The lacking support for the hypothesis that individuals who have started the entrepreneurial process eventually succeed due to their favourable social network, seems to suggest that the relative importance of a social network for start-up is easy to falsify as long as researchers consider only one set of factors as conducive for entrepreneurship. **An intended contribution of this study is therefore "filling the holes" where social network theory comes up short.**

Stated differently, given that the perspective is to view start-up as a result of entrepreneurs' networking for resource acquisition, which other factors may help him or her to start up?

Entrepreneurship as a multiplex phenomenon requires a type of explanation that contains characteristics of the actor himself, i.e. the individual capabilities that may increase an entrepreneur's chances for entrepreneurial success. This is reflected in another theoretical tradition on entrepreneurship, using human capital variables (Bates, 1985; Brüderl, Preisendörfer and Baumann, 1991) or biographical variables (Sandberg and Hofer, 1987; Kolvereid and Skår, 1987) in explaining venture success. In its pure form the human capital perspective is an individualistic approach to an explanation. It is the individual's own obtained or achieved competence that makes him predisposed for venture success. Of the empirical studies, Bates (1985) found that education had a positive impact on profitability. Brüderl, Preisendörfer and Baumann (1991) found that the survival group had entrepreneurs with more years of education and longer work experience. They also had industrial experience and tended to have a self-employed father. Prior experience as self-employed had no significant impact. On the other hand, several studies have shown that venture success, performance or survival are not positively related to education, business education, prior business experience, management experience, or having a father as self-employed (Sandberg and Hofer, 1987; Cooper, Woo and Dunkelberg, 1988; Chandler and Jansen, 1992). The conclusion is therefore that the empirical studies show mixed support for the human capital theory of venture success.

The theoretical perspective in this work is a result of an eclectic strategy, using a combination of two theory traditions. In integrating social network theory and human capital theory into one overall model, the intention is to increase the model's explanatory power of the entrepreneurship phenomenon. Such an approach makes it possible to give a basic structuralistic model, such as the social network perspective, a more individually based component.

The second question to be raised in this study is therefore **whether social networks' impact on business resources to some degree may be caused by individual competence, which people possess before they acquire resources through their network**. When treating social network as an endogenous variable in the model, a more precise test of the importance of the social network is constructed. Does social network have an independent effect on business resources, or are there variables, before social network in temporal order, that cause some of this effect? If the importance of the social network on business resources varies with the background of the potential entrepreneur, structural factors alone do not account for the variation in business resources.

The intended contribution of this study is therefore:

- 1) to specify and test empirically to which degree resources assumed to be conducive to start-up are generated by the social network. The potential of social networks' to generate what entrepreneurs need to start firms, in terms of affective, informative and material resources is tested.
- 2) to expand the traditional model of analysis which treats social networks as an exogenous variable, by paying attention to human capital variables, i.e. the capital individuals themselves invest in their education and work experience. This makes a model where entrepreneurship is generated by an interplay between individual factors (human capital variables) and structural factors (social networks and business resources).

The interplay of individual characteristics and structural features is assumed to work in a temporal sequence, according to when they occur in the life cycle of the entrepreneur. The model reconstructs the social processes through which entrepreneurship is created, by specifying the temporal order of the factors assumed to contribute to the start-up of a venture, see the figure 1.1.

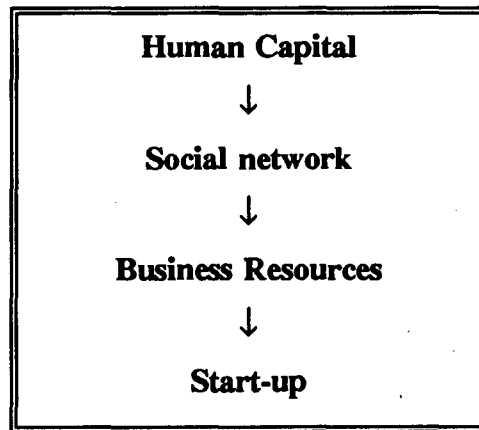


Figure 1.1 The conceptual model in the study.

The life cycle model presented here is fairly restrictive. It functions like a causal chain model where each link in the chain incorporates and transmits the effects of all prior variables in the chain. The first characteristic an entrepreneur brings with him/her in the entrepreneurial process is his/her individual capabilities. These capabilities help in making effective networks. However, when social networks have been made, only they are relevant for predicting the amount of business resources obtained. The effect human capital has in the entrepreneurial process is assumed to be fully transmitted by the social network. Thus when social network is controlled for human capital is assumed to have a zero impact on business resources. This is also the case for the next block in the model: business resources are assumed to transmit all the effect of the social network on start-up. When business resources are controlled for, I assume a zero impact of human capital and the social network on start-up. All effects of all three sets of explanatory variables on start-up are assumed to be fully transmitted by business resources, which is the mediator to start-up. The main thesis to be tested in this study is: the interplay between individual and structural factors works such that **structural factors are able to transmit the impact of individual factors. Structural factors that appear latest in temporal order are able to transmit the effect of prior structural factors. The effect of factors appearing early in a prospective entrepreneur's life cycle are subsumed in the factors which appear later.**

Since there seems to be some unexplained variance in both network and human capital studies, and given the fact that entrepreneurial paths will differ this study tries to reduce the empirical difficulty caused by the fact that the need for human capital, social network and resources will likely vary among entrepreneurs in different industries. In order to isolate alternative explanations of the variation in start-up, a homogeneous empirical setting is chosen. One industry is chosen for testing the hypotheses. Since there seems to be a bias in prior network studies toward highly educated entrepreneurs, far above the average standard in the normal population, this study aims at sampling prospective entrepreneurs from a population with more "normal" educational characteristics. Prior network studies have also had trouble in defining a pure entrepreneurial population. In order to define a population of "real" prospective entrepreneurs, the respondents are sampled from an industry where individuals show their entrepreneurial interest in applying for a licence for starting a business - here, the farming of cod. The intended empirical and methodological contribution here is to sample "real" prospective entrepreneurs, with an educational background closer to the average and pursue causality more aggressively by controlling for third variables in designing the study, a feature that is called for in recent reviews of entrepreneurship studies (Low and MacMillan, 1988).

Cod farming, which forms the empirical setting in this study, is a young industry which took off on a larger scale in the late 1980s.¹ The enterprise has innovative characteristics in the sense that a new product - a new species - is to be farmed. farmed cod may be viewed as a hybrid between traditional cod fishing and the newer aquaculture industry (Foss and Aarset, 1992). Cod farming is not an artificially raised product, but a natural resource - living small cod - bred to full size within a controlled environment. Its technology differs somewhat from traditional fish farming. Due to its position between fishing and farming, the access to production and trade are regulated through institutional systems established to handle other tasks. This young industry may therefore be characterized as being

¹See appendix 5 for an overview of the industry.

still in the melting pot. The entrepreneurs in this industry are either fishermen who have access to living cod through their quotas, or they are traditional fishfarmers who have to buy the raw material for farming.

The outline of the study is as follows: Part one is the theoretical part of the thesis. Prior entrepreneurial definitions are reviewed before we decide on a definition for this study. Studies of social networks and the impact human capital on entrepreneurship are reviewed and directions for formulating a model in this study are explored in chapters 3 and 4. The conceptual model, its assumptions and its variables, are described in chapter 5. Hypotheses are developed in chapter 6. Part two describes the research methods, design and data. In chapter 7, the empirical setting, the design, the data and method of analysis and the requirements for validity, are described. Then the variables are operationalized and validated. In chapter 8 the descriptive statistics of the variables are shown and t-tests on explanatory variables for the differences between the starters and non-starters are shown. Part three contains the testing of the hypotheses, and also the results when influential outliers are removed. Chapters 9 - 11 contain testing of the 19 hypotheses in the model. Part four is the conclusion of the thesis. In Chapter 12 I argue for a revised model. In chapter 13 the implications and the limitations of the study are discussed, and the conclusion is drawn.

2. Entrepreneurship

In this chapter some classical definitions of entrepreneurship are reviewed (2.1). The definition of the entrepreneur in this study will be given in 2.2. The industry an entrepreneur starts his/her enterprise in will be discussed (2.3). A summary of the chapter is given in 2.4.

2.1. Definitions of entrepreneurship

Generally speaking an entrepreneur is an individual who starts a new business. The various aspects of business creation such as the entrepreneur's function, the characteristics of the enterprise and the entrepreneur him(her)self have been differently emphasized in the literature throughout the years. Before defining entrepreneurship more precisely and deciding which aspects of entrepreneurial activity to focus on in this study, a short review of the most central aspects of entrepreneurship will be given.

In his article "The meaning of entrepreneurship", Long (1983) reviews entrepreneurship definitions from Richard Cantillon (ca 1730) to Kirzner (1975). Figure 2.1.1 gives a summary of Long's findings.

Researcher	Year	Definitional attributes
Richard Cantillon	ca 1730	<ul style="list-style-type: none"> - entrepreneur defined as a self-employed person - additional uncertainty accompanies self-employment - entrepreneurs should proportion their activity to market demands
Jean-Baptiste Say	ca 1810	<ul style="list-style-type: none"> - many managerial talents are required to be a successful entrepreneur - many obstacles and uncertainties accompany entrepreneurship
Alfred Marshall	ca 1890	<ul style="list-style-type: none"> - the abilities to be an entrepreneur are different yet complementary with the abilities to be a manager
Joseph Schumpeter	ca 1910	<ul style="list-style-type: none"> - entrepreneurship is at its essence the finding and promoting of new combinations of productive factors - entrepreneurship is the prime creative socio-economic factor
Frank Knight	ca 1920	<ul style="list-style-type: none"> - the courage to bear uncertainty is the essential aspect of entrepreneurship - entrepreneurs are required to perform such fundamental managerial functions as responsible direction and control
Edith Penrose	ca 1960	<ul style="list-style-type: none"> - managerial capacities should be distinguished from entrepreneurial capacities - identifying and exploiting opportunistic ideas for expansion of smaller enterprises is the essential aspect of entrepreneurship
Harvey Leibenstein	ca 1970	<ul style="list-style-type: none"> - entrepreneurial activity is aimed toward the reduction of organizational inefficiency and to the reversal of organizational entropy
Israel Kirzner	ca 1975	<ul style="list-style-type: none"> - the identification of market arbitrage opportunities is the fundamental function of the entrepreneur

Figure 2.1.1: Summary of important definitional attributes of entrepreneurs

Source: Long (1983:54-53)

Long (1983) concludes that there are three essential themes that have been interwoven in various combinations in virtually all formal theories of entrepreneurship: 1) Uncertainty and risk; 2) Complementary managerial competence; 3) Creative opportunism. The first theme seems essential to venture creation, whilst the third theme seems to be of less importance in the empirical setting of cod farming. Regarding the second theme, complementary managerial competence, one immediately raises the question as to how to distinguish entrepreneurship from management. Hartman (1959) also took up this question. In his article he compares Scumpeter's definition with Weber's definition and finds the latter more appealing when it comes to differentiating an entrepreneur from a manager. According to Weber it is formal authority that distinguishes an entrepreneur from a manager. Within an organization, the entrepreneur alone is the source of all formal authority, whereas management is defined residually as "not being the source of all authority" (Hartman, 1959:45). Besides thinking of the entrepreneur possessing formal authority, the main difference between a manager and an entrepreneur is that a manager implements a strategy within an existing organizational context whereas an entrepreneur is the one that sets an innovation into action within a new organizational context (Grønhaug and Reve, 1988). The figure below contrasts strategy and innovation/ entrepreneurship.

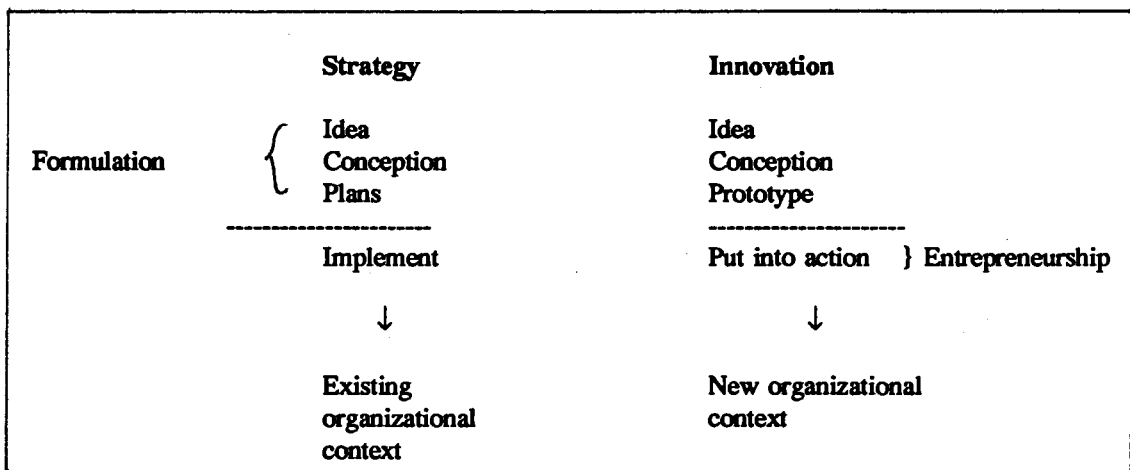


Figure 2.1.2. Strategy and innovation contrasted.

Source: Grønhaug & Reve (1988:325).

The manager implements plans in a given organizational context, whereas an entrepreneur tries his prototype out in a more uncertain environment.

Grønhaug and Reve (1988) also point to the very important fact that innovation and entrepreneurship are two different terms. We may view innovation on the idea level, whereas entrepreneurship may be "confined" to realizing a business idea.

"Entrepreneurship requires that the new product or business idea has proved viable. Thus, entrepreneurship requires focus, resources and actions beyond creation of the business idea. However, entrepreneurship is limited to some *initial* phases of the process of implementing and realizing the new idea" (Grønhaug & Reve, 1988:335).

Applied to our setting, this means that it is the start-up of a cod farm that is the focus of the entrepreneurial activity, not the aspects of how a cod farmer runs his business, nor the innovation stage behind the prototype of the entrepreneur. It is the realizing of the business idea that is the focus of entrepreneurship.

To go a step further, we can differentiate between sorts of various entrepreneurs. Webster (1977) attempts a classification of entrepreneurs. He distinguishes between five types of entrepreneurs: 1) The Cantillon entrepreneur; 2) The industry-maker; 3) The administrative entrepreneur; 4) The small business owner; 5) The independent entrepreneur. They differ in the following aspects as shown in figure 2.1.3.

Attribute or Characteristic	The Cantillon Entrepreneur	The Industry Maker	The Administrative Entrepreneur	The Small Business Owner/Operator	The Independent Entrepreneur
Risk-taker	Yes	Yes	Yes	Yes	No
Risk-creator	No	Yes	No	No	Yes
Operates within business firm framework	Yes	Yes	Yes	Yes	No
Operates within venture framework	No	No	No	No	Yes
Long-term management affiliations	Yes	Yes	Yes	Yes	No
Firm/Venture initiator	Yes	Yes	Yes	Yes	Yes
Compensation incentive:					
Capital gains	No	Yes	Yes	No	Yes
Salary/Wages	No	No	Yes	Yes	No
Profits	Yes	Yes	Yes	Yes	No

Figure 2.1.3. Synopsis of entrepreneurial differentiation

Source: Webster (1976:56)

As seen from the figure above, the independent entrepreneur is the only one who operates within a venture framework and who does not have profits as an incentive mechanism. Neither of these characteristics fits the type of entrepreneur represented in this study. Further, the industry maker does not fit our case, because a cod farmer is not a typical risk creator. An important incentive for starting the farming of cod is that this is likely to increase one's salary. Only the administrative entrepreneur and the small business owner fit this description. Applied to our setting, a cod farmer fits the description Webster gives of the small business owner. This type of entrepreneur is limited in scope with respect to sales, geographical outreach and profit potential. This suits our setting. Geographically, cod farming is limited to the place where the license status that the farmer may place the net pens. It is there that the fish will be landed and slaughtered and from there it has to be

sold. Economically, the profit in cod farming is mainly seen as securing additional income for a fisherman, or to run a small family business if the cod farmer is a traditional fish farmer. Due to governmental rules, the size of the licenses², which varies from 1000m³ to 12000m³, only secures a volume for farming cod on a small scale. Webster also points out that many small business operators go into business for other reasons than more flamboyant entrepreneurial types - who are attracted to entrepreneurship due to a "big financial payoff". Also, this fits the entrepreneur in our setting, as a cod farmer's motive will mainly be to secure income and create work places beside making profits.

In addition to defining entrepreneurship as starting a small business and having the formal authority, the enterprise in the cod farming industry also has clear innovative characteristics. How has the literature dealt with this? According to Schumpeter (1934) the function of the entrepreneur is to innovate. Innovation is defined as the "carrying out of new combinations of productive factors which can be used in the following ways: The entrepreneur 1) creates a new product; 2) uses new technology; 3) opens a new market; 4) creates a new and better organization. Which of Schumpeter's innovation criteria does cod farming fit? First, it is a new product in terms of being a new fish to farm. Cod has traditionally not been a fish to be farmed. In addition, farmed cod has a different texture and taste to wild cod. Its quality is impaired more by freezing than wild cod. Due to its relatively firm texture when freshly cooked, farmed cod has been especially preferred by restaurants. Secondly, although the technology is not entirely new, as it is similar to that of salmon farming, the difference in feeding the fish adds a new component to cod farming (Bjørken and Jørgensen, 1990). Thirdly, cod farming in fact expand the general market for cod. Wild cod has its peak season from January until April; outside this season quality cod is rare. The thought with cod farming was that it should function as a buffer towards wild cod in supplying restaurants with quality cod in the pre-winter season, and supplying raw material to the fishing industry when the resource of wild cod is low. Cod farming therefore seems to have

² Since the farming of cod is done in net pens in sea water, it is the amount of water within one net pen that defines the size of the license.

innovative characteristics due to aspects of the product, the technology and the market. Cod farming does not involve creating a new kind of organization, however. Cod farming will involve small business units where the family business is likely to be the organization form.

Grønhaug (1988) points at that "most researchers would agree that the important thing to understand is not the individual innovative act taken in isolation, but rather the process of its creation and repercussions" (Grønhaug, 1988:491). This procedural approach in analyzing the steps in the entrepreneurial/innovative process seems appealing. How an entrepreneur gets an innovation started must be an interesting theme in constructing the conceptual model. A guideline for this research is therefore to incorporate innovation as an aspect of the entrepreneurial task. It seems likely that starting production of a new product represents a greater challenge for the entrepreneur compared to starting production of a well-known product, where few (or none) of the aspects of the enterprise represent novelty. To create or adopt something new requires deviation from past practice - it breaks with conformity (Grønhaug and Reve, 1988). Cod farming represents a new niche, in between the traditional fishing industry and the newer aquaculture industry. Then the entrepreneurs have no predecessors to imitate and they have to combine their skills and the available technology in new ways. Knowledge must be acquired by trial and error processes and by communicating with other cod farmers. According to the theory of founders of new firms (Aldrich, 1991), these entrepreneurs are facing a high degree of uncertainty and a low degree of legitimacy due to a new product, no prior industrial experience and scepticism from the environment. A result of including innovation as an aspect of entrepreneurship, is that the entrepreneurial process - from idea, planning and to start-up - is likely to require the specific assets possessed by the entrepreneur and a need for making contacts with people for resource acquisition.

An entrepreneur who starts producing a new product, uses new technology or tries to open a new market is likely to be more dependent on the assistance from actors in the environment. A basic need therefore may be to explore the acceptance,

legitimacy and acquisition of business resources through social behavior such as social networking.

A central theme in the entrepreneurship literature has been whether entrepreneurs possess certain personal and psychological characteristics. Variables that have been hypothesized as being a trigger behind entrepreneurship are need for achievement (Mc Clelland, 1961; Miron and Mc Clelland, 1979), internal locus of control (Borland, 1974; Brockhaus, 1975; Brockhaus, 1980), risk disposition (Mc Clelland, 1961; Mancuso, 1975; Brockhaus, 1980) and personal values such as independency, leadership, autonomy, aggression, (and a lesser degree of values such as) need for support, conformity, and goodwill (Hornaday and About, 1971; De Carlo and Lyons, 1979; Komives, 1972). This focus on the personality profile which is supposed to make some persons more qualified for entrepreneurship than others has been strongly criticized in entrepreneurial reviews (Gartner, 1989), Foss (1989) suggests that due to the sampling in these studies - where mainly established entrepreneurs have been used - it may be that these traits are a consequence of entrepreneurship rather than its cause. In that sense, these variables are difficult to integrate in a model that seeks to predict entrepreneurship. Gartner (1989) suggests that research too long has asked the question "Who is an entrepreneur ?" In focusing on a particular personality type, a fixed state of existence, a describable species, one focuses too much on who an entrepreneur is rather than what an entrepreneur does. Researchers ought to focus on what entrepreneurs do - how they behave rather than what they are - by determining the many factors that are employed in the creation of an organization. Entrepreneurship is not a fixed state of existence. It is a role that individuals undertake to create organizations. Following this approach, I will in this thesis not include certain attributes or traits which need to be present to qualify for the term entrepreneur. Rather, I will focus on the implementation of a business idea. To put the plan into effect, to realize the business idea is the central aspect that will decide whether we are examining an entrepreneur or not. The individuals who have shown entrepreneurial interest by applying for and receiving a license to start a firm, will be labelled prospective entrepreneurs. Out of this population, those who come to the point of start-up will

be labelled entrepreneurs or starters. Those who did not make it to start-up, will be labelled non-starters.

Newer research has followed up this behavioral approach by defining the entrepreneur in terms of the activity he performs. The network literature defines entrepreneurship as a process of gathering and exploiting resources to start a new enterprise (Aldrich and Zimmer, 1986). This definition focuses on the social process behind start-up, attaching little importance to entrepreneurial characteristics and concentrating on the dependency of entrepreneurs on the environment. This is an appealing definition as it focuses on entrepreneurship as a process over time. In building on this definition we may, in the conceptual model, point to the factors assumed to help a prospective entrepreneur through an entrepreneurial process from idea to start-up. In this way the focus is on the process behind start-up, rather than how well established managers are running their business. It is starting a business that is the activity of an entrepreneur; individuals who run firms are not entrepreneurs, rather they are managers.

2.2 Directions for this study.

In this thesis, the definition of entrepreneurship involves various components from several entrepreneurial traditions:

An entrepreneur in this study is a person who realizes an innovative business idea. This activity involves uncertainty and risk due to producing a new product, which has been unknown in the market. The prospective entrepreneur tries to reduce this uncertainty by forming relations with other persons or institutions, who possess the necessary resources for start-up of a business. Entrepreneurship is a process over time. Based on a business idea the prospective entrepreneur starts planning and eventually comes to the point of starting a business. Some prospective entrepreneurs will not complete this process. Only those who in the end start a business are labelled entrepreneurs.

In this definition we do not make any requirements as to the size of the business or the formality of business creation. It is the start-up of a business activity based on a business idea that is the focus.

The dependent variable in this study is start-up, i.e. the likelihood that a prospective entrepreneur actually comes to the point of starting his venture. I want to explain why, out of a group who already has shown interest in starting a firm - by applying for a license - some are successful in starting a firm whereas others are not. I want to compare two groups who, at one point in time, were in the beginning of the entrepreneurial process (t1), why and how some of them were successful in terms of coming through the process and actually starting a firm (t2).

This is shown in figure 2.2.1.

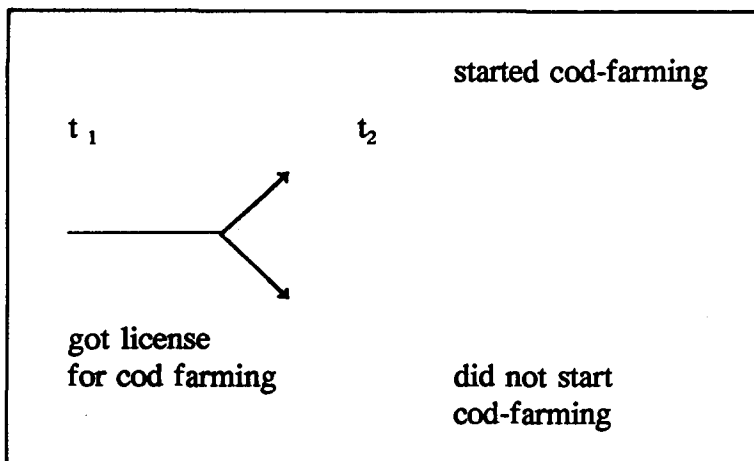


Figure 2.2.1. The dependent variable in the study; start-up

2.3 The industry

The definition of an entrepreneur and the requirements of the enterprise as defined in sections 2.1 and 2.2 did not contain any requirements about where in the life cycle of an industry (Porter, 1980) the enterprise is placed. According to our definition, we may sample prospective entrepreneurs from any industry regardless of where in the life cycle the industry finds itself. This is also in accordance with the main contributions in the literature which have not isolated specific theories for entrepreneurs in emerging industries or entrepreneurs in maturing industries. As we will see in chapters three and four, the dependent variable is mainly survival of a firm, the performance of a firm, stages in the entrepreneurial career or start-up of a firm. Where the enterprise is in the life cycle has not been the focus; also for that reason, researchers have sampled entrepreneurs from various industries, whilst very few studies have been in depth examinations which hold industry constant.

In giving a general definition of entrepreneurship - we do not require more of the enterprise than that it has to have innovative characteristics - we do follow the general pattern in entrepreneurial studies. Due to this we do not build into the conceptual model what is required for starting an enterprise in an emerging or maturing industry. We seek to apply a general theory of start-up. However, due to the necessity of using retrospective survey questions, which was clear when no financing was available for this project, the author of this thesis chose an industry in its earliest stage in the life cycle. With a new, expanding/emerging industry, one could "defend" using retrospective methods, since the non-starters and the starters would have their activities prior to start-up/not start-up more freshly in mind.

This choice, however, means that we, in this study, deal with prospective entrepreneurs who may start an enterprise in an industry at an early stage in its lifetime and therefore are likely to experience some difficulties vis-a-vis the environment in proving the enterprise capable of surviving. The characteristics associated with such an emerging industry are described in Porter (1980). Of the structural characteristics mentioned by Porter, the cod farming industry's problems

are especially due to the initial small size and the newness of the industry. Small production volume (the majority of cod farmers have licenses for only 1000m³) and the newness of the industry yield high costs in an emerging industry relative to those the industry can potentially achieve (Porter, 1980). Further, the cod farming industry exhibits, as a hybrid between the traditional fishing industry and the newer aquaculture industry, both technological and strategic uncertainty; cod is a new fish to farm, the technology differs somewhat from the farming of salmon and there are a wide variety of approaches to product/market positioning. As it is a new product, the emerging industry also has first-time buyers. The industry therefore faces a difficult task in how to market a substitute for the normal wild cod. Especially for a fish like cod, with rich traditions as a high quality fish in its peak season January to April, customers must adapt to the fact that the fish may actually be "produced" in an industrial way and be available throughout the year. In addition, an emerging industry like cod farming may actually be governmentally regulated, which due to a shifting political government may cause shifting conditions for the industry. Characteristic for cod farming is that it was shaped in a period when the right wing party had political leadership in Norway. In this period, a more liberalistic philosophy was prevailing and everybody who applied for a fish farming license were in fact granted one. From 1988-1989, the rules were changed and a more aquacultural background from the prospective entrepreneur was required. In addition, cod farming is an industry dependent on the environment. The cod farming industry is likely to be influenced by the crisis in the salmon farming industry, which had been affected by illness and overproduction (Holm and Jentoft, 1992). The environmental consciousness among people in general may have risen and therefore the scepticism against farming of a new species may have been especially large.

To conclude: A general definition of entrepreneurship does not take into account in which part of an industry's life cycle the enterprise is. In following this tradition we will not, in the hypotheses chapter, state specifically how start-up in a new industry is compared to start-up in a mature industry. I am not concerned with covering theoretically a particular part of the life cycle of an industry. This implies

that the empirical setting for testing the hypotheses may be emergent or mature industries. Due to the necessity of using retrospective survey questions, a new industry was chosen. A new industry has special difficulties that make start-up a real challenge for entrepreneurs. Since we have to take the industry stage as given, the conceptual model for explaining start-up will in this thesis not include stage as a variable.

2.4 Summary

In reviewing various entrepreneurial definitions, it is necessary to include two central aspects of entrepreneurship: risk-taking, in terms of starting a commercial business, and that the start-up of the venture involves innovation (product, technology, market). In a general definition, there is no link to the larger industry the entrepreneur's enterprise is a part of. The enterprise, having innovative characteristics, may be carried out in an emerging or a maturing industry.³ The focus in this study is the implementation of the business idea rather than the factors that precede idea generation. The main focus is how a prospective entrepreneur moves from the idea to start-up. Further, we paid attention to behavioral aspects of entrepreneurship, rather than traits. A general definition in the theory of social network is that an entrepreneur is a person who, through social relations, acquires resources for starting a business. In building on this definition, networking and resource acquisition are viewed as the behavioral aspects of entrepreneurship. In developing the conceptual model in this study, we shall pay attention to these factors. In the following chapter therefore, the theory of social network on entrepreneurship is reviewed.

³ In this connection we gave a short presentation of the industry in this study and stated that, due to practical factors, we were not able to sample entrepreneurs from a mature industry, since they would have more trouble referring back to the activities they undertook prior to start-up. Instead we chose an new industry, which fits Porter's classification of "emerging" industries.

3. Social network - studies of entrepreneurship

In this chapter, the literature on the relationship between social network and entrepreneurship is reviewed.⁴ The criteria in reviewing theoretical (section 3.1) and empirical (3.2) contributions is to emphasize the dimensions of the social network which have been used. In the empirical contributions the focus is on whether or not the proposed relationship has been supported by the data.⁵ In 3.3 the directions for choosing variables in this study are discussed.

3.1 Theoretical contributions

Aldrich and Zimmer (1986) assumed that entrepreneurship is embedded in a social context, channeled and facilitated, or constrained and inhibited, by entrepreneurs' positions in social networks. The authors developed four arguments as to how dimensions of social network may be conducive to entrepreneurship. First, they focused on the importance of being within a group which, through increasing their group identity and group boundary, increases network density. High density increases the formation of new relations and action sets between actors. The authors mentioned examples from ethnic groups and their "internal organizing capacity". Dense networks may produce a collective capacity which is important for an entrepreneur to draw on when starting his/her firm. Secondly, the accessibility of brokers or other persons who can match actors with complimentary interests is important for increasing the reachability within a network. In such a way information and resources are more easily spread out. Thirdly, diversity - a balance between weak and strong ties - is crucial for entrepreneurship. An entrepreneur will for instance have his/her own personal network consisting of

⁴ There is another part of the literature that uses network as a form of organization - a governance structure - between market and hierarchy (Powell, 1990; Larson, 1991; Larson, 1992). These contributions are not reviewed here as the focus in this study is on the processes before organization formation.

⁵ In addition to the quantitative empirical studies reviewed here, there is also qualitatively oriented network research, mostly based on regional studies where entrepreneurial networks are exemplified through case studies (Johannisson, 1990). These studies are not reviewed here as we mainly need to review contributions that contain hypotheses and variables in order to construct a model to be tested in this work.

strong ties between the actors. In addition he/she will have some acquaintances who each have their own personal network. This tie between the entrepreneur and the acquaintance is "not merely a trivial acquaintance tie, but rather a crucial bridge between two densely knit clumps of close friends" (Granovetter, 1982:106). The assumption is that a potential entrepreneur with a few weak ties will not get access to information from other (more distanced) parts of the social system. Fourth, Aldrich and Zimmer pointed to the importance of establishing weak ties to those actors with most social resources, i.e. actors as high in the social hierarchy as possible. Applied to entrepreneurship, they argue that successful entrepreneurs will be found in positions with weak ties to people who are in positions to provide timely and accurate information, to people with the resources to act as customers, and to people with resources to invest (Aldrich and Zimmer, 1986:28). To sum up: a high degree of density, reachability, diversity and access to social resources through weak ties are conducive to entrepreneurship.

Aldrich and Dubini (1989) argued for two general principles which link networking behavior to entrepreneurial success. The first principle is that: Effective entrepreneurs are more likely to systematically plan and monitor network activities than others. The authors hypothesized that: 1) effective entrepreneurs are able to chart their present network and to discriminate between production and symbolic ties; 2) that effective entrepreneurs are able to view effective networks as a crucial aspect in ensuring the success of their company. 3) that effective entrepreneurs are able to stabilize and maintain networks, in order to increase their effectiveness and their efficiency. The second principle is that: Effective entrepreneurs are more likely to undertake actions aimed towards increasing their network diversity than others. The authors hypothesize that effective entrepreneurs are able to check network density, so as to avoid too many overlaps on the one hand but still achieve solidity and cohesiveness. To sum up: Effective entrepreneurs can monitor their networking behavior so as to steer the "middle line", i.e. both weak ties to receive necessary information and strong ties to get support and group identity.

Foss (1989) argued for developing resources as an intermediate variable between network and stages in the entrepreneurial process. Stages were defined dynamically as movements from the idea stage to the "pre-business" stage and from the "pre-business stage" to the business stage. Resources that were identified as moving the entrepreneur from the idea stage to the "pre-business stage" were affective resources, defined as social support for the prospective entrepreneur's business idea, and constructive criticism of his plans. The author hypothesized that in an entrepreneurial friendly context, density, strength of ties, multiplexity and degree of direct ties reflect a homogeneous network that on the one hand increased the receipt of social support for the business idea and on the other hand reduced the receipt of constructive criticism of ideas. Both these types of resources were predicted to increase the likelihood of moving from the idea to the "pre-business stage". In a context characterized as less entrepreneurially friendly, a homogeneous network would decrease the availability of social support but instead increase the degree of constructive criticism. For predicting the second movement from the "pre-business- stage" to the business stage, informative resources were assumed to increase the probability of moving to the last stage in the process. Here the author predicted that the more homogeneous the network, the less available business relevant information would be.

Larson and Starr (1993) presented a network model of organization formation where exchange relationships are transformed from being simple, single-dimensional dyads to be stable, multidimensional and multilayered inter-organizational exchange relationships. The model defines three stages of entrepreneurial networking activity: 1) Focusing on the essential dyads; 2) Converting dyadic ties to socioeconomic exchanges; 3) Layering the exchanges with multiple exchange processes. This networking activity is used to secure the critical economic and non-economic resources needed to start a business; however, this link remains undiscussed in the article. The authors viewed organization formation as a result of the crystalization of stable, committed, revenue-generating, inter-organizational exchange relationships which extend beyond the earlier idiosyncratic and personalized relationships of the entrepreneur (Larson and Starr, 1993:5).

To sum up: The theoretical contributions point to the importance of both being within a dense network but still having the access to diversity through weak ties. The internal organizing capacity within dense groups is important for entrepreneurship at the same time as being loosely connected to actors with social resources. Aldrich and Dubini (1989) argued that effective entrepreneurs can judge their networking behavior rationally so as to balance network density and network diversity and to distinguish between instrumental and more symbolic ties. Foss (1989) pointed to resources as the important element that social networks actually "produce" which are likely to help in moving a prospective entrepreneur through the stages from idea to start-up. Larson and Starr (1993) developed a model where the "clue" to venture creation is that the entrepreneur focuses on essential dyads then converts them to socio-economic exchanges and then layers them with additional business functions, activities and levels of exchange. Although the procedural focus is appealing here, the question still remains as to how social network may be resource driven. It is further likely that a prospective entrepreneur will use different dyads for different reasons and will not necessarily build on prior ties. In other words, the interesting focus is perhaps not how a pair of ties get transformed through the process, but rather what a diverse set of ties at different stages in the process gives in the form of potential resources.

Characteristic for the earliest contributions are that they speak more about characteristics of the network and less of the characteristics of the ties a potential entrepreneur is building and what they embody. This perspective seems to be more of a theory how entrepreneurship emerges through a particular structure of the network. There seems to be less focus on how networking may be driven by the need for resources. To whom do prospective entrepreneurs relate in order to acquire the resources needed? And are the various dimensions effective in generating different resources? Before discussing how this study should be focused, let us move over to the empirical contributions in this field and see which of the theoretical dimensions have been followed up and at empirical support they have received.

3.2 Empirical contributions

The theme in Birley's study was the extent to which the entrepreneur interacts with the networks in his local environments during the process of starting a new firm (Birley, 1985). Birley's assumption was that during this process the entrepreneur is seeking not only the resources of equipment, space, and money, but also advice information, and reassurance. The research problem was the usage of informal and formal networks in this process⁶. The result of the study showed that the main sources of help in assembling the resources of raw materials, supplies, equipment, space employees, and orders were the informal contacts (family, friends, and colleagues). The only formal source that was mentioned with some regularity was the bank, which was mentioned towards the end of the process, where many of the resources were assembled and the elements of the business was set in the entrepreneurs mind (Birley, 1985:108). The author points out that the formal sources were not unwilling to offer help, but rather that the entrepreneurs were unaware of what was available. The informal system appears to create a barrier to the formal system rather than acting as a conduit. She concludes that a major aim of a new strategy should be to increase the awareness of the community to the formal sources and types of help that are available.

Aldrich, Rosen and Woodward (1986) found support for their hypotheses that respondents in the process of starting a firm had: 1) a higher proportion of business relationships in their network; 2) had a higher proportion of weak ties in their network; 3) did use more time per week in developing contacts; 4) had more network members per week; 5) had younger networks than entrepreneurs already running businesses and non-business owners. The data did not support the hypotheses that respondents in the process of starting used less time in maintaining contacts, nor that they contact the most people to talk to about business.

⁶ The formal network was operationalized as: the bank, accountants, lawyers, and the Small Business Administration. The informal network was operationalized as: family, friends and business contacts.

Neither of the hypotheses that entrepreneurs in the process of starting a business would have fewer multiplex relationships, and that established entrepreneurs had networks with a higher degree of multiplex relationships received support.

Aldrich, Rosen and Woodward (1987) tested network dimensions on both business founding and business profitability. The authors hypothesized that prospective entrepreneurs who start businesses will have networks with more members, with higher levels of activity and with greater diversity than those who do not start businesses. The findings were significant for the variables hours per week developing contacts, average number of contacts and density. The findings did not support network size, hours per week maintaining contacts and diversity as important elements of business foundings. For business profit the picture was different. For businesses over three years old, only size was significant. For businesses under three years of age, hours per week maintaining contacts, density and diversity showed significance. The data suggested that entrepreneurs who use much time maintaining relations and who maintain high levels of contact with networks whose members are interconnected are more likely to make a profit. The empirical analysis found the opposite of what was predicted: the stronger the association between the network members - the less diverse the network - the larger was the likelihood of profit. The consistent finding in this article is that "developing contacts" was significant for business founding but not for profitability, whereas "maintaining contacts" are significant for early profit but not for founding. This supports the notion of varying needs of networks throughout the entrepreneurial process. The puzzling finding in this study is that strength of ties had the opposite sign. The finding supports instead the importance of strong ties (less diversity) instead of weak ties (high diversity). Another puzzling finding is that network size was only significant for businesses over three years.

Kolvereid and Skår (1987) did not find empirical support for their hypothesis that organizations initiated and managed by entrepreneurs with rich, generous and broadly connected networks had higher performance than organizations initiated and managed by entrepreneurs with less developed networks.

Greve and Foss (1990) hypothesized that entrepreneurs in their later stages have more members of their network, use more time to establish contact, use more time to maintain contacts and have a greater number of low density contacts. The 106 respondents were grouped according to their stage in the entrepreneurial process. Group 1 was those who had no plans for establishing a business. Group 2 people were planning or are currently in the process of starting a business. Group 3 were those who had established a firm. In a univariate analysis these hypotheses received support. Those who had come furthest in the establishing process had a more extensive network, they use more time to establish and maintain contacts than those who have not come that far. The main differences were between group 3 and group 1. The authors also hypothesized that entrepreneurs in the later stages had relatively lower network density, that they had a higher percentage of contacts mediated through working life and that they had a higher share of contacts from working life. These hypotheses did not receive support in a univariate analysis. In a multivariate analysis, where only the variables which came out significantly in the univariate analysis were used (i.e. number of persons, time per month used to establish contacts) density and knowledge of the 5 primary contacts, the explained variance was 36 %, but none of the variables were individually significant.

Johannisson (1990) did not find any significant relationship between networking and business success⁷. The business orientation of the primary network, i.e. proportion of business ties, does not imply increased business success. Neither did network size nor the indicator of resource accessibility: time in renewing, time in maintaining contacts and frequency of interaction with primary network members.

⁷ Business success was measured by four dummy variables: 1) whether venture profits were made the year preceding the study; 2) whether venture profits were expected or not the year of the study; 3) whether the personal financial situation had improved as a consequence of the start-up; 4) if business operations were expected to grow in the future.

Aldrich et al. (1987) found, however, significant results for businesses over 3 years; Johannisson interprets this as due to a difference in business culture. The Swedish sample suggests that for younger ventures (2 years and younger) there is a positive correlation between network size and business success (profits made the year before). American entrepreneurs may benefit from professional networking once on the market whereas Swedish entrepreneurs operate their social network so as to get access to the market in the first place. Johannisson's conclusion is that personal network in general is not related to business success in emerging firms; entrepreneurial networks seem to be necessary but not sufficient for business venturing.

Reese (1992) focused, among other things, on the significance of network for acquisition of resources. The author distinguished between resource persons and the entrepreneur's actual use of resources. Her hypothesis was that network size and time spent on network was conducive to getting access to resources. The data revealed, however, that although the entrepreneurs in the study included network members to whom they could turn for help, most of them did not use this help. The data did not support the notion that "better" networks yield "better" access to resources. Reese states that the lack of any effects may be due to: 1) that knowing people who could help and actually using that help may be very different processes; 2) that the network construction variables (size, time spent developing, time spent maintaining social networks) were not the appropriate network dimensions to improve access to resources; 3) that the entrepreneurs had differences in their needs for resources (Reese, 1992: 229-231).

However, she urges further studies of the impact of networks on resource acquisition.

"However, these questions do not require us to abandon the use of networks to understand resource acquisition. Quite the contrary, I urge more attention to the process whereby networks facilitate, or impede, the acquisition of resources by moving to more subtle and in-depth explorations that become possible after this basic groundwork, such as I have presented in this dissertation, has been laid." (Reese, 1992:225).

Aldrich and Reese (1993) tested the link between networking and performance using panel data from new and recently founded businesses in the Research Triangle Area of North Carolina. They found no evidence that the size of the entrepreneur's personal network, the amount of time invested in developing or maintaining contacts affected business survival or performance significantly. The authors also tested the effect of resource pathways - the extent to which particular connections linked to specific business resources - had affected business performance⁸. The data revealed that almost everyone knew somebody they could turn to for the various types of help. Most people also asked for this kind of help. However, also here, the data analysis revealed no significant affect between access to any of the four resource pathways and business survival. Also, whether a respondent actually had sought advice or assistance in one of these areas over the year prior to the last interview was not significantly affected by how active they had been at time one with regard to the pathway (Aldrich and Reese, 1993:11). The results were puzzling, the respondents were active, they knew where to find help and did also seek that help at time one and two, but their propensity to seek such advice was not affected by whether they knew someone previously or whether they had actually used such advice a few years ago. The authors interpret this as indicating that networking may be triggered more by immediate circumstances (needing legal advice, needing more capital) than by patterns of relationship laid down years before.

On the following pages, tables of the results from these studies are presented. How the results in these studies will affect the focus in this study is shown in section 3.3. A ↔ reveals that the empirical analysis is based on a correlational analysis.

⁸ Resource pathway was trichotomized: 1) Respondents did not know anyone who could provide legal assistance in business matters, financial or accounting assistance, assistance in obtaining business loans or investors, help from someone who has several years of experience in the same line of business as the respondent. 2) Respondents did know someone but had not asked them for advice or assistance in the past year. 3) Respondents knew someone and had asked them for advice or assistance within the past year.

Table 3.2.1 Selected studies based on a network prospective

	N	Sample	Dep variable	Theoretical prediction	Empirical support
Aldrich, Rosen, Woodward (1986)	150	Members and associates of Research Triangle Council for Entrepreneurial Development	Stages: 1. No plans 2. Thinking 3. Process starting 4. Running	"process of starting" ↔ bus. relationships "process of starting" ↔ weak ties "process of starting" ↔ time to develop contacts "process of starting" ↔ time to maintain contacts "process of starting" ↔ network size "process of starting" ↔ multiplexity "running or starting" ↔ multiplexity "process of starting" ↔ network age	yes yes yes no yes no no yes
Aldrich, Rosen & Woodward (1987)	165	Members and associates of the Research Triangle Council for Entrepreneurial Development	Business founding Business profit	+ size starters ↔ hrs/week developing starters ↔ hrs/week maintaining + average contacts per week starters ↔ density starters ↔ strength of ties + size profit ↔ hrs/week developing profit ↔ hrs/week maintaining + average contacts per week profit ↔ density profit ↔ strength of ties	no yes no yes* yes no Bus.age ≤ 3yrs. > 3yrs. no yes no no yes no no no yes no yes no

	N	Sample	Dep variable	Theoretical prediction	Emp.supp.
Kolvereid & Skår (1987)	148	Heterogenous sample of 500 Norwegian entrepreneurs, 1 - 6 year old organizations. Average of 8.5 employeers. 35% manufacturing 65% service	- Performance (income of entrepreneur, expected turnover development in one year, profitability, expected size of the firm 5 years into the future, average annual growth in number of employees the three last years)	share of business ties \leftrightarrow performance network age \leftrightarrow performance network strength \leftrightarrow performance network activity \leftrightarrow performance (# persons in the network, average frequency of contacts)	no no no no
Johannisson & Johnson, (1988)	383	Entrepreneurs from six different regions in Sweden	1. Thinking 2. In the process of starting 3. Running 4. Taken over a business	Findings Network size highest in 3 Time to develop contacts: highest in 3 Time to maintain contacts: highest in 4 Time to travel for making contacts: highest in 3 Professional network members: highest in 3 Local network members: highest in 1 Network members mediated in business connections: highest in 3	

	N	Setting	Dep variable	Theoretical prediction	Empirical support
Greve & Foss (1990)	106	Applicants of entrepreneurial studies	1. No plans 2. Planning 3. Running	+ Size in "planning/running" + # Hours developing "planning/running" + # Hours maintaining "planning/running" + # Indirect ties "planning/running" - high density network "planning/running" + low density ties "planning/running" + # worker related ties "planning/running" + # ties mediated through work. life "planning/running"	yes yes yes yes no yes no no
Johannisson (1990)	183	Five different regional areas with various conditions for business venturing, in Sweden	Business success	Human - capital \rightarrow success - age - education level - technical training Network \rightarrow success share of business ties network size resource accessibility (time to develop and maintain personal network, frequency of interaction)	no no yes no no no

	N	Setting	Dep variable	Theoretical prediction	Empirical support
Gatiker & Greve (1992)	Not indicated	Members and associations of the Research Triangle Council for Entrepr. development - students of entrepreneurial course, Milan, Italy - entrepreneurs from diff. Swedish communities - applicants of entrepreneurial course, Norway	Stages: 1. Motivated 2. Planning 3. Implementation	U-shaped relation betw. size and stages density ↔ motivated density ↔ planning density ↔ implementation developing ↔ planning stage ↔ - family netw. members self.emp parents. ↔ family in network self. emp. mother ↔ family in network self. emp. father ↔ family in network	yes no no no no yes no
Aldrich & Reese (1993)	201	Voluntary and non-profit org. of interest to entrepreneurs ⁹	Business survival Business performance	Size + Hrs/Wk developing + Hrs/Wk maintaining + Size + Hrs/Wk developing + Hrs/Wk maintaining +	no no no no no no

⁹ 1) CEO. 2) Six networking organizations. 3) Participants at a Business Center class. 4) National Association of Women Business Owners. 5) Randomly selected business start-ups in Wake County, NC.

3.3 Directions for this study

How well have the network dimensions performed in these empirical studies ? Which of them seem promising to include in our model and which other network variables may be included in this analysis ? In this section the directions for this study are discussed in terms of: 1) The independent variables (social network); 2) The dependent variable (start-up); and 3) Methodological challenges.

The independent variables

Most of the dimensions of social network that have been focused on in these studies are the structural dimensions of the entrepreneur's network: how many contacts he has (size) and the degree to which the network members are connected to each other (density) and the distance between the network members (reachability). In network terms these dimensions are the network's morphological characteristics (Mitchell, 1969), which actually may be seen from drawing network graphs of a person's social network and the links between the members. The largest size of the social network has, in a majority of the studies, been associated with the planner or runner group. This variable will also then be included in this study in order to test whether we can provide additional support by testing the hypothesis on a new sample. However, a question that emerges when discussing network size is actually whether a traditional network variable like range (Mitchell, 1976) could add something to the analysis. The reason for including range, is that size does not take into account that Alter¹⁰ with the same statuses are represented. Size of the personal network may not be conducive for entrepreneurship if it consists of Alter with one and the same status or role towards Ego.¹¹ What a prospective entrepreneur likely needs, is to make contact with some professionals like a banker, realtor, lawyer but also to have industrial persons represented like a customer, supplier of raw material etc. In addition he needs advice from other business starters in his local environment. When including range in addition to

¹⁰ Alter = the network members of the prospective entrepreneur.

¹¹ Ego = the focal actor in the study, here the prospective entrepreneur.

size, we test the importance of the need for a wide range of statuses when size is held constant. A step forward would be to ask: is it the number of Alter that counts or is it the number of different Alter ? In other words, is it the number of network members that counts regardless of whether these network members occupy the same statuses or roles toward the prospective entrepreneur ? In including both dimensions in a multivariate analysis, we may be able to answer this question more precisely. Density and reachability will not be included in this analysis as we will use variables that only characterize the ties the prospective entrepreneur has to his network members and not the ties between the network members.

There seems to be less emphasis of the interactional characteristics of networks, i.e. the nature of the links themselves, in these studies. To this group belong variables as multiplexity and strength of ties and the content of the relations (Mitchell, 1969). Multiplexity, is a variable that until now has received little attention for empirical testing. The variable states to which degree Ego has multiple relations to Alter. It was only tested in Aldrich, Rosen and Woodward (1987) but did not receive support. It will be included in the model in this work. Strength of ties has, in these studies, been discussed as diversity, and defined as the degree to which network members, in Egos network, know one another. A low degree of diversity is represented when Alter knew each other very well and a high degree of diversity when they did not know one another. The variable will not be included here as it requires that the respondent evaluates the ties between his network members. The content of the relations has so far only been operationalized as the share of business relationships or share of professional contacts in Ego's network. Both variables have received support (Johannisson and Johnsson 1988; Aldrich, Rosen and Woodward, 1986). These results support a hypothesis that starters should have a higher degree of professional/ business related contacts than non-starters. We need, however, a more thorough analytical discussion about which facets of the relations are assumed to be needed for acquiring resources. A framework here would be to discuss which categories of different Alter prospective entrepreneurs have and which resources they are likely to give him/her.

In addition to concentrating on some of the variables in prior research and choosing some new variables, we must also take into consideration that there is a cultural difference between studying networks among highly-educated, high-tech entrepreneurs in urban parts of America to studying networks among individuals applying for licenses for fish farming in small peripheral municipalities in the rural parts of Norway. A consequence of this is that some of the network concepts seem less usable in the setting of this study. Network activity is a difficult concept to work with as "networking" is less of a deliberate "strategy" for the kind of entrepreneurs used in this study. In a close-knit rural setting, where the neighbor is likely to also be a kin, and where the main occupation is likely to be within primary industries such as fishing and farming, the clear cut distinction between work and leisure time is very blurred. The respondents in this study are likely to talk business on an informal basis with every single individual in the neighborhood. To map out the part of this networking which is more goal-oriented and instrumental regarding start-up, requires us to use different variables than focusing on network activity measured as "How many people would you estimate you have talked to in the last month regarding your (planned) business?". "How many hours per week do you use in developing contacts?". "How many hours per week do you use to maintain contacts?".

To sum up: Variables that seem promising based on prior research are: network size, types of relationships and multiplexity. In this lies the fact that we will focus more on interactional dimensions. A traditional network dimension, range, that has not been investigated in entrepreneurial research before, will be included here. These variables describe different aspects of Ego's network, both structural, interactional and which we will label here attributal. Common for them all are that they are ego-centered. It is Ego's personal network we are mapping out, the links from him to his members, not the links between the members themselves.

The dependent variable

The main dependent variables in the reviewed studies have been business performance, in terms of profitability and growth, survival and stages in the entrepreneurial process.

From the reviewed studies it seems like survival is too difficult to predict by using network variables. Aldrich and Reese (1993) have interesting arguments in their study. They state the majority of the businesses in their sample was from highly competitive industries where market forces, and the state of the economy, were the dominant features in the life of a business. In addition the businesses were young. The early years of a firm's existence, with rapid shifts in fortune, produced the kind of volatility in business size which was characteristic for many of the businesses in the sample. With such large swings in performance, networking will not explain very much (Aldrich and Reese, 1993).

"Perhaps "survival" is too crude a measure of networking's impact; perhaps so many other factors affect business survival that, in the short run, networking's impact is masked by more immediate economic considerations" (Aldrich and Reese, 1993:9).

There is also doubt about networks' impact on performance. As the researchers say themselves, there are many other factors than entrepreneurial networks that decide the degree of financial success in a firm.

"The present research may be criticized for not using hard performance measures. Moreover, traditional performance measures from organization or corporate finance theory may not be fully applicable to the small organizations investigated in the present research. Research has shown that small businesses often are reluctant to show financial success due to the tax system in some countries (Gandemo, 1985).(Kolvereid and Skår, 1987:24).

To a large degree, these factors are out of the control of the entrepreneur who started the firm. Kolvereid and Skår (1987) point out that the relationship between networking and performance may be influenced by contextual factors including localization, industry, ownership and organization structure, technology and individual characteristics (Kolvereid and Skår, 1987:25). My reaction to this is:

perhaps we ask too much of network theory to relate it to performance ? Since there obviously are so many other external factors, such as context, industry and market situation that decide how well a firm does, we give network theory a too difficult task if we predict network as the only independent variable to cause variation in business performance measures. It is not necessarily so that network does not affect profitability. However, the theory has not come far enough to predict how network and survival or performance are linked. It seems that there is too long a time span between an entrepreneur's networking and the actual survival of a firm or its financial performance. As Aldrich and Reese (1993) state, networks actually get overshadowed by other factors so that in the long run, when other factors are controlled, networks' impact are not visible. The result of this is that researchers should consider dependent variables that appear earlier in temporal order, more closely connected to the entrepreneur's networking.

Another problem in using performance as a dependent variable is that it involves a change in the unit of analysis, as networks refer to the individual entrepreneur and performance measures are organizational. As Kolvereid and Skår state:

"The problem concerning the unit of analysis is also apparent. While networking focuses on the individual entrepreneur, the performance measures are organizational" (Kolvereid and Skår, 1987:25).

A requirement for this study is therefore to choose a dependent variable that relates more to the entrepreneur's actions and less to how well an established firm does. A dependent variable is required that precede business performance in temporal order.

Research has also focused on a dependent variable that is more closely linked to networking, by focusing on the importance of networks at three different stages in the entrepreneurial process. However, it seems that distinguishing between stages using networks as independent variables has been difficult to do empirically. When significant results are obtained, it is mainly between those who are in the process

(those in the process of starting, runners) compared to those who have no intentions and those who are thinking of starting. The lack of longitudinal design in these studies does not allow comparison within groups, i.e. to compare the same group of people in different stages of the entrepreneurial process. The comparison has not been made within groups but only between groups, i.e. between those who have come furthest in the process compared with those who have not started yet. It is therefore difficult to assume that some came through the whole process, due to their network, compared to others.

The conclusion of the review of the studies in this section is that although stage is an appealing and challenging dependent variable, especially if one is able to undertake longitudinal research, the methodological aspects of testing the impact of networks on stages is a difficult process, which may also require that one follows a group of potential entrepreneurs over time and observe/analyze their network during this process. Organizational performance and survival also present problems as dependent variables, due to both substantial and methodological reasons. The solution lies in concentrating on a dependent variable which seems to represent the main distinction in these studies, i.e. that "runners" and "planners/ in the process of starting" are different from people who have not started a firm. In other words, the distinction between starters and non-starters.

Methodological challenges

The methodological challenges seem to lie both in:

- 1) defining relevant populations from which to sample prospective entrepreneurs;
 - 2) pursuing causality more aggressively;
 - 3) improving measurement of concepts.
- 1) The finding that network best distinguishes between those with no intention of starting and those who are in the entrepreneurial process has also to do with the population frame used in these studies. The samples in Aldrich, Rosen and Woodward, (1986) and (1987) are all members and associates of Research Triangle

Council for Entrepreneurial Development. This organization does not only consist of entrepreneurs but also of persons who through their profession do network with entrepreneurs, i.e. lawyers. Some of the Norwegian studies, e.g., Greve and Foss (1991) and Gattikker and Greve (1992) have used students from Entrepreneurial Studies at a regional college. Also here, persons are attracted due to other reasons than starting a business. Therefore: when one finds that those in the entrepreneurial process do have a larger number of persons in their network who they use for discussing their business ideas than those who have no intentions, then this cannot be said to be a very informative finding. When people are not interested in starting a business, it is obvious that they do not develop a social network to talk about their business ideas. For further research, it would be wise to sample prospective entrepreneurs from a population of "real" entrepreneurs so that one can avoid making a comparison with a reference group that actually does not fulfill the critical criterion of being a potential entrepreneur (i.e. have no intentions of starting a business).

Another aspect of the population frame for entrepreneurial studies is the challenge to avoid prior network studies' bias toward highly educated entrepreneurs: 44 % of the respondents reported having a bachelor as their highest degree, another 47 % reported a graduate degree in Reese (1992). In Greve and Foss' (1990) sample, 58 % had university degrees. 43.4 % had an advanced degree in Aldrich, Rosen and Woodward (1986). The samples in these studies consist of a well educated respondent group, far above the average standard in the normal population. It is therefore difficult to generalize these results to entrepreneurial respondents with more average educational characteristics. If future studies could sample prospective entrepreneurs from populations with a more average educational background, then that would enhance the general argument of networks' impact on entrepreneurship.

2) Some of the studies reviewed here are correlational and descriptive in their nature. In order to construct a more testable approach of the model we may take into consideration the criteria for causation, which is that the independent and dependent variable covary, that independent variables precede the dependent

variable in time and that there are no alternative explanation for the differences between the starters and the non-starters (Kidder, 1981). In aiming for a more testable approach, we may formulate a priori hypotheses and define the temporal order between the variables; then test these hypotheses within a design with control for third variables, homogeneous respondents and use causal data analysis techniques. That would give us a better "test" of the significance of social network for start-up.

3) In measuring the dependent variable it does seem to be a challenge to use less obtrusive measures than the ones commonly employed. To ask respondents to tick off in categories such as "does not intend to start", "is thinking about starting", "is in the process of starting" requires that the entrepreneur has to place himself in rather wide and ambiguous categories. An additional question that could be used to verify this measure is to ask the respondents if (or when) they undertook certain activities which represent different stages in the entrepreneurial process.

To conclude: In this study, the challenge is to sample prospective entrepreneurs from a population of "real" entrepreneurs. This will be done by focusing on one industry, where the starting of a venture is licensed. I will then try to acquire data from all persons who have been issued with a license. After a period that will be defined as "time enough to start", a retrospective study will be done where the respondents describe the network they have had. The share of the respondents who have started will then be compared with the share of those who has not started. This enhances the probability of having a suitable reference group of non-starters. I will seek to define an entrepreneurial population with educational characteristics closer to the average. In addition, a multi-method approach (Cook and Campbell, 1979) will be used to measure the dependent variable, in order to be able to state more precisely whether a respondent has started a business or not. In addition to this, it must be stated that a study including only social network variables captures too little of the entrepreneurship phenomenon. To start a business also depends on the individual capabilities of entrepreneurs. We need to incorporate other perspectives in order to seek to explain more variation in the entrepreneurship

phenomenon. Network analysts need to be more eclectic and try to combine theory traditions instead of viewing entrepreneurship as a result of social structures, only believing in one perspective. Here the study of Kolvereid and Skår (1987) has shown the richness of including the entrepreneur's resourcefulness in terms of education and work experience. In the next section another theory tradition that has studied entrepreneurship will be reviewed, namely the human capital tradition.

4. Human capital theory of entrepreneurship

In this section, studies are reviewed that regard the individual resources as a triggering factor in managing a business. The dependent variables in these studies are business performance, profitability or business survival and to some degree also start-up. Therefore this perspective focuses more on how well-established entrepreneurs run their business than whether the business gets started. In this chapter we will review studies of the impact of individual characteristics on start-up or survival (4.1) and point out the potential for including these variables in the conceptual model of this study (4.2).

4.1 Empirical contributions

Human capital theory pays attention to the capital the entrepreneur has invested in himself (Bates, 1985; Borjas, 1986; Preisdörfer and Voss, 1990; Brüderl et al, 1991) in terms of general human capital (education and work experience) and specific human capital (industrial experience, experience as self-employed, leader experience).

Sandberg and Hofer (1987) proposed that new venture success was more likely when: 1) entrepreneurs have prior entrepreneurial experience; 2) when entrepreneurs have prior managerial experience in a related industry. Neither of the propositions received support from the analysis, based on correlation between venture success (5 points scale from highly successful to highly unsuccessful) and biographical variables from 17 new venture proposals from a venture capitalist.

✓ Kolvereid and Skår (1987)¹² based their personality perspective on the literature review done by Sandberg and Hofer (1987) who found that the most commonly examined biographical characteristics of entrepreneurs were: 1) their education;

¹² Kolvereid and Skår (1987) is reviewed in both chapters 3 and 4 as the authors have incorporated the network perspective and the human capital perspective in their analysis.

2) their prior entrepreneurial experience; 3) their managerial experience. Kolvereid and Skår (1987) used the term "resourceful entrepreneurs" for respondents with a strong biographical profile (i.e. high education and high managerial experience and high prior entrepreneurial experience). The authors argued that resourceful entrepreneurs are better risk managers and that they also may be able to reduce the risk involved by strategic choice such as lobbying. The authors therefore expected them to succeed in starting a new enterprise and that their organizations will have a higher survival rate than the organizations of less resourceful entrepreneurs (Kolvereid and Skår, 1987:8). The data supported their hypothesis. Another hypothesis was that resourceful entrepreneurs have richer, more generous and more broadly connected networks than less resourceful entrepreneurs. The data revealed a positive correlation between education and the number of contacts, but a negative correlation between education and proportion of ties that are business related. There was also a positive correlation between entrepreneurial or management experience and size of the network. People with entrepreneurial experience were found to have a slightly lower proportion of business contacts in their networks (Kolvereid and Skår, 1987). Also, family history was positively related to network characteristics: having a parent entrepreneur was associated with a high number of contacts, network multiplexity and network age. The authors suggest that entrepreneurs seem to inherit their parents' network. Locating the business in the region where the entrepreneur has his family ties appeared to be associated with a lower number of people in the network and higher network age, which the authors interpreted as showing that people who move from one region to another tend to increase their number of contacts and expand and renew their networks as they move. In short, the findings in Kolvereid and Skår (1987) supported the personality perspective and the relationship between individual characteristics and networking.

* Cooper, Woo and Dunkelberg (1988) presented findings from a three-year longitudinal study of 2994 entrepreneurs and their firms. The status of their firms after their second and third years was examined and the authors considered how the discontinued firms and their entrepreneurs differed from those which survived. Their findings showed that survivors were more likely to be college graduates,

older and to have fewer previous full-time jobs. The survivors, however, did not have higher levels of previous management experience, were not more likely to have previously owned a business and were not less likely to have come from a non-business background. Furthermore, the survivors had not taken more business courses, and were not more likely to have come from families in which the parents had owned a business (Cooper, Woo and Dunkelberg, 1988:232).

In their study of the effect of human capital variables on survival rates (over 5 years) in Germany, Brüderl, Preisendörfer and Baumann (1991) found that in a multivariate analysis with 11 explanatory variables, the following predicted survival significantly: length of education (years), work experience (years), if the respondent had industrial experience and if his/her father had been self-employed. Whether the respondents had self-employed friends and acquaintances, whether they had leadership experience and previous self-employment experience or whether they were male had no significant impact. Whether the respondent was German also had no significant effect.

Chandler and Jansen (1992) identified the entrepreneurial, managerial, and technical functions as three roles that founders must competently enact in order to be successful. Questionnaires allowed the founders to provide self-evaluations of their competencies. Among their findings were that the number of businesses previously initiated and the years spent as an owner manager did not appear to be strongly related to the performance of the venture.

A summary of the review of these studies is given in table 4.1.1.

Again, a \leftrightarrow reveals correlation analysis, and a \rightarrow reveals causal analysis (regression or logistic regression).

Table 4.1.1 Selected studies based on human capital theory.

	N	Sample	Dep variable	Theoretical prediction	Empirical support
Sandberg & Hofer (1987)	17	New venture proposals submitted to four different venture capitalists	Venture success	<p>Prior entrepreneurial experience ↔ venture success</p> <p>Prior managerial experience in related industrial ↔ venture success</p>	no no
Kolvereid & Skår (1987)	148	Heterogenous sample of 500 Norwegian entrepreneurs, 1 - 6 years old organizations. Average of 8.5 employees. 35% manufacturing 65% service	<p>1. Performance</p> <p>2. Networking</p>	<p>Entrepreneurial resourcefulness ↔ performance</p> <p>Entrepreneurial resourcefulness ↔ network</p>	yes yes
	N	Sample		Findings	
Cooper, Woo & Dunkelberg (1988)	2944	Members of The National Federation of Independent Business who reported that they had recently become business owner		<p>Survivors <u>more</u> likely to</p> <ul style="list-style-type: none"> - be college graduates - older - fewer previous full-time jobs <p>Survivors did <u>not</u> have</p> <ul style="list-style-type: none"> - higher levels of previous management experience - more business courses <p>Survivors were <u>not</u></p> <ul style="list-style-type: none"> - more likely to have previously owned a business - less likely to have come from a non-business background - more likely to come from families in which parents had owned a business 	

	N	Sample	Dep variable	Theoretical prediction	Empirical support
Brüderl, Preisendörfer & Baumann (1991)	1794	Individuals in Munich, Upper Bavaria having registered their firm (1985/86)	Survival	Education (yrs) \rightarrow survival Work experience (yrs) \rightarrow survival Industrial experience (dich.) \rightarrow survival Leadership experience \rightarrow survival Experience as self-employed (dich.) \rightarrow survival Father self-employed \rightarrow survival Friends self-employed \rightarrow survival	yes yes yes no no yes no
Chandler & Jansen (1992)	38	Manufacturing and service firms in the State of Utah	Performance	Findings: number of business previously initiated and years as owner manager not strongly related to performance	

4.2 Directions for this study

Human capital theory offers a different kind of explanation to entrepreneurship than social network theory. The theory suggests that it is the characteristics of the individual that predisposes some entrepreneurs to be able to get their firm through the first difficult time period in a firm's life. Factors assumed to help an entrepreneur in doing this are: education, prior entrepreneurial experience, managerial experience, industrial experience, and having a self-employed father. The substance in this relationship seems to be that such individual resourcefulness serves the entrepreneur in meeting the challenges of venture creation. The mechanisms, how these characteristics actually help an entrepreneur to keep his firm alive longer than others, remain however unclear. How do human resources assist individuals in venture creation. A challenge therefore in this study is to describe through which mechanisms individual resources are conducive to entrepreneurship. In this thesis we will view individual resources as exogenous factors having an indirect impact on start-up through other intermediate factors. May individual capacity enhance a prospective entrepreneur's ability to build an efficient network for resource acquisition? In this case our social network model is expanded by integrating human capital theory in the temporal order that seems appropriate. Do prospective entrepreneurs, when building their social network for resource acquisition, have their own human capital in terms of education and work experience prior self-employment as an "individual basis" which may enhance their ability to build and develop social ties? Do human capital variables, which in previous studies are assumed to affect survival and profitability, in fact do so because they have a positive indirect impact on individuals' ability to create a network for acquiring business resources needed for start-up? The idea here is that prospective entrepreneurs, through their age, fathers degree of self-employment, education, work and industrial experience, have some individual resources that are assumed to be valuable compared to other actors in the entrepreneurial process.

Which human capital variables may create variation in individuals' ability to form their social network for business purposes? Age is certainly a relevant factor, as

one would expect networking behavior to be both time and energy consuming. There is a general distinction between general and specific human capital; the latter will be focused on in this study. Further it is interesting, in this setting, to divide specific human capital into two groups. For cod-farming it would be more relevant to distinguish between educational human capital, which the prospective entrepreneur has obtained through schooling, and experience related human capital, obtained through work experience. Theoretically human capital may be of two types, one of which is the general level of education, which is the classic variable used in previous studies. However, another educational variable which shows an individual's variety of educational experience may also be of interest. For start-up, it is not only the highest educated individual which is relevant, also the individual who has many different types of education may have some advantages. What seem to be reasonable work experience dimensions for influencing start-up through social network? Based on the results in the reviewed studies, industrial and prior entrepreneurial experience seem the most promising variables. In addition, technical experience, defined as the familiarity with production techniques similar to the ones in the planned project of the entrepreneur will be included. Traditionally, family background is used as a measure of the human capital which the prospective entrepreneur inherits from his family, usually whether the father had been self-employed or not. Since this study takes place in a rural areas where mobility is low, the prospective entrepreneur may have siblings who live near him and who also may have started businesses in related industries. In addition to fathers' self-employment, also siblings' self-employment will be included as they may represent important key persons to draw upon in the entrepreneurial process. I also want to explore whether a self-employed mother has an impact. Self-employment in the family will, in this study, include father, mother and siblings¹³. Management experience did not receive support in the reviewed studies. It will also not be included here; this is also due to the fact that, in this setting, persons with management experience are likely to be the same persons as those with prior self-employment.

¹³ It is likely that siblings will not have such a strong impact as parents.

The human capital perspective and the social network perspective yield different explanations of the factors which cause entrepreneurship. Whereas human capital theory has an overall explanation mode based on dimensions within the individual himself, social network theory is closer to a structuralistic approach where the explanation for entrepreneurship is found in the environment surrounding the entrepreneur (Astley and Van de Ven, 1978) (see figure 4.2.1).

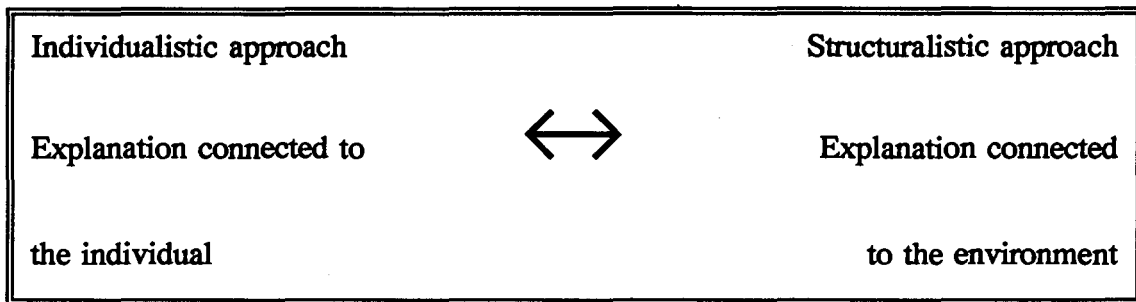


Figure 4.2.1 Degree of individualistic - structuralistic type of explanation.

A theoretical challenge must be to bridge these two approaches. A theory that combines intention and context needs to be formulated. This requirement has also been raised by many researchers of entrepreneurship. Kalleberg has formulated this very well:

"Studies of entrepreneurship have been conducted in relative isolation from each other, and there are few attempts to integrate insights from diverse perspectives into an overall explanation of entrepreneurship. Rather, different writers have studied entrepreneurship with their own distinct set of assumptions and disciplinary blinders... psychologists often study the personal attributes of entrepreneurs without paying much attention to the social contexts within which they work; sociologists often focus on the environment for entrepreneurship without considering the nature of the entrepreneurial personality; and economists often view entrepreneurs as rational, isolated decision makers without specifying the embedded nature of social behavior" (Kalleberg, 1986:157-158).

Applied to the formation of the conceptual model in this study, the aim of incorporating of human capital variables is to make the model less structuralistic.

This is also in accordance with Granovetter who states:

"A fruitful analysis of human action requires us to avoid the atomization implicit in the theoretical extremes of under- and oversocialized conceptions. Actors do not behave or decide as atoms outside a social context, nor do they adhere slavishly to a script written for them by a particular intersection of social categories that they happen to occupy. Their attempts at purposive action are instead embedded in concrete, ongoing systems of social relations" (Granovetter, 1973:487).

The research question now is not only whether to be embedded in certain structures of relations to Alter, who provides the prospective entrepreneur with resources. The question is also whether the prospective entrepreneur himself can improve his ability to network, by investing in educational and practical competence. In other words: which kind of individual resources does a prospective entrepreneur have when he starts developing a network for business purposes, and which of them makes him capable of building a network for the start-up of a business.

The next chapter attempts to integrate the human capital and social network perspectives.

5. Model and variables

The main explanatory variable in the model is social network. Social network is constructed (Reese, 1992). Making social relations depends on all actors involved, Alter as well as Ego. Here we confine ourselves to exploring the extent to which individuals' own resources are conducive for networking behavior. Social network then becomes a dependent variable in the study as I want to test what causes variation in prospective entrepreneurs' social networking. Secondly, social network is viewed as an explanatory variable, by increasing the extent of business resources. In this sense the model focuses on where in the entrepreneurial process social network works. I want to test both what causes variation in prospective entrepreneurs' networks and what social networks actually "produce" in the entrepreneurial process. Do individual resources function as a trigger for networking and does networking generate business resources? In this chapter, the conceptual model consisting of variables from the network perspective and human capital perspective is constructed (section 5.1). The level of analysis and the assumptions the model builds on are also made explicit (section 5.2). The variables in the model are defined in section 5.3.

5.1 A life cycle model with individual and structural factors as conducive to start up.

The model is a combination of two "pure" theory traditions - social network theory and human capital theory. The effects of both these traditions will be captured as dimensions from both of them serve as explanatory variables in a multivariate model. An eclectic strategy like this makes it possible to test whether a model's explanatory power will increase by using variables from both traditions. In the model, entrepreneurship is generated by an interplay between individual factors (human capital) and structural factors (social networks and business resources). This interplay is assumed to work in a temporal sequence according to when the factors occur in the life cycle of the entrepreneur. The various dimensions from the theory traditions are therefore put into blocks according to when in a prospective entrepreneur's life cycle they are assumed to appear. In this way we seek to define precisely the mechanisms

through which individual and structural resources are conducive to entrepreneurship. In defining three blocks which appear one after the other in temporal order, the social process of entrepreneurship from idea to start-up is stressed. The three blocks are as follows:

- 1) Individual resources brought into the entrepreneurial process¹⁴: age, theoretical human capital (business education, level of education, education diversity), experience related human capital (technical experience, prior self-employment, industrial experience), family related human capital (self-employment in the family).
- 2) Structural resources in terms of attributal, interactional and structural aspect of the social network the prospective entrepreneur is engaged in. Size, range (structural dimensions), collegial zone, industrial zone, service zone, multiple attributes (attributal dimensions), kin and friends, multiplexity (interactional dimensions).
- 3) Structural resources in terms of affective, informative and material business resources. Support for the business idea (affective resource), bureaucratic advice, technological advice, accounting and budgeting advice (informative) resources, financing, labor production resources and access to the market (material resources).

No assumption about the causal order between variables within the same block is made.

The mechanisms between the three blocks are as follows: The resources the prospective entrepreneur has when developing the business idea, are mainly the individual resources in terms of education, work-experience and family background.¹⁵ These individual resources are likely to serve as a triggering factor on the social network which the prospective entrepreneur starts developing for exploring the risk

¹⁴ The variables earliest in the life cycle are age and degree of self-employment in the family. These variables are likely to affect the prospective entrepreneur's choice of education and his work experience. However, as the focus in this study is not to predict this relation, the life cycle model is simplified by putting age and self-employment in the family in the same block as the other human capital variables.

¹⁵ Gender is also likely to affect social network. The literature on gender's impact on social network has not been reviewed here and no hypotheses are developed. I have no chance of testing hypotheses of gender's impact as I had to take the empirical setting which is male dominated as given.

and chances for a business start-up. Social network is not built independently of the focal actor, therefore a structural dimension like social network relies on individual resources. The next mechanism is that social networks have a role in increasing the extent of business resources needed for start up. Social network structures - the individuals and institutions that are supposed to serve them in the entrepreneurial process - "produce" affective, informative and material resources needed for starting a business. To conclude: the theory is that individual factors serve as a background for the structural factors in the life cycle of entrepreneurship. For example, a prospective entrepreneur brings with him/her important background characteristics in terms of education and work experience (individual factors) that may affect the ability to build social relations (structural factors). Through the social network, he/she acquires business resources (structural) which increase the chance for start-up. In this way the model seeks to reconstruct the processes through which entrepreneurship is created.

In constructing a model where factors follow in causal chains, hypotheses of causal relations from variables from one block to variables in the next block (in temporal order) are made. The exogenous variables in the model - whose variation is assumed to be decided by factors outside the model - are eight human capital variables, reflecting important individual resources which prospective entrepreneurs bring with them when starting on the entrepreneurial process. The first set of hypotheses describe how these resources which the individuals bring with them when entering the industry, can actually increase the social network. Since the eight exogenous human capital variables are treated as "givens", the correlation between them is also treated as "given" and therefore remains unanalyzed¹⁶.

The second set of hypotheses describes how aspects of the social network may increase access to business relevant resources. The eight resource variables are the second set of endogenous variables in the model. Since the causal order between variables appearing earlier in temporal order is specified, i.e. human capital precedes

¹⁶ That means that the part of variation in the eight endogenous network variables will be due to correlated causes (Pedhazur, 1982), which will not be analyzed further as we have not stated the causal order between the human capital variables.

social network which again precedes business resources, we have here mediated causes (Pedhazur, 1982) where it is possible to assess the indirect impact human capital has on business resources through its impact on the social network. In addition, the spurious part of the relation between social network and business resources may be assessed, i.e that a variable earlier in temporal order, human capital, is affecting them both. This is done by checking whether the effects of social network on business resources are reduced when human capital is controlled for.

The final path is from resources to start-up, the phenomenon in which this study seeks to explain and which is the last endogenous variable in the model. Also here we have mediated causes and the indirect effect which human capital has on start-up may be assessed through its indirect impact through social network and business resources. We may also assess the indirect effect which social network has on start-up through business resources. In addition we check the spurious part, the impact of business resources on start-up, by looking for any reduction of the impact of business resources on start-up when human capital and social network are controlled for.

The path model predicts that only three non-zero paths exist in the model, one from human capital to social network, one from social network to business resources and one from business resources to start up. This is then a restrictive model since all effect on start-up is assumed to be mediated through a chain of intermediating variables. This is the "causal chain effect" of the life cycle model- i.e. all factors later in prospective entrepreneur's life subsume all effects appearing earlier in the life cycle model. Practically, it means that all of the effect of human capital on business resources is assumed to be mediated through the social network and that all of the effect of human capital and social network are mediated through business resources.

The structure of the path model builds on the traditional assumptions for path analysis (Pedhazur, 1982): 1) The relations among the variables in the model are linear, additive and causal; 2) All relevant variables are included in the model, so that the residuals, which contains the elements that are not explained by the model, are assumed to be uncorrelated with the relevant variables; 3) The causal flow is

unidirectional - all causal linkages run "one way" - making the model recursive
(Duncan, 1975); 4) The variables are measured on an interval scale; 5) The variables
are measured without error.

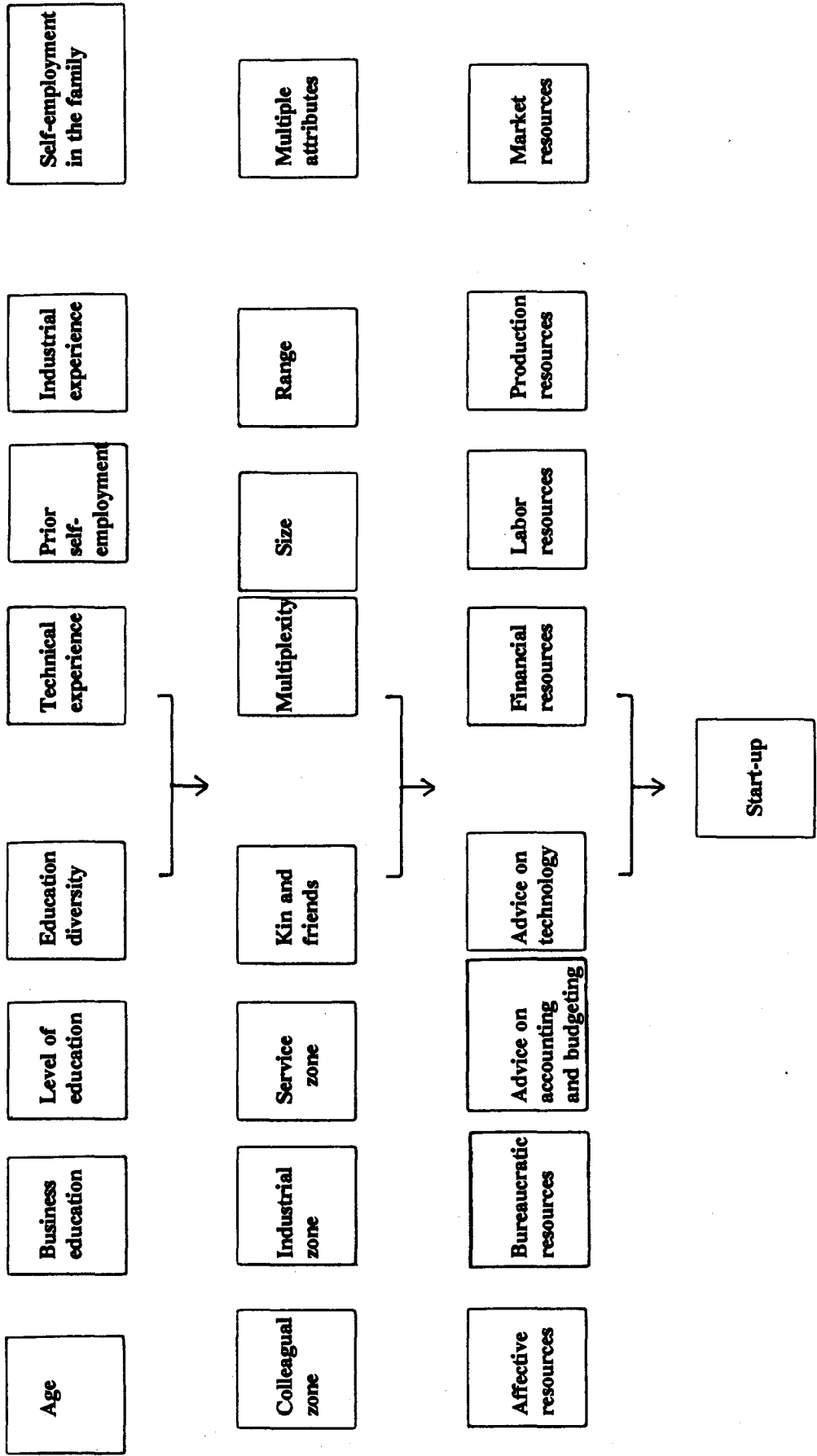


Figure 5.2.1 Model: Resources as mediator for starting a business.

Compared to earlier research, this model involves a more critical test of social network theory. Firstly, does the network have an autonomous effect on resources or does it only reinforce differences in individual resources which actors already possess when making contacts? If the effect of the social network on start-up is very much due to the prior influence of background variables, it is actually variation in background variables that "predispose" individuals for developing different networks; and a large part of the social network's impact on business resources is spurious. In this case, the role of social networks is only to reinforce the impact of these effects. Alternatively, if the social network's impact on business resources does not get reduced when human capital is controlled, then social network plays a more autonomous role in predicting business resources.

Secondly, do business resources have an autonomous effect on start-up or do they only reinforce the difference between individual with special human capital and social network characteristics? If the effect of business resources on start-up is very much due to prior influence of the background variables and networking behavior, then human capital and social network "predispose" individuals for achieving resources. Then a large part of business resources' impact on start up is spurious. Alternatively, if business resources' impact on start-up is not reduced when human capital and social network are controlled, then business resources have a more autonomous impact.

Essential in the model compared to earlier research, is the idea that human capital and the social network are preconditions for resource acquisition. By letting capital and social variables affect start-up indirectly, the mechanism through which they are conducive to start-up is tested. Compared to earlier research which has proposed direct effects from human capital and social network on start-up, this model suggests a more binding temporal order between factors assumed to conducive for start-up. The theory here is that human capital and social network only affect entrepreneurship indirectly, through business resources; they are not mediators to start-up themselves.

The relatively complex structure of the model, having three successive paths in temporal order allows us to assess the indirect effects which the explanatory variables have on start-up through other variables (Bollen, 1989). We can therefore decompose each effect of an explanatory variable on the dependent variable start-up into its direct effect and its indirect effect through other variables. In adding the direct and indirect effects together we get the total effect. This is a step forward compared to prior research which has focused on direct effects, only. In using a life cycle model, with three sequential paths we are able to assess the total impact which is the result of both the direct effects, on which earlier research has focused, and the indirect effects which this model allows us to test the importance of. Regarding modelling of theories, a major goal is to supply a model that makes some of the exogenous variables endogenous (Duncan, 1975). In this way, a model can tell us how indirect effects and total effects are generated. Figure 5.1.2 shows how each relation (the total effect) between human capital and social network variables and start-up may be decomposed into their direct and indirect effects.

Effects on start-up from:	Direct effect	Indirect effect (social network)	Indirect effect (business resources)	Total effect =
Human capital variables				
Age, business education, level of education, education diversity, technical experience, prior self-employment, industrial experience, self-employment in the family.	no	yes	yes	indirect effect
Social network variables				
Colleagual zone, industrial zone, service zone, kins and friends, multiplexity, size, range, multiple attributes.	no	no	yes	indirect effect

Figure 5.1.2 Decomposition of relations between human capital, social network and start-up.

5.2 Level of analysis and assumptions in the model

This study operates on the individual level of analysis. The theory concerns what increases the chances of a prospective entrepreneur starting his/her venture. This is a study of egocentric networks where the level of analysis is the role-set of the focal actor (Merton, 1957). We then study prospective entrepreneurs' personal networks (Klovdahl, 1985): an individual (Ego) and the relationships that link other individuals (Alter) to the individual himself/herself. That includes all actors which the prospective entrepreneur is directly tied to. Ties among Alter are not the focus of this study, therefore measures from social network analysis (sociocentric networks) like diversity density, reachability and centrality are not included in this analysis.

An argument against this choice may be that we in fact treat a variable that is relational, i.e. includes the ties and contact with other than the focal person, as attributal, i.e. as a characteristic an individual possess (see the discussion in Scott, 1991). In treating dimensions by social network as attributal rather than relational it may be hard to explain variation in social networks with only Ego's own individual resources as an explanatory variable. Substantially, I then explain social network, whose variation is likely to be due to other actors' behavior and not only the prospective entrepreneur, by an explanatory variable related only to the individual himself. Treating relational data as attributal in one stage of the model makes it difficult to argue theoretically that only attributal variables (human capital) affect social network. This is an issue seldom discussed in prior studies. In focusing on egocentric networks we must be aware that, although we focus on variables that may be argued to be attributes of Ego, they are in fact a product of social constellations where other actors have been involved.

Regarding the focal actor in the study - the prospective entrepreneur - the study is based on the following assumptions: Through the level of analysis, role-set, the focus involves characteristics of Ego (individual resources), the relations he/she has built up to Alter and the characteristics of this personal network. The variables are attributal. This involves that the data will not be collected from other sources than the individual respondent himself. I describe Ego's network through the eyes of Ego himself, not through the other persons who constitute his/her personal network (to whom Ego has built up relations). In this lies an implicit assumption that Ego is rational and strategic in his networking behavior. Ego makes contact with the kind of Alter he needs in order to gain access to resources. Network structures are then not viewed as forced upon Ego, but as a result of Ego's own actions and behavior. Realistically, too much attention is then paid to the prospective entrepreneur's own rationality and ability to form his social network.

The ego-centered approach and the assumption of the focal actor have consequences for how to position this study in relation to other network studies of entrepreneurship. The strict focus on Ego's ties and relations to Alter in his/her role-set makes

this study more undersocialized than for instance Aldrich et al. (1986;1987) who also include relations among Alter. In focusing so strongly on Alter's attributes and how Alter is related to Ego, we lose the social context that emerges between Ego's network members and which also may affect Ego. This is not a study of how total network structures - composition measures such as density, diversity, reachability - channel valuable information and other resources into the focal actor. This is a study of how Ego's ties to his/her network members are conducive to resource acquisition. The choice here has been to get a more detailed picture of who Alter is, i.e. which attributes he/she possess, and how Alter is related to Ego as these aspects have not been given priority in earlier studies.

5.3 Variables

In this section, the variables in the model are defined. The individual resources are defined in section 5.3.1, social network dimensions in 5.3.2, business resources in 5.3.3 and start-up in 5.3.4.

5.3.1 Human capital dimensions

There are three kinds of individual resources in the model. One kind of resource is assumed to be inherited from the prospective entrepreneur's family. Another kind is related to the entrepreneur's education prior to start-up, and the third is related to the entrepreneur's work-experience. This distinction is showed in Figure 5.3.1.1 below.

Human capital

Family related	Educational	Work-experience
Self-employment in the family	Business education Level of education Education diversity	Technical experience Earlier self-employment Industrial experience

Figure 5.3.1.1 Types of human capital variables.

As it will be interesting to distinguish between the relative impact of each of the variables within educational and work-experience related human capital, I will not treat family related, educational related and work-experience related human capital as three latent variables, with the variables mentioned in figure 5.3.1.1 as indicators. Instead the seven variables will be kept as they are and in addition add age as a human capital dimension. The theoretical definition of the eight human capital variables follows in figure 5.3.1.2 below.

Content	Self-employment in the family	Business education	Level of education	Education diversity
Definition	Degree of self-employment by the prospective entrepreneur's mother, father, siblings.	Degree of business education beyond junior high school level	Level of education beyond junior high school level	Number of dif. types of education beyond junior high school level
Content	Technical experience	Earlier self-employment	Industrial experience	Age
Definition	Degree of prior work experience involving same production techniques as involved in the planned project.	How many times the prospective entrepreneur has been self-employed.	Degree of work experience from different industries related to the prospective entrepreneur's project	The respondent's age.

Figure 5.3.1.2 Definition of eight individual resources.

5.3.2 Social network dimensions

As stated in section 3.3, there is a need for distinguishing between structural, attributal and interactional dimensions of a prospective entrepreneur's social network. These reflect different dimensions of a network and may affect resource acquisition in different ways. Structural variables to be included in this study are: size, defined as the number of persons a prospective entrepreneur has made contact with regarding his planned business; range is the number of different attributes of Alter in the network, i.e. the number of different statuses which are represented.

In revealing the attributal aspects of social network, Birley's (1985) distinction between the formal and informal part is useful here¹⁷. Birley saw the formal network as important for the entrepreneur responding to their specific requests but stated that the formal network is less useful in the business of diagnosing the business needs. The informal network, on the other hand, may be less informed about the options and schemes open to the entrepreneur, but more willingly to listen and to give advice (Birley, 1985). In order to distinguish more between network sources I turn to a classic contribution in network analysis, Boissevain (1973), who, in order to find borders for network, introduces the concept of zones of intimacy. The inner zone of Ego's network consists of the persons that are closest to him, the next zone consists of relatives and friends. The outer zone consists of persons one barely knows and with whom one interacts now and then, if only very formally.

Applied to the industrial setting in this study, closest to the prospective entrepreneur are likely to be other business starters, like fishermen, other cod-farmers and salmon farmers. It is to them that he is likely to turn first when needing reaction to his business ideas and later for practical help with fishfarming. The second zone, will be industrial actors, such as suppliers and customers. Applied here this will be fish buyers, sales persons in the organizations, researchers and direct consumers. He

¹⁷ Formal sources included banks, accountants, realtors, Chamber of Commerce or the Small Business Administration. Informal sources included family, friends, previous colleagues and previous employers.

interacts with these on a basis that has more to do with the upcoming business. In the third zone are people who have a status representing service for the prospective entrepreneur regarding start-up. These relations may be kept up by talking on the telephone, having a short meeting and interactions on a rather formal basis. What distinguishes the zones is that they represent different statuses or attributes. The collegial zone consists of Alter with attributes as a business starter. The industrial zone consists of Alter with attributes related to the industry in which the prospective entrepreneur is to start his business. The service zone consists of Alter who primarily have a role of assisting the entrepreneur in his effort to start his firm. The prospective entrepreneur is assumed to need Alter from the three zones during the process, but for different reasons and not all at the same stage of the process. The three zones, collegial, industrial and service, represent the degree of frequency and formality in the interactions; we may call this social distance. Figure 5.3.2.1 shows his below.

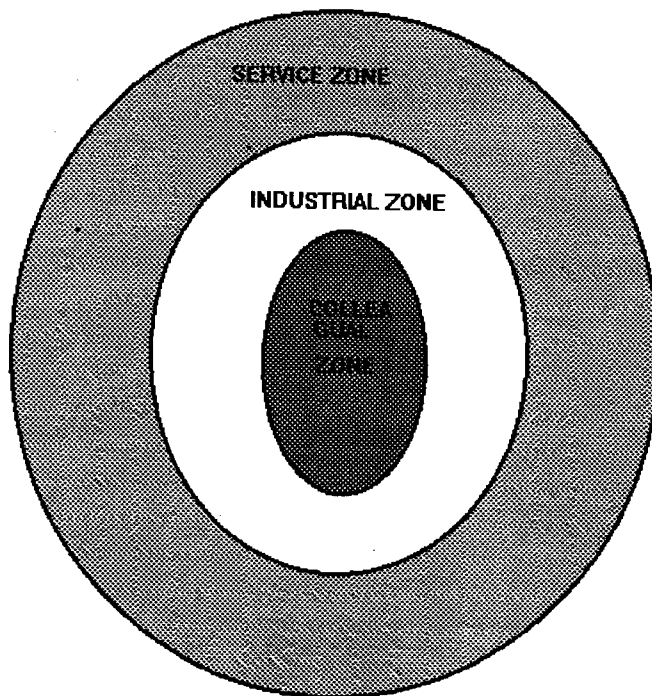


Figure 5.3.2.1 Zones in a prospective entrepreneur's personal network.

In addition to distinguishing between the three mentioned characteristics of Alter, industrial actor and service sector, a fourth dimension is used in this study. Multiple attributes is a dimension that characterizes the degree of possession of several attributes within or across the three zones. The average number of Alters' attributes in Ego's network tells us whether the network members have diverse statuses or not. This dimension may be an important aspect of Alter: which effects on resource access does it have that a prospective entrepreneur communicates with a network member who is, for example, both a business starter, employed in a research institution and is a local politician ? Multiple attributes are then the extent to which a network member occupies different professional statuses. Common for the four mentioned dimensions is that they all describe attributes or a degree of attributes of the members in a prospective entrepreneur's network. These types of network variables will be labelled characteristics of Alter. These dimensions tell us nothing of the relationship to Ego. The zone division is done purely to group Alter according to categories in the network, assumed to be based on a social distance to Ego.

Let us move over to the interactional characteristics (Mitchell, 1969) of social networks, by which Alter is related to Ego. The essence of interactional characteristics is that they can describe ties which are assumed to be more strongly related to Ego, as the interaction between Ego and Alter is based on roles. Roles, such as kin or friends are assumed to strengthen the ties to Ego. Kin and friends may play an important role in informal resource gathering due to the rural setting in this study. Traditionally, there is a belief that social networks function better in rural than in urban parts of societies (Finset, 1986). The belief is that well arranged and small local communities are assumed to give the best conditions for interaction between people. When considering the setting in this study, where respondents come from peripheral municipalities with low mobility, many inhabitants have married within the municipality so that kin are close by. In a study of kin and neighbor relations in a small island community in Northern Norway, Midré (1978) found that out of the 45 households where one or both of the adults came from the island, all of them had kin on the island which implied a high degree of social contact. This daily contact resulted in networking relations where information and support were exchanged and

practical help was given. A norm of reciprocity was predominant. If the norm was not adhered to, the contact and exchange relations would no longer exist after a while. Applied to this study, it therefore seems worthwhile to test how important roles such as kin and friends are for these prospective entrepreneurs compared to other parts of the network where Alter serves the prospective entrepreneur in terms of his attributes. Research that supports the hypothesis that kin and friends may play an important role in the networks of the respondents in this study, has been based on network differences between classes (Holter, 1973). Holter finds that studies seem to indicate that the working class network is more attached to the locality, it is smaller, denser and contains more kin than the network of the middle class. Social mobility seems to be associated with a small kin network. A setting characterized by low mobility and the fact that Norwegian entrepreneurs appear to locate their firm where they live (Waagø, 1979), should give structural conditions to justify using kin and friends as resource pathways.

The distinction between attributes and roles in this study, makes it possible to include a second interactional characteristic: the concept of multiplexity which refers to links which contain more than one content (Gluckman, 1962). Multiplex relations are also called multi-stranded relationships, because they are structurally represented by parallel arcs linking two actors, i.e. one arc representing a kinship link and one arc representing economic assistance (Mitchell, 1969). In this work, we define multiplex relations as multistranded links where Alter is tied to Ego both through his attribute and through his role. If an attribute such as cod farmer (colleagual zone), fish buyer (industrial zone) or employee in the Fisheries Extension Office (service zone) is combined with being related to Ego through a role as close friend, spouse or other family-member then this multiple tie is assumed to be more strongly tied to Ego, than otherwise¹⁸. People acting and interacting in a multi-stranded relationship are less

¹⁸ The distinction between multiplexity and strength of a tie may seem somewhat blurred. The definition of the strength of a tie is "a (probably linear) combination of the amount of time, emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter, 1973:1361). It is reasonable to view multiplexity as one dimension of the strength of a tie, as one may argue that the higher the multiplexity of a tie, the higher the intimacy of that tie. However, it is analytically important to distinguish between these two concepts as strength of a tie is a more complex concept consisting of many dimensions and therefore also a more ambitious measure. This seems also to be

likely to be able to withdraw completely from contact with one another compared to people in single stranded relationships (Mitchell, 1969). Theoretically, those ties should have a greater potential in offering resources when the actor is more strongly related to others. The strength of multiplexity compared to kin/friends is that it attaches Ego to the network zones. In that sense multiplexity overcomes the weakness of kinship ties. It opens for interaction with network members who possess attributes which are important in generating resources on which the prospective entrepreneur depends.

To sum up: Our network dimensions are of three different types: one that describes the structural characteristics of the social network in terms of its size and its range; and roles and multiplexity that describe the interactional aspects of the relations. Attributes in zones 1, 2 and 3, and multiple attributes describe the characteristics of Alter. Figure 5.3.2.2 shows this distinction.

Social network

Structural characteristics	Interactional characteristics	Attributal characteristics
Size Range	Multiplexity Kin/friends	Colleagual zone Industrial zone Service sector Multiple attributes

Figure 5.3.2.2 Three types of social network variables

Again, the relative impact of each of the variables under each of the three dimensions will be assessed as the eight dimensions are kept as separate variables. Figure 5.3.2.3 shows the definition of the eight network variables.

in accordance with Granovetter, who in a footnote in his article refers to Simmel (1950) and states that although multiplexity in some circumstances indicates a strong tie, in others it do not. Ties with only one content or diffuse content may be strong as well. "The present definition would show most multiplex ties to be strong but also allow for other possibilities" (Granovetter,1973:1361).

Concept	Colleagual zone	Industrial zone	Service sector
Definition	Actors having an attribute that represents a business starter.	Actors having an industrial attribute.	Actors performing services which are publicly/privately financed and provided
Concept	Kin and friends	Network size	Network range
Definition	Actors having roles towards Ego.	The number of Alter in Ego's network	The number of different attributes covered in Ego's network
Concept	Multiple attributes	Multiplexity	
Definition	Average number of Alter's attributes	Degree of multiple ties, where Alter is tied to Ego through both a role and an attribute.	

Figure 5.3.2.3 Definition of eight network dimensions.

5.3.3 Resource dimensions

Starting a business requires more resources than the prospective entrepreneur controls. The lacking resources may be called complementary assets (Teece, 1987) which consist of capital, production equipment, labor, suppliers and customers.

How can we make an analytical distinction between the various assets ? A general distinction is between affective, informative and material resources (Foss, 1989).

Within these three categories, resource dimensions assumed to be needed in the process from idea to start-up of a firm can be defined. This is also in accordance with Kanter (1983) who uses the concept "organizational power tools" which consists of three basic commodities: information (data, technical knowledge, political intelligence, expertise); resources (funds, materials, space time); and support (endorsement, backing, approval, legitimacy).

Are there earlier operationalizations from network researchers that we can use ? Whereas Birley (1985) did not operate with a theoretical distinction between resources, Reese (1992) operationalized resources as four kinds of assistance: 1) Legal assistance; 2) financial and accounting assistance; 3) help with business loans or business financing; 4) assistance from someone with experience in the same kind of business. This list can easily be augmented. In keeping the general distinction - affective, informative, and material - we can discern between the informative versus the material by saying that every resource needed which is concrete in nature, such as financing, labor, production equipment and sale, is defined as a material resource. Resources that are less concrete in their nature, like advice on the public bureaucracy, assistance with accounting and budgeting and assistance on "how to produce", meet the criteria for being various dimensions under informative resources. Then, encouragement and constructive criticism are dimensions under affective resources (Foss, 1989). Figure 5.3.3.1 shows the dimensions according to the three different types of resources.

Business Resources

Affective	Informative	Material
Encouragement Constructive criticism	Advice on bureaucracy Advice on accounting/budgeting Advice on technology	Financing Production resources Labor Sale

Figure 5.3.3.1 Types of resources.

Here, affective resources are viewed as a concept with two indicators (encouragement and constructive criticism) whereas the other variables are treated as being separate. The definition of the eight resource dimensions mentioned above is given in figure 5.3.3.2.

Concept	Affective resources	Adv. bureaucr.	Adv. acco&budg.	Adv. on technology
Definition	Degree of support for the potential entrepreneur's idea of starting a business	Degree of advice on how to handle the bureaucracy	Degree of advice on accounting and budgeting	Degree of advice on production equipment and production
Concept	Financing	Labor	Prod. resources	Market/sale
Definition	Degree of access to financing	Degree of access to labor	Degree of access to production resources for start-up	Degree of access to the market - sale of the product

Figure 5.3.3.2 Definition of eight resource dimensions.

5.3.4 Start-up

As stated in chapter two, the dependent variable in the study is start-up, i.e. the likelihood that a prospective entrepreneur comes to the point of start-up. What are the theoretical dimensions of start-up of a venture? When is a firm actually started? Theoretically, the entrepreneurial process may be viewed as a continuum from idea to start-up. Ganes (1982) developed a model which is cited in figure 5.3.4.1.

Stages: Idea stage → Planning stage → Business stage

Activities:

<u>Cognitive/expressive</u>	<u>Action</u>	<u>Implementation</u>
Wish to start a firm	Planning	Physical establishment of the firm
Developing and processing of ideas	Information - gathering	Production
	Contact with actors in the environment	Sale

Mark the transition between stages:

↑
To move process from the cognitive element to practical action

↑
Registering of the firm

Figure 5.3.4.1 The entrepreneurial process.

Source: Ganes (1982)

Ganes emphasizes that the model is an ideal one and that the stages do not necessarily come in the order shown in the figure above. Applied to the setting in this study, however, it is reasonable to assume that the individuals do start out with an idea that emerges into planning and then ends in implementation. The argument is that the business idea is relatively concrete and does not need many revisions. Further, it seems as if prior network research has also made an implicit assumption that planning follows the business idea, and that implementation follows planning. (Aldrich, et al. 1986).

Since start-up, and not stages, is the dependent variable, what is the analytical distinction between a starter and a non starter ? My suggestion here is that this distinction must be based on whether some activities along this entrepreneurial process are performed or not. This is also in accordance with Reynolds and Miller (1992) who, in their model for identifying the beginning of firms, introduce the concept of gestation markers based on dimensions such as personal commitment, financial support, sale and hiring. Their study of over 3000 firms indicated that if only one event should be used as an indicator for conceptualizing "birth" of a firm

it would be the date of first sales by a firm. However, since the enterprise in the setting in this study involves producing over a time span - and the actual running of a fish farm - before the "product" has reached market size and is technically for sale, we cannot have sale as a criterion for start-up. What signifies the starting of a cod farm is more realistically that the actual production has taken place, i.e. that the fish is put into cages.

In applying Garnes' (1982) model to our setting, the activities involved and the degree to which they distinguish between starters and non-starters are shown in figure 5.3.4.2 below.

	Non-starters	Starters
Wish to start a firm	X	X
Development & processed business idea	X	X
Planned acquired information	(X)	X
Made contact with relevant actors	(X)	X
Established the physical firm	(X)	X
Started production		X

5.3.4.2 Theoretical distinction between a non-starter and a starter.

The X's denote that the activity is undertaken by the starter or the non-starter, the (X) means that the activity is not a necessary acquisition, i.e. the non starter may drop out at an early or late stage in the process.

To conclude this chapter: The perspective given here is that entrepreneurship is a process over time. In explaining this process - that some out of a population of prospective entrepreneurs are successful in starting their firm - the theoretical perspective in this thesis uses a combination of individuals' own resources and the resources available through a social network. In a life cycle model, the earliest

factors in time order are supposed to be subsumed by factors appearing later in temporal order. Therefore human capital is only hypothesized to help prospective entrepreneurs to build social networks. And social network is only hypothesized to give access to business resources. The factor that is hypothesized to incorporate all effects from prior variables is business resources.

In defining the variables in the model, 8 human capital variables, 8 social network variables and 8 business resource variables were defined. The path model then consists of 24 explanatory variables, of which only 8 (business resources) are assumed to have a direct effect on the dependent variable start-up in this study. The other 16 variables (human capital and social network) are assumed to have only an indirect impact on start-up, working through their effect on business resources.

Let us now move on to hypothesize how the theoretical dimensions in each block are assumed to affect one another.

6. Hypotheses

In this chapter hypotheses will be developed. The complex path model with the 24 explanatory variables in blocks, where there are eight variables in three blocks which follow one another, makes a simplified structure for the development of the hypotheses necessary. I will mainly discuss and argue for each block's impact on the next block in the model; either how one independent variable in one block affects all variables in the next block (as in 6.1) or how one dependent variable in one block is affected by all variables in the block that precedes it (as in 6.2). This is not an ideal way to present the theoretical logic behind each path/relation, but is unfortunately a necessary simplification due to the fact that human capital, social network and business resources each contain eight variables.

6.1 Dependent variable: Social network (H1-H8)

In this section I will start out with each exogenous variable and, in one hypothesis, predict how the human capital variables will affect the social network variables in the succeeding block.

Age

A spontaneous hypothesis would be that age has a positive effect on social network. The longer a person has lived, the more people he has met; the more friends he has and long work experience will probably result in a wider range of network members. The life experience of older people will give them a broader base of social contacts, which again may be used for entrepreneurial purposes.

However, when education, work experience etc. are controlled for, there is no longer an obvious reason why age should affect social network positively. On the contrary, a reasonable hypothesis would be that age affects social network negatively. A one year increase in age when education, work experience etc. are held constant would mean that a person has to use relatively more energy in networking. The network variables which can be affected by a person's human

capital are as stated in section 5.3.1: number of business starters, number of industrial actors and number of persons in the service sector, number of kin and friends, multiplexity, size, range and multiple attributes. I would argue that all of these variables reflect the fact that either it is necessary to make one more tie or that any tie would require more time and effort as multiplexity and multiple attributes are multistranded ties. The hypothesis is therefore:

H1 Age has a negative impact on the collegial zone, industrial zone, service sector, kin and friends, multiplexity, size, range and multiple attributes.

Are there any empirical studies that support this hypothesis ?

Empirical support for the negative impact of age on social network can be found in a broad range of literature. In his study of core discussion networks of Americans, Marsden (1987) found that, in a bivariate examination of subgroup differences by age, network range was greatest among young persons. In their research note on "Friendship, Gender and the Life Cycles", Fisher and Oliker (1983) found that from age 65, men and women experienced a reduction in their social ties. Women at this age had considerably more friends than men, despite the decline in the number of ties. This interaction effect (friendship of men and women are conditional upon stage in the life cycle) gives even more support for the hypothesis in this work, since our data are from a male dominated industry. In a study of the social network of the elderly, the overall network size was 3.37 among the youngest group (age 18-34), 3.07 among the middle age (35-64) and 2.18 among the oldest group (65 and over) (Chung-Lee, 1991). Blau's study of survey data from two communities showed that the extent of friendship participation¹⁹ declined with age (Blau, 1961). In a study of entrepreneurial networks, Reese (1992) found that age reduced network size by 1 % for each year.

¹⁹Measured by an index, a score based on the following three items."How many really close friends do you have here in town that you occasionally talk over confidential matters with"? "How often do you get to see the friend that you know best in town ?" "Would you say that you go around with a certain bunch of close friends who visit back and forth in each other's home?"

Business education

We expect, based on the human capital theory, that business education is an important skill that increases the prospective entrepreneur's chances of actually starting his firm. How can business education affect social network? We expect that an individual with a formal education in business is capable of developing a more effective network for start-up, i.e. a large network with a wide range of network members. Business education is also expected to make the prospective entrepreneur more capable of making ties to the more formal, professional parts of the social network. We also expect him to be able to make ties to persons with multiple attributes. The hypothesis is:

H2 Business education has a positive impact on the industrial zone, service sector, size, range and multiple attributes.

Level of education

How does the level of education affect the individual's ability to build a social network? The general hypothesis here is that level of education will have a positive impact on those network variables that require some analytical background to establish. I assume that making ties to the parts of network that are furthest away, i.e. that represent the more formal and professional part of the social network, requires analytical skills. As Kolvereid and Skår state: "Resourceful individuals may also find it easier than others to communicate and create networks" (Kolvereid and Skår, 1987:10). The hypothesis is that both ties to industrial actors and to persons in the service sector will be positively affected by the level of education. In addition to this, I also assume that the structural variables (size and range) will be positively affected by the level of education, and also that more educated individuals make ties to network members with multiple attributes.

A study by Gurevich (1961) supports our size hypothesis. 26 adults were studied over a period of 100 days in order to ascertain the number of contacts they had with others. The mean varied by status-group: blue-collar workers had 225

different contacts, house-wives 273, white-collar workers 426 and professionals had 558. Another theoretical argument, that also has some empirical support may justify these hypotheses: research on homophily refers to the tendency for similarity in various attributes among persons who affiliate with each other (Lazarsfeld and Merton, 1954). Studies have shown that individuals seek to make friends with people similar to themselves. Applied to our case, we may therefore expect that those with a high level of education are more capable of affiliating with the second and third zone, for the reason that these individuals will be more similar to themselves compared to people with a lower degree of education. The hypothesis is therefore:

H3 Level of education affects the industrial zone, service sector, network size, network range and multiple attributes positively.

From the entrepreneurial studies, Kolvereid and Skår (1987) found support for their hypothesis that resourceful entrepreneurs have larger networks than less resourceful ones. Education was positively correlated with the number of people in the network. However, education was significantly negatively correlated to the proportion of business relationships, which does not give empirical support to our hypothesis of education positively affecting the number of ties to industrial actors. Furthermore, a finding in some of the recent entrepreneurial studies also supports the hypothesis. Reese (1992) found that graduate education had a positive, albeit not a significant effect, on resource path²⁰. Her interpretation of this is that business people with graduate degrees knew a greater variety of resourceful people and included them in their network. This indirectly supports the hypothesis of how the level of education affects network size, range and multiple attributes.

Education diversity

This variable reflects a variety of educational experience that is assumed to have a positive impact on various network dimensions. This is one of the new variables

²⁰Resource path is an exploratory scale developed by weighting types of access to four resources used (Reese, 1992: 55).

suggested to be taken into account in addition to level of education. Education diversity affect the same network variables as level of education. In addition, a reasonable hypothesis is that education diversity also affects multiplexity. The more diverse an education a prospective entrepreneur has, the more arenas he has entered in which he could make friends with persons to whom he is tied through an attribute.

H4 Diversity of education has a positive impact on the number of ties to the industrial zone and service sector, multiple ties, size, range and multiple attributes.

Technical work experience

Technical work experience is assumed to be effective for developing the social network. Familiarity with production techniques appears to make it easier to seek information and advice through social relations. In the setting of this study, technical work experience is assumed to be especially relevant for networking, since it reflects work experience - with Danish seines - that is carried out on a seasonal basis on larger boats involving a different work environment and with other professionals and people from other places compared to small boat fishing. How will this work experience affect networking ? Since this technical work experience is gained on larger boats where different professionals from more than one region are usually seasonally employed, this is a very conducive environment for making ties to people from whom the prospective entrepreneur can seek assistance when starting cod farming.

The hypothesis is therefore that technical experience will have an effect on the number of other business starters, since the prospective entrepreneur will have work-experience from working together with these other professions. The experience is likely to make him/her more capable of making ties to other industrial actors. The prospective entrepreneur will, through this experience, have a background for making multiple ties, and the size and range of the network is likely to be larger. It is likely that he will have a greater chance of using

"relevant" friends in his project.

H5 Technical experience affects the collegial zone, industrial zone, kin and friends, multiplexity, size, range and multiple attributes.

We do not have any direct empirical support here. However, Johannisson (1990) found that technical training was significant in predicting success. This of course only supports a direct effect from technical experience to start-up. The hypothesis here, however, is that this relationship may be indirectly mediated by social network and business resources.

Degree of earlier self-employment

In the human capital tradition, former experience as business starters is viewed as an important background for entrepreneurship. The main hypothesis here is that former experience may give the prospective entrepreneur a relevant background for making ties to persons who possess important resources. In earlier studies, self-employment is operationalized dichotomously: whether the respondent has been self employed or not. Can we think of earlier self-employment as a continuous dimension ? Is there any variation in networking behavior among respondents who have been self-employed once, and those who have been self-employed twice ? How may experience actually affect the network which a prospective entrepreneur is building ? Experience as earlier self-employed makes it more likely that the prospective entrepreneur makes contact with other business starters, industrial actors, and the service sector. He will know parts of the network from his earlier experience, especially if the earlier self-employment has been within a related industry. If his prior self-employment is from a totally different industry, he will still have some advantages due to the fact that he has actually set up a business before. It is also likely that he will involve kin and friends in his project as they will know his earlier projects. The possibility of making multiple ties are also greater. We also expect larger size, range and that the prospective entrepreneur with a high degree of self-employment also has the ability to involve individuals with multiple attributes.

H6 Degree of prior self-employment affects collegial zone, industrial zone, service sector, kin and friends, multiplexity, size, range and multiple attributes.

Industrial experience

Industrial experience is supported for having a direct impact on venture success (chapter 4). Which mechanisms justify a hypothesis that industrial experience works indirectly ? The argument here is that the greater the industrial experience is, i.e. the more diverse relevant working experience one has, the greater the chance of actually knowing the relevant parts of the network needed for starting a business. Applied to this setting, individuals who have either been fishermen, fish farmers or worked in the fishing industry, will have an easier task in making ties to colleagues the service and industrial sectors. Their experience is likely to have given them knowledge about the three different zones, and about what ties need to be built. Industrial experience is also a good background for being able to make many ties (network size) and many different ties (network range). Prior industrial experience makes it more likely that some of the ties may be multiple. Persons occupying roles as kin and friends will be natural helpers in this process, since they may have been involved in the prospective entrepreneur's prior projects. In addition, prior industrial experience may make it more likely that the prospective entrepreneur is able to make ties to persons with multiple attributes.

H7 Industrial experience affects the collegial zone, industrial zone, kins and friends, multiplexity, size, range and multiple attributes positively.

Self-employment in the family.

It is a well known finding that entrepreneurs tend to come from families where the father has been self-employed (Waagø, 1979). In empirical tests of human capital theory, we have seen that the father's self-employment only had a significant impact on success bivariately, but when other factors were controlled this effect disappeared (Brüderl et al., 1991). The hypothesis in this work is that self-employment has important indirect effects on start-up through its effect on

enhancing the prospective entrepreneur's network. The argument is that self-employment in the family "produces" a special social resource on which the prospective entrepreneur can draw. As a departure from earlier research, the dimension focused on here is the degree of self-employment in the family, where siblings' self-employment is added to the self-employment of the parents. The variable here is assumed to work linearly on the network dimensions: the more self-employment in the family, the richer potential for them to be useful supporters for the entrepreneur and also to make him capable of building a more effective social network.

The hypothesis is therefore that the more self-employment in the family, the larger the number of kin involved in the process. The number of multiple relations will also increase, because the prospective entrepreneur is likely to be tied to persons in the different zones by a kinsman. Since this study takes place in a rural setting, it is likely that the kin of Ego will occupy statuses such as fishermen, fish farmers, fish buyers, and even local politicians. The chance of being related to persons with those attributes through a kinsman is therefore high.

Are there reasons to assume that self-employed parents and siblings make the prospective entrepreneur more capable of developing an "effective" network for business purposes than individuals who do not have this background? May talking about and discussing business matters at home give the prospective entrepreneur knowledge that later will trigger a better capability of constructing a business relevant network? The idea is that the early socialization process and the experience to which siblings expose one another may enhance the prospective entrepreneur's capabilities of developing useful contacts. I therefore expect that self-employment in the family will give the prospective entrepreneur skills in making contact with the "right" persons: the hypothesis is that the prospective entrepreneur makes more ties to other business starters, industrial actors, persons in the service sector, and has a larger and wider network and one with a high degree of multiple attributes.

H8 Self-employment in the family has a positive effect on the collegial zone, industrial zone, service sector, kin and friends, multiplexity, size, range and multiple attributes.

The present author has not found any direct empirical support for this hypothesis. However, some findings from prior research may support the kin/friend and multiplexity hypotheses. In a study by Greve and Foss (1991), where 46.8 % of the respondents had fathers running a business and 20 % had mothers running a business, the respondents indicated three contexts in which their five primary contacts were established: family connections (20.17 %), friends (29 %) and work or business contacts (42.16%). The authors were surprised by the high number of contacts originating through family connections and proposed that it is a likely result of the respondents' background. Gattiker and Greve (1992) did not find support for their hypothesis that the stage in the entrepreneurial process had a negative impact on the number of family among the network members. In other words, their results seem to indicate that family members were more of a constant size throughout the idea-, planning-, and implementing stage. This supports the notion that kin and friends and multiple ties are necessary throughout the process. Interestingly, self-employed parents did not increase the number of family among the network member, nor did a self-employed father. What did receive support was that those respondents who had a self-employed mother were more inclined to use family members in the entrepreneurial process. This at least supports the notion that mothers should be included in this analysis, and suggests that female siblings may have an impact.

A summary of the hypotheses of human capital dimensions affecting social network dimensions is given in figure 6.1.1.

	Colleagu. zone	Industr. actors	Service sector	Kin friend	Multiple-xity	Size	Range	Mult. attrib.
H1 Age	-	-	-	-	-	-	-	-
H2 Bus.		+	+			+	+	+
H3 Educ.		+	+			+	+	+
H4 Educ.		+	+		+	+	+	+
H5 Tech.	+	+		+	+	+	+	+
H6 Self.	+	+	+	+	+	+	+	+
H7 Indu.	+	+		+	+	+	+	+
H8 Self.	+	+	+	+	+	+	+	+

Figure 6.1.1 Hypoteses of human capital affecting social network.

Regarding the effect of a prospective entrepreneur's human capital on his ability to build a network, the theory to be proposed in this work is that educational, work experience and family-related human capital dimensions have a somewhat different impact on the various social network dimensions. Educational human capital is only assumed to have an impact on the part of networking which appears to require some analytical skills, i.e. a large and wide ranging network with Alter with multiple attributes and with many ties to the two zones furthest away. Experience related human capital, on the other hand, is assumed to have an impact on both interactional, structural and attributal network variables, however with some weaker impact on Alter with attributes in the third zone, furthest away from the prospective entrepreneurs. Family related human capital is assumed to be general human capital which affects all social network dimensions.

6.2 Dependent variable: Business resources (H9-H17)

In this section, hypotheses about the impact of the social network on access to resources will be developed. As stated in chapter 3 this relation has until now (except for Reese, 1992) not been tested. The argument has been that network influences start-up through the resources to which they give access. In this section we specify how different aspects of the network, both structural, interactional and attributal, give access to different resources. The structure of organizing the hypotheses is to find the number of social network variables which predict a given business resource.

Affective resources

One type of resource, often mentioned as necessary for a prospective entrepreneur, are so-called affective resources, i.e. positive feedback and encouragement. The idea is that prospective entrepreneurs with new business ideas need immediate support, in terms of encouragement and constructive criticism, in order to move forward in the entrepreneurial process. (Foss, 1989).

Regarding structural variables, both size and range are assumed to have a positive impact. The more persons involved, and the more different they are, the better the structural condition for a diverse set of people to give Ego encouragement and feedback on his ideas. Reese (1992) stated a general hypothesis that supports this assumption: "The larger the network, the greater the probability that specific resources can be reached" (Reese, 1992:163). Of the interactional characteristics, both kin/friends and multiplexity are assumed to be conducive. Kin and friends are closest to Ego, and these relationships will contain a high degree of trust, intimacy and commitment. Such ties will be conducive for feedback at the initial stage. Multiplex ties are also assumed to be positive as they, due to being based on both attributes and roles, tie Alter closer to Ego. Kin/friends and multiplexity are interactional network dimensions which will support the prospective entrepreneur in his/her ideas and plans. We can support this hypothesis by recalling Lee's study (1969). She showed that for information that really

required trust, most of the respondents used very short paths, i.e. they seldom went further than their closely knit network.

What attributes of Alter may be conducive to generating affective resources ? Is Alter, regardless of attribute, equally capable of giving affective resources? My prediction is that since this resource is assumed to be needed relatively early in the process, then those parts of the personal network that the prospective entrepreneur is assumed to deal with at that time is the predominant Alter with this resource potential. One group of the personal network with which I expect Ego to interact first and to ask for opinions and discuss his business plans, are other business starters. Applied to the setting in this study, this is a reasonable hypothesis, since Norwegian fish farmers traditionally are known for communicating with one another and for their eagerness to learn and bring the technology of a new industry further. A quotation from a Norwegian study of the fishing industry may illustrate this point:

"The growth in the fish farming industry may be explained as a result of a social process, where fish farmers exchange knowledge and develop role models for newcomers" (Jentoft, 1991:95) (my translation).

Theoretical support for the effects of other business starters on affective resources can be found in the studies of homophily. The notion of homophily has been used to explain why individuals tend to be most influenced by individuals who are similar to them (Kandel, 1978). Applied to our case, this supports the notion that the prospective entrepreneur turns to those persons in the network he feels most similar to - in order to ask for opinions on his ideas. Persons in the first zone, other business starters, are truly the group within the network that is most like to him, and therefore a group he may turn to, to seek advice on ideas.

However, also the service sector, the more distant and formal part of a prospective entrepreneur's network, may serve him in supporting his idea. Since this study takes place in Norway, where the state traditionally plays a large role in designing the shape of industries, and where small businesses leaders may turn to a variety

of governmental and privately funded service institutions (see study of Ulset & Reve, 1983), we would expect that contact with the service system would increase affective resources. In Birley's study, the respondents did not use much of this more formal part of the social network (Birley, 1985). It would be interesting to test the effect here, as we believe that the general services initiated and provided by the government would result in an effective support system. We therefore hypothesize that 6 of the 8 network dimensions have a positive effect on access to affective resources:

H9 Size, range, kin/friends, multiplexity, collegial zone and the service sector have a positive impact on affective resources.

We have no direct empirical support for these hypotheses as affective resources as a "result" of networking has not been focused on before. However, the kin/friends and multiplexity hypothesis may be supported indirectly by recalling that Birley, Cramie and Myers (1990) found that an owner-manager's primary contact was more likely to be a member of his family or a friend than his secondary contacts. When family and friends were combined as social contacts, 46 % of the members of the owner-manager's network fell into this category. Also Greve and Foss (1991) reported that the respondents, when indicating in what context their five primary contacts were established, had the three following groups: family connections (20 %), friends (29 %) and work or business contacts (42 %). When adding family and friends together, 49 % of the network was established in the context of what we here label kin/friends. These studies show that kin/friends are an important part of an entrepreneur/owner-manager's network. The hypothesis here is that kin/friends support the prospective entrepreneur with affective resources.

Informative resources

In an exploratory study of how information is acquired in five small businesses, Sørli (1982) concluded with the following proposition:

"Small business leaders are often strongly attached to their local environment, and depend on a well developed personal network. Learning and information gathering do happen within a socially based network. The most important contacts we find among business connections and other business leaders. Through their personal network the leaders receive a stream of unrequested information which is specially arranged/designed for the actual situation in the individual business" (Sørli; 1982:92) (my translation).

This proposition may be viewed as a basis for the hypotheses constructed in this section. Here we are interested in hypothesizing how each of the individual network dimensions may generate relevant informative resources.

The need for informative resources is assumed to follow after the initial motivation stage. In order to move forward in the entrepreneurial process, the prospective entrepreneur needs information about how to handle the bureaucratic side of starting a business, how to do budgeting and accounting, and the production aspect of an enterprise. Three types of informative resources are to be predicted through different network dimensions.

Let us start with advice on handling the bureaucracy. In addition to size (support from Reese, 1992), range and multiplexity, multiple attributes are also assumed to have a positive impact. The more different attributes a network member has, the more likely is that he/she will have a varied work experience, which again may affect his/her ability to handle bureaucratic issues. Regarding the attributal aspect of network, colleagues, who themselves have been business starters, support the prospective entrepreneur with information about how to handle the bureaucracy. In addition, kin and friends are assumed to serve the same function. However, the largest impact is expected to come from the service sector, where professionals have an assistance function towards entrepreneurs.

H10 Multiple attributes, size, range, multiplexity, collegial zone, service sector and kin/friends affect advice on handling the bureaucracy positively.

The second informative resource is advice on accounting and budgeting. This is a more "narrow" resource, not given by all eight network dimensions. Size (Reese, 1992), range and multiplexity are expected to affect it positively. Regarding the attributal network dimensions, the service sector, in addition to kin and friends, is expected to be important. (I do not assume that colleagues of the prospective entrepreneur help him with accounting and budgeting, nor that he makes contact with the industrial zone in order to get this kind of advice).

H11 Size, range, multiplexity, service sector and kin and friends have a positive impact on advice on accounting and budgeting.

The third informative resource is advice on technology, i.e. information about what is needed to start production and the actual technology used. Again, this is viewed to be a specific resource, given by only one of the zones in Ego's personal network: the collegial zone. In addition, kin and friends are assumed to affect it positively. Of the structural dimensions, size (Reese, 1992) and range are assumed to affect it positively. The larger and more varied the network, the higher degree of advice on technology is likely to be generated.

H12 Range, multiplexity, collegial zone and kin and friends affect advice on technology positively.

To hypothesize that the social networks of prospective entrepreneurs in the cod farming industry are conducive to giving access to three different types of information, is reasonable as Norwegian fish farmers are known for being relatively altruistic rather than opportunistic. A quotation from a study of 21 pioneers in the salmon farming industry illustrates this argument:

"We may state that the fish farmers at least until 1985 were ahead of the researchers, although it should have been the other way round. And that was a result of the pioneer spirit which was typical in the very beginning. And the open relationships between people...people told one another things. This and this had happened and this and that they had done" (Osland, 1990:131) (my translation).

Financing

Financing is not supposed to be a narrow resource, to which access can only be gained by a part of the social network. A prospective entrepreneur can acquire financing through the public and private institutions that offer help to entrepreneurs. Clearly, we must assume a positive relationship between ties to the service sector and access to financing. In addition, kin play an important role in acquiring capital in cases where the enterprise is a family business, which will often be the case in cod farming. Then multiplexity is also a reasonable predictor as the interactional characteristic strengthens the ties between Alter and Ego. Since financing is not expected to be a narrow resource, size (Reese, 1992) and range are also assumed to affect financing positively.

H13 Size, range, multiplexity, service sector, industrial actors and kins and friends affect the degree of financing positively.

We have empirical support for the kin and friends hypothesis from Cooper and Dunkelberg (1986) who found that the most important source of financing for people who inherited businesses was loans from friends and relatives.

Production resources

Production resources are assumed to be a "narrow" resource given by the more informal part of the network. Size, not range, is therefore hypothesized to have an impact on production resources. Here we have theoretical support from Reese (1992). The attributal dimensions assumed to give Ego access to these resources are industrial actors and business starters, the two closest zones in the network. Of the interactional dimensions, multiplexity is assumed to affect production resources. The stronger the commitment between Ego and Alter, the larger the likelihood for a trade.

H14 Size, multiplexity, collegial zone and industrial actors affect production resources positively.

Labor resources

A reasonable hypothesis given the literature in the field is that help/assistance to run a small business is acquired through one's social network. Labor is expected to be a narrow resource, given access to through the closest ties to Ego. Alter who possesses interactional characteristics to Ego - having a role as kin and friends or being multiple ties - are assumed to be effective in giving access to labor. Kin are likely partners in family business, and close friends are likely to be the first ones asked if help is needed. Qualitative studies of fish farming careers support this argument (Spjelkavik, 1990). Multiple ties are assumed to have a positive effect as well since they bind Alter more strongly to Ego. Size predicts labor positively (Reese, 1992) whereas we expect range to affect it negatively. Net of other factors an increased range makes it less probable that any labor is received.

H15 Size, multiplexity and kin and friends affect labor positively. Range is assumed to affect labor negatively.

Access to the market

Market access is a "narrow" resource, assumed to be available only through the network zone that the prospective entrepreneur approaches when the need for material resources arises. Market access is assumed to be generated only by the industrial zone. The number of actors in this zone and the multiple ties Ego has to Alter in this zone, are therefore hypothesized to affect access to the market positively. As market access is a "narrow" resource, size, not range, is assumed to affect it. I expect the industrial zone to have the largest relative impact of the three variables.

H16 Size, multiplexity and industrial actors affect market access positively.

In Figure 6.2.1, a summary of the hypotheses developed in this section is given.

	Affective H 9	Adv. bureau. H 10	Adv. accob H 11	Adv. techn. H 12	Financing H 13	Labo H 14	Produc- tion H 15	Market H 16
Mult.attr.		+						
Size	+	+	+	+	+	+	+	+
Range	+	+	+	+	+	-		
Multiplex.	+	+	+	+	+	+	+	+
Bus.st	+	+		+			+	
Services.	+	+	+		+			
Industr.					+		+	+
Kin/friend	+	+	+	+	+	+		

Figure 6.2.1 Hypotheses of network's impact on resources.

More precisely, the relationship between structural, interactional and attributal aspects of social networks and the access to the affective, informative and material resources, are governed by some special mechanisms. As seen from figure 6.2.1 above, affective and two of the informative resources (bureaucracy and accounting and budgeting) and one of the material resources (financing) are assumed to be "broad" resources generated by at least two zones and roles as kin/friends. One informative and three of the material resources are assumed to be "narrow" resources generated only by one zone and/or kin and friends.

When resources are assumed to be "broad", range appears to be an efficient predictor, otherwise not. In general therefore, it is assumed that the affective and informative resources are less "network specific", whereas for material resources only some parts of the social network need to be activated.

If we take the temporal order of resources into consideration, the assumption is that interactional network variables - roles as kin and friends and multiplexity - are important for generating resources throughout the process. In this lies the argument that interactional network variables - roles and multiple ties - are assumed to be the strongest ties in the network and represent therefore the ties that a prospective entrepreneur can count on. This may be said to be "the strength of strong ties". According to Granovetter's theory: "strong ties have greater motivation to be of assistance and are typically more easily available"(Granovetter, 1982:211). Granovetter also states that strong ties are of less importance in bringing new information into a social system. In this model we see that multiplexity plays a larger role than kin/friends throughout the process. Multiplexity, as it is a combination of role and attribute, has a "weak ties component" (through attribute) that kin/friends lack. Therefore kin/friends are not assumed to be able to generate the latest resources needed in the process. The attributal variables are assumed to have their impact on various stages in the entrepreneurial process. The zone with the closest distance to Ego is assumed to play a role for giving access to resources throughout the process. The second closest zone to Ego serve him with resources in the last stage of the process, whereas the third zone is assumed to serve him with resources in the first and second stage. In other words, the informal part of the network is assumed to generate resources throughout the process, the formal part only through the first and second stage, and the industrial part activates resources close to start up. The theory therefore predicts that the necessary networking strategy is to use all three parts of the social network but for different resources and at different stages in the entrepreneurial process. Figure 6.2.2 shows this.

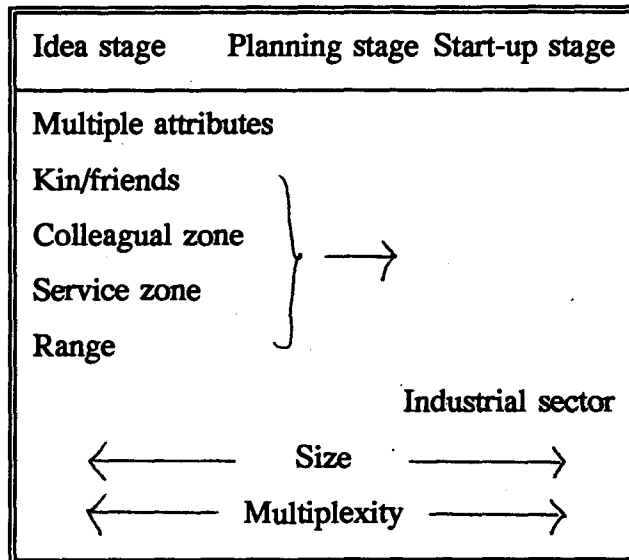


Figure 6.2.2 Network characteristics in the three stages of the entrepreneurial process.

We have now hypothesized the direct path between social network and business resources. According to the life cycle theory, social network fully transmits the prior impact that human capital had on the social network (H1-H8 in section 6.1). A result of this is an implicit hypothesis that when social network is controlled for, the effect of human capital on business resources is assumed to be zero. When a prospective entrepreneur, based on his/her individual resources, has constructed a social network, and through that has received business resources, the individual resources have no longer any impact on the degree of resources obtained.

We therefore hypothesize:

H 17: When the social network is controlled for, the effect of human capital on degree of business resources becomes zero.

In this lies the implication that we may expect a direct positive impact of human capital on business resources when the social network is not controlled. This effect is called its total effect, and may be positive because its consists implicitly of the possibility that social network, which appears after human capital in time order, may help human capital to have a positive total effect on business resources. The

theory is, however, when social network is controlled, human capital shall no longer have an impact on business resources, due to the theory that states that all of the effect of one factor is fully transmitted by the factor that appears immediately after in temporal order.

Let us move on to predict how each of the business resources are assumed to affect the probability of a prospective entrepreneur starting his venture.

6.3 Dependent variable: Start-up (H18-H19)

A major task in this work is to test whether resources generated by the social network increase the likelihood that a prospective entrepreneur actually comes to the point of starting a firm. As stated in earlier sections, there has been scant attention to resources as an intermediary variable, and therefore we have little guidance in the operationalization of variables and neither do we have support for theoretical hypotheses. Organizing the hypotheses become simpler here, as we only have one dependent variable. How each of the resources will affect start-up is the structure for the hypotheses.

First, an assumption regarding the temporal order between resource dimensions has to be explained.²¹ This assumption builds on the thought that starting a business consists of three stages (Wilken, 1979). Wilken defines entrepreneurship as the combining of factors of production to initiate changes in the production of goods. Further, he divides this role into three phases:

- 1) The perception phase, where the individual perceives the possibility of behaving entrepreneurially, involving an analysis of the opportunity conditions. The prospective entrepreneur views resources, whether he has them or not, as combinable factors of production.

²¹Due to simplicity, the temporal order between resources are not built in the model and remains therefore as an assumption, not listed empirically.

2) Perception is followed by planning. The amount of planning is dependent upon the nature of the contemplated change and the situation. The larger the change, and the less structured the situation, the greater amount of planning will be required.

3) The actual initiation of the change will constitute the implementation phase. During this the actual combining takes place. Factors of production are procured and combined by the entrepreneur during this phase (Wilken, 1979: 64-65).

What are we to make of this ? Can we assume that perception, planning and implementation require different types of resources ? Foss (1989) argued that affective resources in terms of social support and constructive criticism were needed for moving from the idea to planning stage, and that informative resources were needed for moving from the planning to business stage. Figure 6.3.1 shows this.

Stage in the entrepreneurial process:	Idea → Planning → Start-up
Resources needed:	Affective Informative

Figure 6.3.1 Movement between stages in the entrepreneurial process and the resources needed.

Since the dependent variable here is start-up and not stages, we assume that the prospective entrepreneur needs some resources initially and some later in the process, shortly before implementation. The assumption here is that the subdividing of resources into three groups, affective, informative and material, also follows a temporal order. Can we find support for this argument from other authors ? Birley (1985) found that her respondents approached the bank at the end of the process when many of the resources were assembled and the elements of the business were set in the entrepreneur's mind (Birley, 1985:108). This at least supports the notion

that material resources are normally acquired relatively late in the process, after the plan is set and start-up seems within reach.

Affective resources.

Individuals who get ideas about starting a venture will tend to communicate those ideas to the people who surround them. What is needed in this first stage of the process is that the individual receives positive and constructive feedback so that he does not stop the process of developing his ideas further. Foss (1989) distinguished between encouragement in starting the firm and constructive criticism on ideas and plans. Encouragement describes positive reactions and feedback whereas constructive criticism is needed for rethinking, evaluating and improving plans. Both these affective dimensions are assumed to be necessary for coming up with a good business idea and to move on to collect information about how to go about starting a venture. Implicit here, is the assumption that affective resources are the first resources needed by a prospective entrepreneur. He needs these in order to move further in the entrepreneurial process - from cognitive/expressive actions to more concrete actions consisting of planning and information gathering. The hypothesis is therefore:

H18 a: Affective resources increase the likelihood of start-up.

Informative resources.

Informative resources are conducive to start-up because they help the prospective entrepreneur to convert his idea into more active planning of the venture. The information one gets on various aspects of the venture will bring one further in the process of acquiring the material resources needed for start up. In this study, three types of informative resources are assumed to be needed: 1) Information on how to handle the bureaucracy; 2) Information on elementary business transactions such as accounting and budgeting; 3) Information about the production process.

Advice on dealing with the bureaucracy

Applied to this setting, assisting with how to deal with bureaucratic matters, is of special importance, since the prospective entrepreneur in this industry needs to apply for a license for cod farming. To do this he has to present a plan for where the pen is to be placed, how the venture is to be financed and give a budget of the expected costs and income. Furthermore, he also has to deal with bureaucracy at the municipal and regional level. In a new industry like cod farming, advice on how to deal with bureaucratic matters must be assumed to be of great help for the prospective entrepreneurs.

Advice on accounting and budgeting

This resource was pointed out to me as a necessary factor by many of the fish-farming consultants interviewed in the pilot study. They reported that many fishfarmers with a weak business background were not able to undertake the simplest business transactions, i.e. how to assess the quantity of foddering when sorting the fish (the fish from one net pen are transferred into two net pens according to their size). As a result of that, one might assume that assistance on financial matters must be a valuable resource for prospective entrepreneurs.

Advice on production methods

Advice on production methods is assumed to be important since we are dealing with an innovative enterprise where the technology is somewhat different from that of related industries. Cod farming involves the farming of a new species where the knowledge and practice from salmon farming are not always applicable. Cod is a cold-water fish and has a faster growth rate than salmon (Bjørken and Jørgensen, 1990). Premixed fodder - dry pellets - produced by fodder producers and used in the farming of salmon - is not suitable as fodder for cod, at least not for cod over one kilo. The fodder to use should be similar to the fodder the wild cod is used to in its natural environment. Practically, it has to be large fodder particles with a low energy and high water content and it needs to be moist. Fishing offal with vitamins added are commonly used (Bjørken and Jørgensen, 1990).

We therefore expect that advice on production methods, defined as advice on production equipment (here on cages and mooring), advice on the actual production process where the raw material is to be processed (here on how to fodder, sort and slaughter the cod) and on how to produce soundly (here to have a sound production and avoid illness) are necessary informative resources for a prospective entrepreneur. The three hypotheses regarding informative resources impact on start-up are therefore:

H 18 b: Advice on bureaucracy increases the likelihood of start-up.

H 18 c: Advice on accounting and budgeting increases the likelihood of start-up.

H 18 d: Advice on technology increases the likelihood of start-up.

Financing

Financing is an important resource for getting a prospective entrepreneur started. Without capital he will not be able to invest in production equipment, raw material or pay workers.

Applied to this setting, a prospective cod farmer can get access to financing through a bank loan. A 20 % capital ownership is usually needed (Furu, 1994). The need for financing is dependent on the scale of production and whether the prospective cod farmer already has some of the production equipment (e.g. cages and mooring) available. It must also be stated that due to the characteristics of this emerging industry, many prospective entrepreneurs choose to start on as small a scale as possible, something that may eliminate the need for external capital. A study of fish farmers in one municipality in a region in Northern Norway (Spjelkavik, 1990) concluded that the actual capital threshold was very low as the entrepreneurs chose to start on a small scale, produce over a time period and expand and invest more capital after a while as their experience grew; they could then employ more people and run the farm on a commercial basis. Such a result in

a related industry may indicate that financing for some prospective entrepreneurs is perhaps not the most critical material resource, or that financing for some entrepreneurs is needed later when expanding the business. However, the hypothesis is:

H18 e: Access to financing increases the likelihood of start-up.

We have indirect support for this hypothesis from a study of problems in business startup where the second most important problem, mentioned by 28 % of the respondents, was financial management (Gartner, 1984). From this a reasonable hypothesis is that if the respondents get help with a problem that is assumed to be critical in business start-up, their chances of starting up will be higher.

An external factor likely to influence the degree to which financing is obtained in this study, is the actual economic situation in Norway at the time of the study. In the beginning of the 90is, Norwegian banks were in a serious financial situation and the Norwegian Government had to increase its grants so that bankruptcy was avoided (Johnsen, Reve, Steigum et al, 1992). In addition, the Norwegian salmon industry also experienced a crisis in 1991 due to overproduction and falling prices (Holm and Jentoft, 1992). Many fish farmers went bankrupt, and the banks lost most of the money they had invested in the industry. The cod farmers who tried to start farming in this period were therefore victims of this situation, as the banks were especially reluctant to invest in anything related to fish farming. This external factor is likely to have a "history effect" (Cook and Campbell, 1979), i.e. that an external factor outside of our reserach interest may affect an observed effect in the study. Applied to this setting: A difficult economic situation, and a crisis in a related industry, may affect the amount of financial resources obtained by the respondents in the study, and therefore may make financing a less significant predictor of start-up than hypothesized.

Production resources

Production resources are important assets needed to start a firm. A prospective entrepreneur needs to gain access to raw materials, production equipment and a location for the firm.

Applied to the setting in this study, the raw material for a cod farmer is cod or cod fry and fodder. The production equipment needed are cages and mooring. The location is decided when receiving the license for farming. However, room for storage to keep the fish and the fodder fresh is needed.

Again we assume that uncertainty is reduced when the different production resources are taken care of. Here, the raw material is the critical factor; no fish, no farming. The access to raw material is also one of the largest problems in the industry due to the factor that cod-fry is expensive and not always available. Results have shown that the best economic solution is to farm small living cod (800g) (Borch and Ljungren, 1988). The small cod to be put in pens for farming may either be the North Atlantic cod, which is typically available North of 62^o, or coastal cod, typically found in Fjords North of 62^o and the regions South of 62^o. The rational strategy is to catch this fish after spawning in order to draw advantage of the cod's compensation growth (Bjørken and Jørgensen, 1990). Due to the seasonally huge amount of North Atlantic cod, it is caught with fishing gear similar to purse seine, and a well in the boat has to be installed in order to transport the living fish. Coastal cod is normally caught with passive fishing gear such as trap or fish pot.

H 18 f: Access to production resources increases the likelihood of start-up.

Labor

In order to start a firm, the prospective entrepreneur also needs labor. The degree of labor needed is assumed to vary with the size of the venture. Fewer employees are needed in small businesses and only seasonal labor may be needed. The arrangement of labor is assumed to be an uncertainty-reducing factor. If the

prospective entrepreneur comes as far as arranging for production equipment and raw material but lacks labor capacity, he/she may be more reluctant to start up. If he/she can count on available labor resources, the motivation for starting the firm may be enhanced.

Applied to our setting, where the majority of cod farmers may start their business as a one-man venture or a family business, labor is not likely to be the most critical factor, due to the small production scale. In many cases, the labor is only needed on a temporary basis, for example during the slaughtering of the fish. However, we still expect that access to labor will increase the likelihood of start up as it will be of importance for the prospective entrepreneur to know who may be able to help him in critical periods of the production process. The hypothesis is:

H 18 g: Access to labor increases the probability of start-up.

Empirical support for this hypothesis is Spjelkavik (1990) who, in his study of fish farming careers in one municipality in Northern Norway, concluded that the strategy for the entrepreneurs in this region was to keep the investment of capital so low that so many as possible could start fish farming with their family as a basis for labor. These entrepreneurs started fish farming on a very small scale, almost on a hobby basis, as a part of a traditional fish farming adaptation, a traditional career in rural parts of Norway. After a while they expanded and invested in more capital and ended up as relatively large family businesses. The empirical support for this study should be clear: access to labor may trigger the motivation for starting.

Market resources

If a prospective entrepreneur gets access to the market by getting to know potential buyers, he has an advantage: knowledge about where to sell the product can be obtained before producing. In exploring the market possibilities, the prospective entrepreneur may reduce uncertainty at an early stage in the process and may carefully time the production process. Applied to cod farming this is particularly

relevant as the slaughtering of the fish may be planned well ahead, labor may be arranged and logistical issues such as transport may be planned.

Applied to the cod farming industry, access to the market represents great uncertainty for potential cod farmers as the sale of farmed cod is more complicated than is the tradition in fish farming. This uncertainty is not only due to the sales system, but also to the fact that farmed cod is a new product and one has little evidence on how the market will react to a farmed cod. In addition, farmed cod is very price and quantity sensitive as the quantity of wild cod will influence the price of farmed cod (Borch and Ljunggren, 1988). However, since the quality of farmed cod is superior to wild cod, it has a competitive advantage over wild cod when it comes to distribution of the fish. Unlike wild cod, with high quality only available in peak seasons, the advantage of having farmed cod on the market is to secure stable and continuous deliveries of high quality cod.

Compared to fishermen, who experience market-insecurity as a function of the fluctuating resource situation, and who have to sell their fish whether the price is high or not, a cod farmer is in control of the resources and has the possibility of choosing well-paying buyers in niche markets (Foss and Aarset, 1992). Control of the market is moved from the buyer to the seller. For that reason, access to the market has a very important meaning in the cod farming industry. Due to the Raw Fish Act (1951), the first hand trade of cod has to go through the Sales Organizations, which pays a rather low price for farmed cod. If the cod was already bought before it was placed in the pens, the cod farmer may sell directly to the well-paying buyers in niche markets.

To sum up: Access to the market may be a real challenge for prospective cod farmers and if access to the market is obtained it is assumed to affect start-up positively. The proposed hypothesis is:

H 18 h: Access to the market increases the likelihood of start-up.

We have only indirect support for the hypothesis that access to the market predicts start-up positively. In a study of the exploration of problems and skill acquisition during business start-up among 106 entrepreneurs, Gartner (1984) found that of six areas, marketing/selling was the most often mentioned problem (37 %) ²². From this we may draw the conclusion that if a prospective entrepreneur gets access to the market and sales, the likelihood of start-up will increase.

To sum up: We expect affective, informative and material resources to affect start-up positively. Although a temporal order is assumed to exist between the three different categories of resources, this will not be tested here, in order to keep the model of analysis as simple as possible. Eight direct paths predict the effects of resources on start-up. The hypotheses are summarized in figure 6.3.2.

	Start-up
H18a: Encouragement	+
H18b: Adv. bureaucr.	+
H18c: Adv. acco&budg	+
H18d: Adv. techn.	+
H18e: Financing	+
H18f: Produc. resources	+
H18g: Labor	+
H18h: Access to market	+

Figure 6.3.2 Hypotheses of resources' impact on start up.

²² The other 5 areas were general management (10%), financial management (28 %), marketing - research (5 %), design - development (10%), production (10%).

The last path of the model includes one equation. All resource variables are included, which makes the equation exactly identified. Implicit here is that we theoretically have not forced ourselves to predict which resource variables may not affect start-up at all when some perhaps more important resources are controlled for.

There should be no doubt, however, that the author of this thesis has made an assumption of a temporal order between the resources. To some degree this assumption builds on assumptions which other authors have made. There is however little empirical evidence. The general assumption is that, in an entrepreneurial process, affective resources are the first "resource" the prospective entrepreneur actually needs. Then the assumption is that Ego needs to widen his network in order to acquire information and advice on how to go about starting a business, i.e. he needs informative resources. Then the more dominant need for material resources appears at the end of the process when the firm actually starts to take shape (Birley, 1985). The multivariate model here allows us to test whether variables that are assumed to occur earliest in the process, i.e. affective and informative, in fact can predict start up even when material resources, which is assumed to be closer in time to start-up, is controlled for. Since a temporal order is assumed (but not explicitly verified) to exist between the resource variables, positive direct paths from all of the resources to start-up are allowed. I do not realistically expect that resources which are assumed to operate early in the temporal order will have the same magnitude of effect as material resources which are assumed to operate later in time.

I do expect that when business resources are not controlled for, the total effects of human capital and social network on start-up may in fact be positive. This is due to the notion that business resources which appear later in temporal order than both human capital and social network, may in fact "help" these variables to have a positive impact on start-up. However, when business resources are controlled for I expect (according to the theory of fully transmitting effects) that the direct effect of human capital and social network on start-up should be zero.

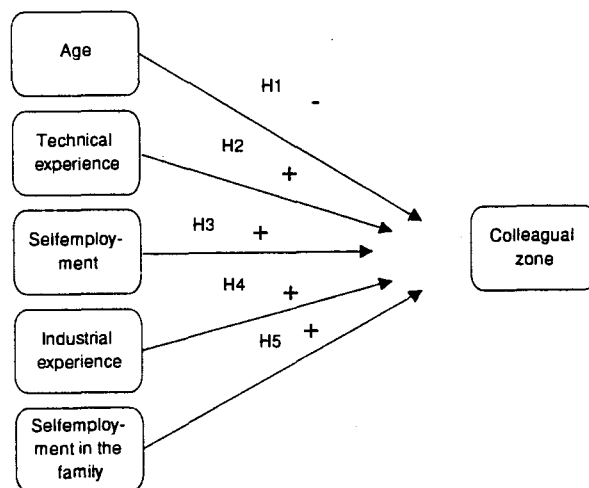
According to the causal chain model, the hypothesis is therefore:

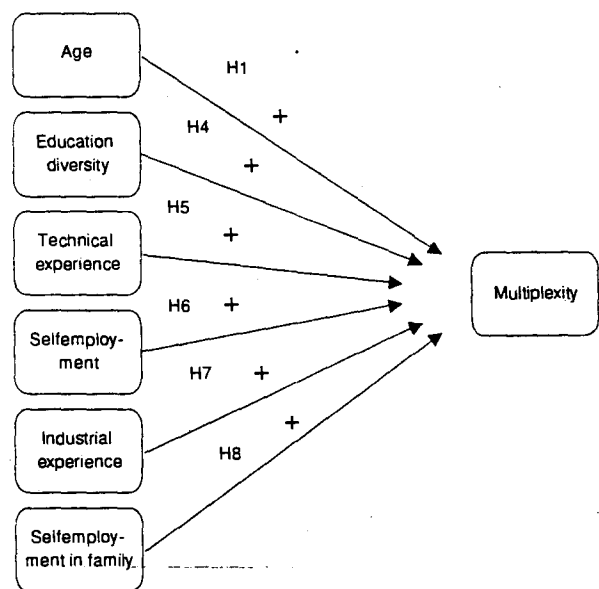
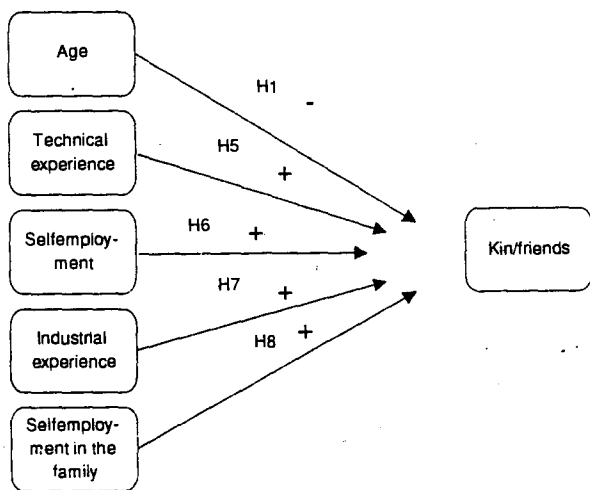
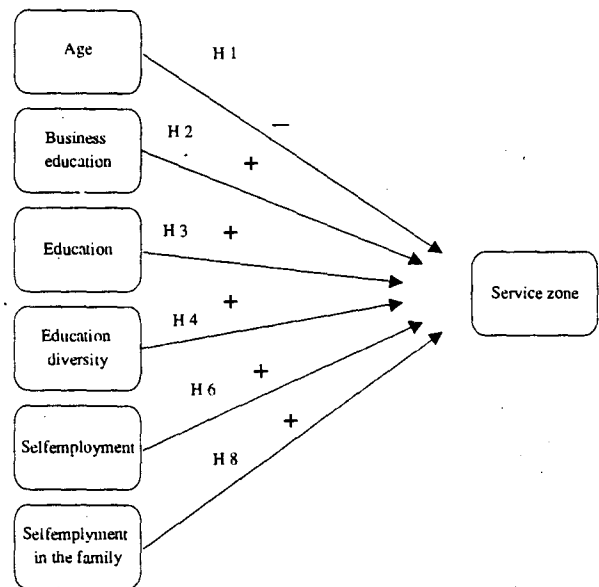
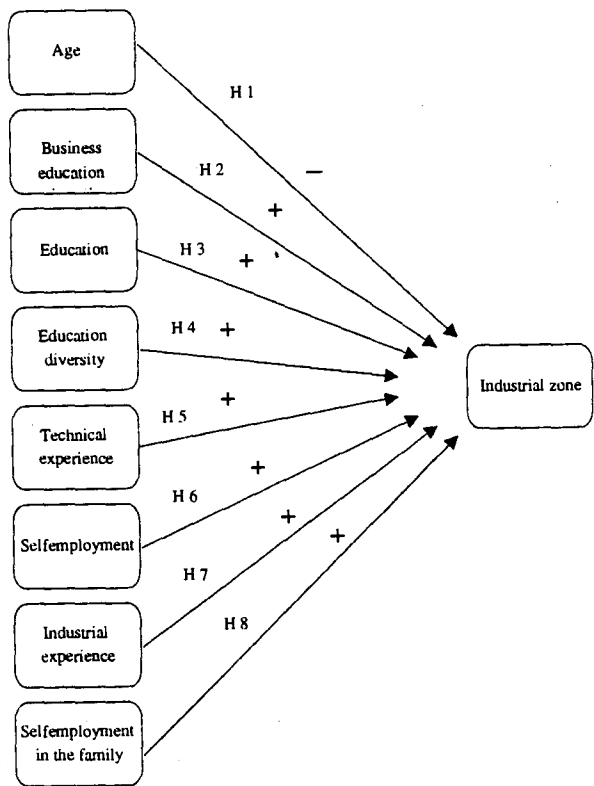
H 19: When business resources are controlled for, the effects of human capital and social network on start-up will be zero.

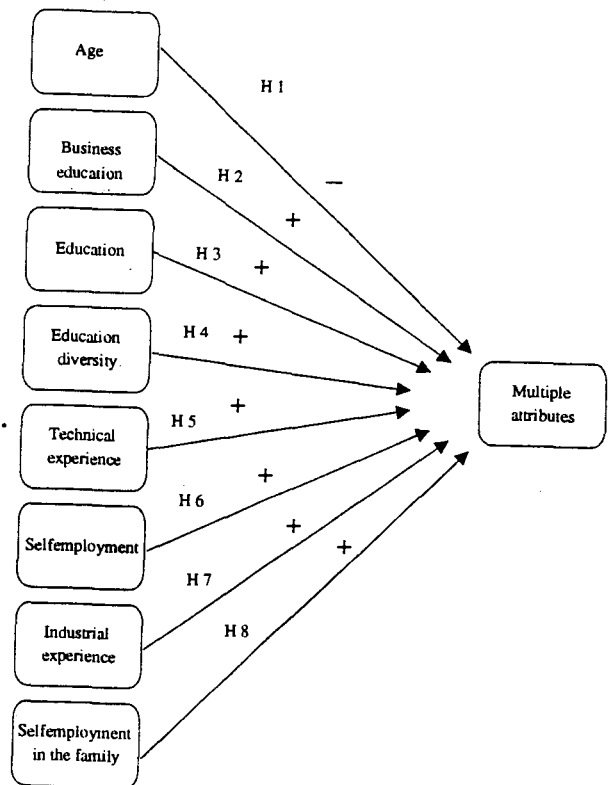
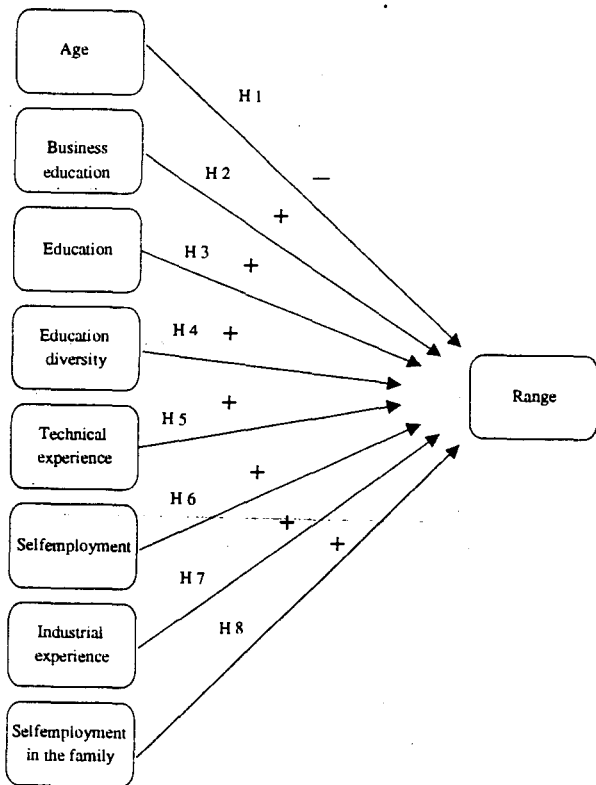
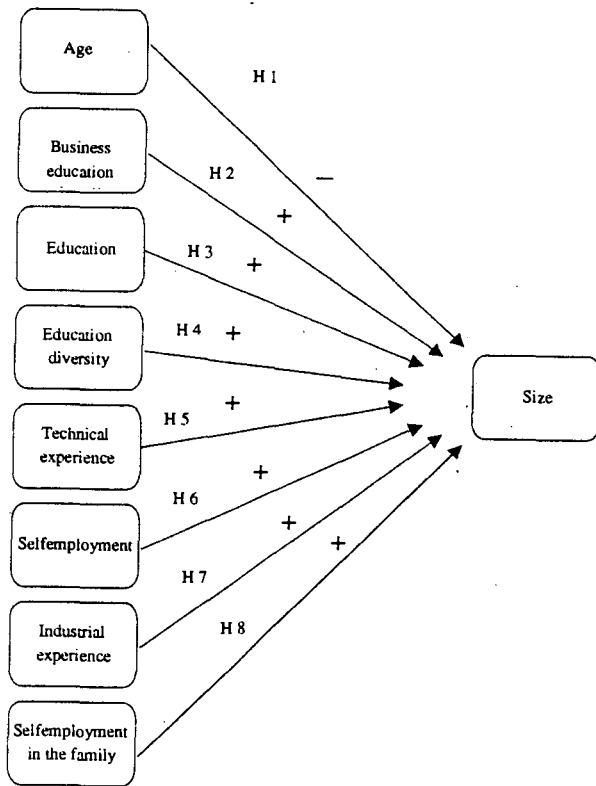
6.4 Summary

In this chapter, hypotheses of the three relationships in the conceptual model have been developed. The hypotheses from the first path propose that a prospective entrepreneur's background characteristics (age, family's self-employment), his/her education and work experience will increase his/her chances of developing a large and wide network consisting of a multiple ties, and multiple attributes and a large number of ties to the three zones in the network and to kin and friends. Human capital, in terms of background, work experience and education, increases network characteristics. H1-H8 therefore hypothesize how the social network is created. The eight figures below show which of the eight human capital variables are hypothesized to affect each of the eight social network variables. Due to simplicity we have not drawn curved arrows between the exogenous variables.

Figure 6.4.1 Human capital variables affecting social networks variables (H1-H8)

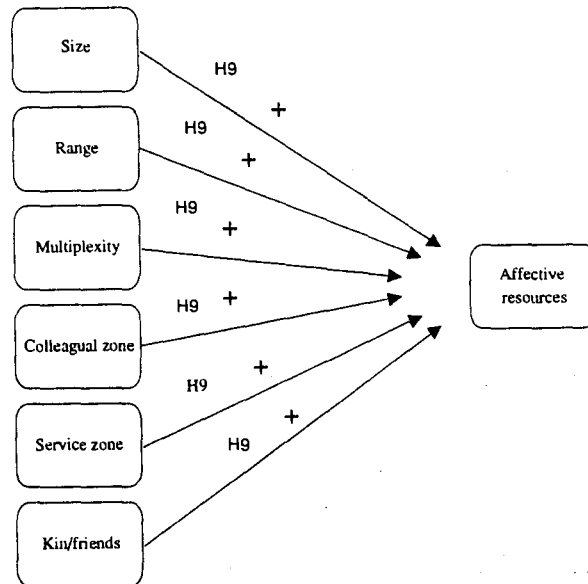


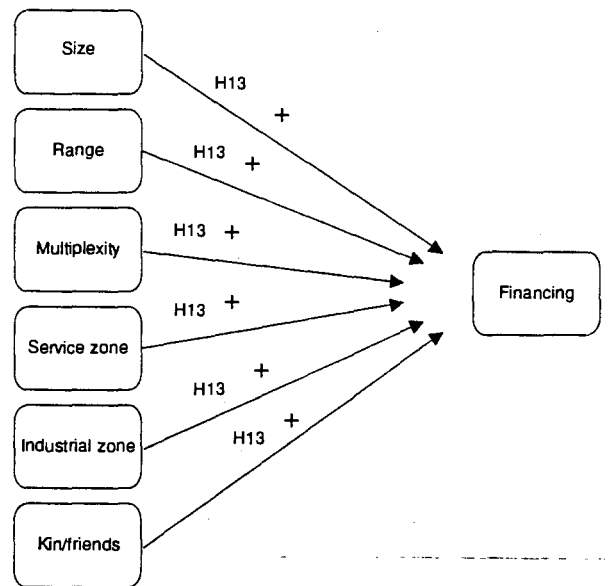
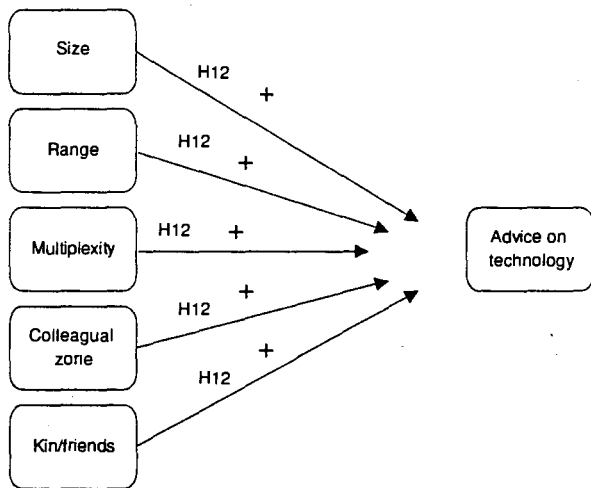
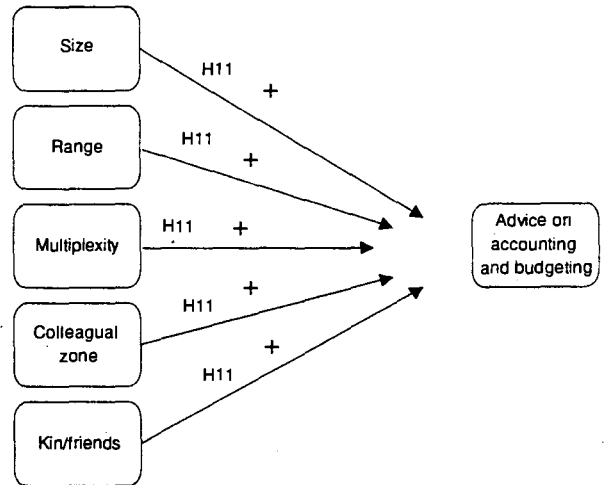
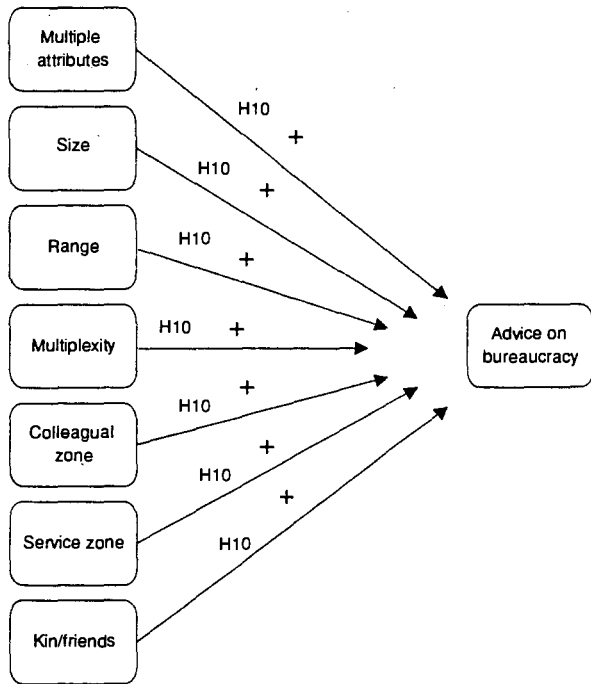


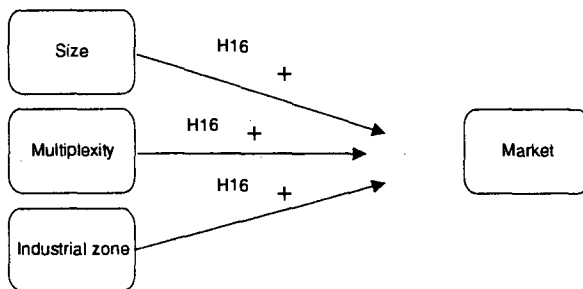
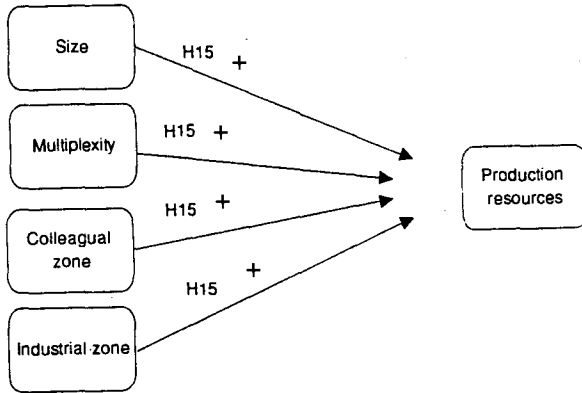
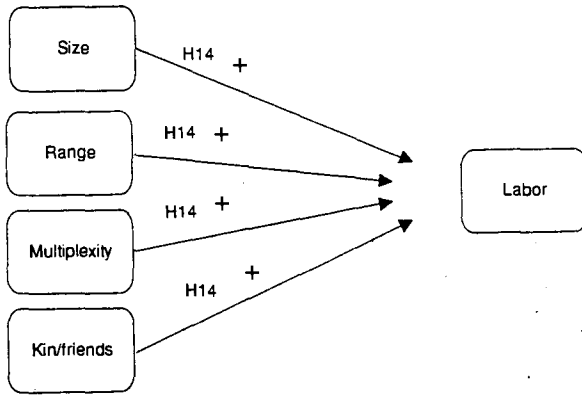


The next path in the model tests how well the different network characteristics "produce" eight different resources assumed to affect start-up positively. The hypotheses are that size, range, multiplexity and multiple attributes, number of ties to the collegial zone, industrial actors, service sector and kins and friends increase the degree of one affective, three informative and four material resources. The hypotheses (H9-H16) are summarized in the eight figures below.

Figure 6.4.2 Social network variables affecting business resources (H9-H16)



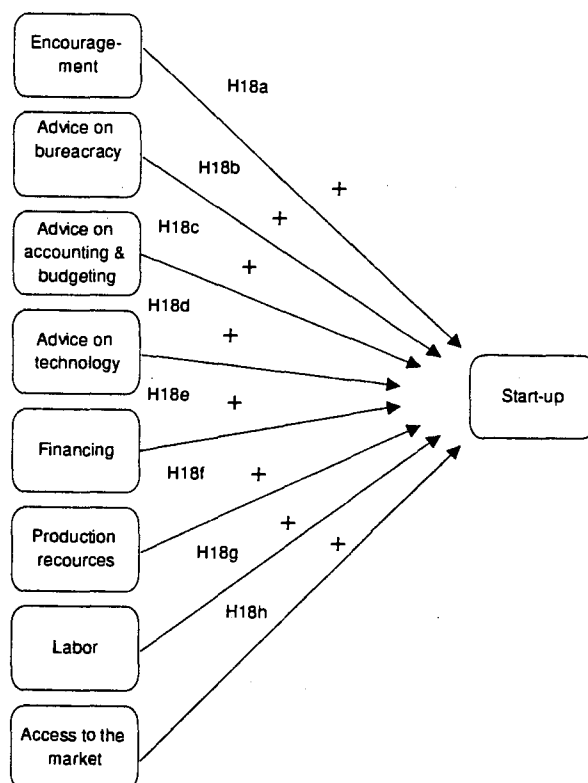




In addition to H9 -H16, we predicted that when the social network was controlled for, there should be no impact from human capital variables on business resources. In a figure this would look like 16 variables (eight human capital and eight social network) as explanatory variables affecting eight resource variables. Whereas the paths from social network to business resources would have a + sign, all paths from human capital variables would have a 0 attached to them.

The third and final path of the model involves testing how two affective resources, three informative resources and four material resources increase the likelihood of starting a firm. H18a-H18h are shown below.

Figure 6.4.3 Business resources affecting start-up (H18a-H18h)



Also related to this path is the hypothesis that when business resources are controlled for, the effects of human capital and social network should be zero, i.e. when 24 explanatory variables affect start-up, business resources shall have a + sign, whereas human capital and social network should have a 0.

To sum up: Hypotheses according to the life cycle model predict that there are only positive paths between the blocks of explanatory variables immediately following one another in temporal order. Direct paths from a more distant block of explanatory variables should not exist. The causal chain aspect of the model is then retained. Factors appearing later in the life cycle of a prospective entrepreneur, subsume all of the effect of factors appearing earlier in time. Thus business resources, which lie closest to start-up in time, mediate start-up.

What mechanisms are not accounted for in the model ? Firstly, the model does not account for the fact that individuals vary in their need for resources. Some prospective entrepreneurs may in fact be self-contained with some resources and may therefore not build a network to acquire all resources. Reese (1992) argued that the lack of fit between networks and resources in her study was to a certain degree a result of the difference between having people in the network to ask for help and whether the entrepreneur used that help. In her study, the respondents had build up a network for resource acquisition, but did in fact not use these resources. In this study, we do not distinguish between having access to resource persons in the network and the actual use of the resources. Here, we ask whether the persons in the network have actually given access to specific resources. A point not accounted for in this model is therefore that prospective entrepreneurs may possess some of the resources themselves and may therefore not utilize certain ties in the network.

Secondly, the model does not account for the fact that the motivation to start a business, may actually change over time, after the respondents have started networking and acquired resources. The model states that, based on some individual characteristics, one approaches a certain kind of network which gives

access to resources which again increases the probability of starting a venture. However, during this time period the decision to start a business may change due to factors outside the model (e.g. fluctuation in the expected profitability in the industry, difficulties in the availability of raw materials, inconvenience in the market situation). In other words, external factors may actually affect the degree and the quality of the resources available and thus may make the prospective entrepreneur reconsider his/her plans about starting the business. The business decision, which we assume the individuals have already taken, may then change during the time span between making network contacts, acquiring resources and the time shortly before start-up.

What is the theory's area of application? The theory's area of application is that it takes for granted that the units of the analysis - the individuals - are prospective entrepreneurs who have expressed their wish to start a firm. In using the conceptual model, the units are followed from the point of time when they received the license and to the point of time when they start the business or not. The theory therefore cannot be used to predict out of a larger population, who becomes entrepreneurs. The theory can only be used to predict, out of a group of individuals who have been given the ability to start a business, who is successful in actually starting. What about the enterprise and industry: are there any limitations of the theory's area of application? This perspective should be applicable to prospective entrepreneurs in different industrial settings and different kinds of enterprises. As started in chapter two, no assumption about the type of enterprise and stage in the industrial life cycle is made. The human capital, social network and resource dimensions are all general dimensions, not specific dimensions of this industry. The affective, informative and material resources, are in this study assumed to be general resources needed to start an enterprise. Empirically, however, the relative need for each of them may be different when the same hypotheses from are tested in a different industry. The conclusion is therefore that on the theoretical level the dimensions are general and the area of application of this theory is therefore wide.

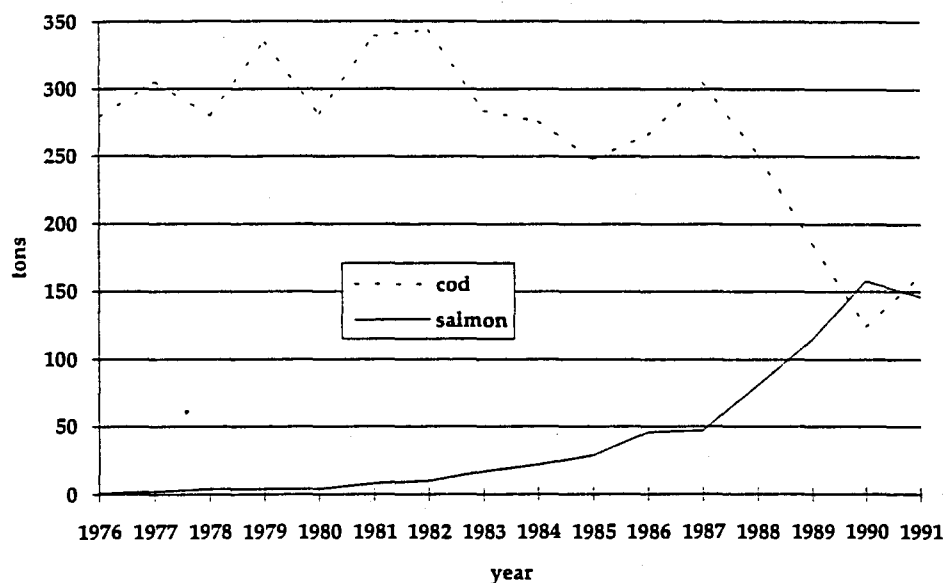
We will now move on to part 2, which begins the empirical part of the thesis.

7. Research design and methodology

In this part we will start describing the empirical setting in this study²³. The chosen design, the data used and the required method of analysis will be revealed. Then the priority regarding validity is discussed and the variables are operationalized. In the last section, the indices are validated. In this way we will know, prior to the hypothesis testing, how well the empirical measures reflect the theoretical constructions.

7.1 The empirical setting

Farming of cod - which took off on a large scale in the late 1980s - may be viewed as a hybrid between traditional cod fishing and the newer aquaculture industry. As seen in figure 7.1.1 below, cod fishery has drastically decreased the last ten to fifteen years, whereas a new industry - salmon aquaculture - has developed. Hence, a solution to the cod problem seemed to be found within the fish farming technology.



*Figure 7.1.1 Fished cod and farmed salmon (tons) in Norway from 1976 to 1991.
(Adapted from Foss & Aarset, 1992)*

²³ See also Appendix 5 for a more thorough description.

Cod farming has, however, developed its own technology. It started off with artificially raised cod fry. As this was found too expensive to produce, the main production now seems to be based on living cod from the sea. This sets the technology of cod farming apart from aquaculture. Farmed cod is not an artificially raised product, but a natural resource, bred to full size within a controlled environment. Dependent on its size, it takes 1/2 to 1 year to breed it to full size - compared to a three year production process in salmon farming.

Cod farming requires a license²⁴, which is withdrawn if it is not used to start farming within 2 years. In the early stages of the industry, everybody who applied was issued a license. The only requirement was that the applicant had chosen a well-suited place for the farm (environmental reasons/motives). That made many people want to start cod farming as they believed it would take off at the same speed as salmon farming. In 1990 the rules changed. Fishermen were now automatically given a license for a farm in the lowest size category (1000m³). Everybody else had to show a minimum of education in aquaculture.²⁵ From 1988, the applicant also had to pay NOK 7 000 for getting the application processed, regardless of the outcome.

7.2 Design and data

An ideal design for testing the hypotheses would be a causal design including longitudinal data, where potential entrepreneurs were followed over time. In such a quasi experiment, the independent variables would be measured before measuring the dependent variable, and the theoretical order between the variables would then be followed up empirically. Such a design, however, was not realistic given the resources that were available for the project. I have sought to carry out a causal design by doing a cross sectional study where the questions were framed

²⁴ For a more detailed description see Foss & Aarset, 1992.

²⁵ In practice, everybody who applied for a license was also issued a license, both before and after 1990.

retrospectively in order to try to establish the temporal order.

In the fall of 1991, a pilot study was done in order to get to know the empirical setting and to learn the challenges and problems in this industry. Three face-to-face-interviews were done with key informants: a codfarmer (large scale), a consultant in fish farming, and a pioneer in a research station for cod farming. In addition, the fish farming consultants in each of the 7 regions were interviewed by telephone. After analyzing these interviews, a preliminary questionnaire was constructed. In designing the questionnaire, I sought to purify the measures both by using key informants from the industry (Churchill, 1979) and the expertise of colleagues at The Norwegian College of Fishery Science. The questionnaire was pre-tested over a 3 month period. Respondents used for pre-testing were two large scale and one small scale cod farmers, and one person with a license for cod farming who had not yet started. I also used leading persons in the industry, research institutions and employees in Norges Råfisklag and a consultant in fish farming. The process of pretesting proceeded in a "snowball fashion". First, a version of the questionnaire was given to one informant. After changing the questionnaire according to his comments, a new version was given a new key informant. The final version was also screened by a Professor of Norwegian Language, in order to write in a dialect form that lies closest to the one used by the respondent group.

Secondary data, registers of licenses from the Directorate of Fisheries, were used to identify the population (Fiskeridirektoratet, 1991). There were 103 licenses as of January 1989 and 405 other licenses as of January 1991. The population in the study is therefore defined as "Persons with a license for cod farming in the time period 1989- 1991". As an extensive data strategy was needed for testing the hypotheses, the entire population was kept as the sample frame²⁶.

²⁶With a theoretical model with 25 variables the goal was to have an N of at least 250 cases.

A cross sectional survey was conducted at the point of time when I expected the respondents to either have started their business or decided not to start. Since the newest licenses were given in 1991 these respondents had to be given "time to start". A five page questionnaire was mailed to 508 respondents on April 30th, 1992. In order to establish the causal order between the variables, and to be sure that the respondents knew this when answering the questions, an information letter was included (see enclosure) which explicitly asked for their actions prior to start-up. Particular attention had to be paid to the variables whose values would change if measured after the respondents had started their business, i.e. the network and resource variables. I explicitly asked the respondents to describe their networks from when they got the idea of starting cod farming to the point where they had started or decided not to start. I hoped to reduce the weakness of the retrospective technique by making the network and resource question in the same visual format, with many indicators so as to enhance the respondents' memory.

In order to increase the response rate, a check of NOK 2 000 was promised as a lottery prize for all respondents posting their answers before May 23rd 1993. Within this time limit, 106 respondents had answered (21 %). A second postal inquiry was done in June 1993, a third in July and a fourth in November. In order to increase the response rate from the non starting group, and from people with licenses from 1989, a telephone inquiry was carried out throughout this time. The majority of the telephone interviews were done in such a way that the questionnaire was sent out to the respondents beforehand. A time for the telephone interview was then arranged, and the respondent had the questionnaire in front of him when the questions were asked. A graduate student at The Norwegian College of Fishery Science assisted me in the telephone interviewing.²⁷

²⁷ He had a background in fish farming from working with his father and brother, and through a job involving farming of cod fry and had knowledge of the industry and its organization through his work on his MA thesis.

By March 1993²⁸, 302 persons had answered - a response rate of 59.4 %. 197 persons had responded after the deadline. Of the 302, 45 were telephone interviews (15 %). Four questionnaires could not be used: too many answers were missing, and the respondents were either not interested in giving further information or they had no telephone and had not answered our written questions. Since the model involved a path analysis with three paths, a consistent N on all variables was needed. Thus 9 of the 298 questionnaires could not be used in the analysis since the network and resource questions were missing or misunderstood, and I was not successful in reaching the respondents to clear it up²⁹. That made 289 complete questionnaires available for the analysis. Of the 289 respondents, 282 (97.58 %) are male and 7 (2.42 %) are female.

7.3 Method of analysis

Testing of causal hypotheses requires methods where we can predict outcomes on a dependent variable based on known values of the independent variables. The conceptual model is a path model in which the variables are assumed to follow one another in a temporal sequence. We also then need a method to sum the strength of these paths together.

All variables in the model, except the dependent variable start-up, are continuous and are assumed to approximate intervally scaled variables; this is required for

²⁸ 262 respondents answered between May 4th and August 10th. Due to a lot of practical difficulties (I went on sabbatical to USA fall 1992, and the assistant had difficulties getting facilities for telephone interviewing) answers from 40 respondents were collected between September 1st (1992) and March 30th (1993).

²⁹ Much work was done to get the respondents to fill out the network and the resource questions, as they were relatively complicated. However, as all respondents got the same additional information on how to fill out these two pages, there should be no bias in the measurement of these questions. In some cases, additional information from the respondents was needed in case of misunderstandings. In these cases the respondents were telephoned and we cleared it up. One special part of the information gathering needs to be made explicit. About 30 persons out of the 186 starters had not indicated on the network and resource questions that they had sold their fish, although they had indicated in question 4 the year they first sold their fish. In coding the answers, I needed to check this inconsistency. In telephoning these persons they answered that question 4 was correctly answered, but that they had forgotten to tick that off in questions 9 and 10. They therefore gave their correct answers about to whom they sold the fish (question 9) and "access to market" (question 10) on the telephone. This information was then coded by me.

using Ordinary Least Squares regression analysis. In order to test the (single) impact of each independent variable when other independent variables are controlled for, only multiple regression analysis is applied. OLS Regression analysis are based on some assumptions (Gujarati, 1988) that cross sectional data often violates. In this study, the assumption of no perfect multicollienarity will be checked. Also regression diagnostics will be employed, by removing influential outliers and re-running the regression.

In testing the last path in the model - the effects of resources on start-up - logistic regression (Aldrich and Nelson, 1984) was used. It uses Maximum Likelihood methodology to estimate the expected probability that each observation falls in the start-group vs the non-starting group. Using this method implies that we predict an s-shaped association (instead of a linear one) between resources and start-up. For a one unit change in a very low or very high value of resources, we do not expect a large effect on start-up. This approximation of our hypotheses makes good sense.

In part 3, the results of testing the hypotheses will be presented. All regressions are run with an intercept, which is not revealed in the tables. Unstandardized coefficients and their p- value will be interpreted, and in the case of assessing the relative impact of each coefficient, the standardized coefficients will be interpreted. Since we have predicted the direction of the hypotheses a priori, one-tailed tests are used. OLS and logistic regression differs in the interpretation of the coefficients. In OLS we interpret that a one unit change in the explanatory variable holding the other explanatory variables constant, has the impact on the dependent variable with the size of the regression coefficient. In logistic regression - here predicting that the dependent variable takes a unitary value - we have a somewhat weaker causal impact as we are only able to say that for a given increase of one unit in the explanatory variable, the probability of starting a business has an expected change with the size of the coefficient. A less abstract way of interpretation is to exponentiate the coefficients. The interpretation is then that a one unit increase in the explanatory variable multiplies the odds of starting a business by the size of the exponentiated coefficient.

When both the dependent and the independent variables are transformed into logarithms, the interpretation will follow the double log procedure (Gujarati, 1988:144): A 1% change in for example, a network variable will give an x % change in a resource variable. When only the dependent variable is logged, the procedure is the semi log (log lin): A one unit change in a human capital variable gives an x % change in a social network variable.

Significance tests are used, mainly below the 5 % level (* p <.05), but results below 10 % level are also mentioned ((*) p <.10). Significance tests, which are used for generalizing from sample to population, require a random sample of the population. This is not the case in our study due to the self-selection bias that it was up to the respondents themselves to decide whether to answer the questionnaire/ telephone interview and thus be included in the sample. However, with a 59,4 % response rate, with all regions represented, and both 1989 and 1991 registers represented³⁰, the author of this thesis is relatively sure that there is no systematic bias in the response rate. A systematic bias that would decrease the generalizability of the study would occur if the 103 non-starters are the "weakest" non-starters and the 186 starters the "strongest" starters compared to the population. In other words, that some of the difference found in this study would be due to the fact that certain groups in the population were more inclined to answer than others. Can we give an assessment of this ? First of all, out of the 206 respondents who did not answer the questionnaire, 8 were sick or had died, 12 would not answer, 6 had moved/had unknown addresses and 9 had discontinued their business, and 1 person was only a contact person for the community whose job was to help to get cod farming started, but was not interested in starting himself. This makes 170 people (33,46 % of the population) not reachable for the study. The question now is who these people are likely to be. Firstly, I am less inclined to think that the "good starters" are overrepresented in the sample. As seen in figure 7.5.3 we have 54 respondents (= 29 %) among the starting group (N=186) who already have discontinued the cod farm. I am therefore relatively

³⁰ Due to telephone interviewing we were able to increase the response rate from the 1989 group.

sure that the "weaker " of the starters are already represented among the starters. Secondly, among the 103 non-starters we have 41 respondents (39.8 %) contemplating start-up and 17 respondents (16,5 %) who at the time of the survey did not want to start, but had earlier registered the firm or obtained production equipment. These numbers should also reflect that it is unlikely that the study has an overrepresentation of the weakest non-starters. In checking the significant differences on human capital variables, we will see that the t-tests in table 7.1.8 show that the non-starters have a higher degree of self-employment, their families have a higher degree of self-employment and the non-starters have both higher education and higher education diversity. I am therefore less inclined to believe that the non-starters in the sample represent a "weak" group compared to the population they represent. The conclusion is: although non-response bias has not been assessed by more formal methods, the background characteristics of the non-starting and starting group do not indicate that the sample we have obtained is constituted of especially "good" starters and very "weak" non starters.

7.4 Validity

In moving from the theoretical to the empirical level of the study, the requirements and priority regarding validity have to be discussed. Validity is defined as the best available approximation to the truth or falsity of our hypotheses (Cook and Campbell, 1979). What we do ask us by testing the hypotheses is 1) Is there any empirical relationship between the independent and the dependent variables ? One type of validity that helps us assess this question is statistical conclusion validity defined as inferences about whether it is reasonable to presume covariation among the variables (Cook and Campbell, 1979). The next question to ask is then 2) Given that there seems to be a relationship, can we assume that it is the independent variable that causes the dependent variable ? Internal validity is the term that defines whether we can assume a causal relationship between the variables. The third question is then whether these variables reflect cause and

effect constructs, i.e. construct validity³¹. Finally, given a plausible causal relationship from one construct to another, how generalizable is this relationship across persons, settings, and time ? External validity deals with this.

There are relationships between the two first and the two latter validity requirements. Statistical conclusion validity and internal validity have to do with ensuring that a proper statistical test of an empirical relationship is constructed and asserting the causal direction between the variables. The essence of construct validity and external validity is to make generalizations. They are both concerned with specifying the contingencies on which the causal relationship depends, which again have important implications for generalizability (Cook and Campbell, 1979). In increasing one type of validity one is likely to reduce another. It is therefore necessary to make a priority. Since this study is more in the way a theory testing and less so applied research, we are less interested in external validity. It is more important here to test whether a hypothesis of a relationship between variables has adequate statistical power to be tested and that the setting is such that not too many external factors intrude on this relationship. Remember that the conceptual model consists of hypotheses in three paths following one another in temporal order. Statistical and internal validity therefore has priority over construct validity and external validity. However, since we introduce some attributal network variables and some business resources that do represent some novelty in the field, we still have to assess the goodness of the measures used. The priority is therefore 1) Statistical conclusion validity 2) Internal validity 3) Construct validity whereas external validity is prioritized less in this study.

I seek to enhance statistical conclusion validity and internal validity by securing a basic statistical power i.e. that we have a large enough number of cases and avoid variation in variables which are not the focus of the study. Therefore one industry is chosen, which represents a relatively homogeneous respondent population in terms of the need for resources for starting their business. Standardized procedures

³¹ Zaltman et al. (1973) define construct validity as "... the extent to which an operationalization measures the concept which it purports to measure". (Zaltman et al. 1973:44).

are used at the data collection stage. Possible mono-operation bias is avoided by using indices based on several measures as explanatory variables. An N of 289 is large enough to avoid small sample properties and is suitable for testing a model with 25 variables. Construct validity is discussed in section 7.6.

7.5 Operationalization of variables

In this section a description is given of how the 25 variables in the model are operationalized. First, the human capital variables are described. Then the social networks, the resources and the dependent variable start-up are operationalized.

HUMAN CAPITAL VARIABLES (Question #5- 8, # 13-15 in the questionnaire, Appendix 3):

Age

The respondent's age in the year he/she was given a license for cod farming.

Measurement: The year the respondent got his license (see #4) was subtracted from 1992, the year the survey was conducted. That number was again subtracted from the respondent's age in 1992 (from #15).

Education diversity

Degree of different education beyond junior high school level.

Measurement: From # 13, the variable is constructed according to the following scale:

- 0= no education beyond junior high school level
- 1= one type of education
- 2= two types of education
- 3= three or more different types of education

Education

Degree - level - of education.

Measurement: From # 13, the variable is constructed according to the following scale:

- 1= 7 years primary school
- 2 =9 years primary school, junior high school, commercial school
- 3 = vocational training
- 4 = high school
- 5 = university

Bus.educ.

Degree of business education.

Measurement: From # 14, the variable is constructed according to the following scale:

- 0= none,
- 1= course in accounting and budgeting for fishermen, course by correspondence, commercial school, course in economics/business after junior high school level
- 2 = high school with economics and business
- 3 = up to 2 years of higher economic/business education

Selffam

Degree of self-employment in the family of the respondent

Measurement: From # 6, the variable is constructed according to the following scale:

- 0 = nobody in the family is self-employed
- 0;5= sibling(s) is self-employed

- 1 = one or both parents self-employed³²
1.5= parent(s) and sibling(s) are self-employed

Self-employment

Degree of the respondent's self-employment, prior to cod farming.

Measurement: From # 5, the variable is constructed according to the following scale:

- 0 = never been self-employed
1 = self-employed once
2 = self-employed twice

Induexp

Degree of work experience (until the year the respondent received a license for cod farming) from industries related to start-up. In this setting these are defined as work experience as a fisherman, from the fishing industry and from fish farming (regardless of whether or not this is as self-employed).

Measurement: From # 7, the variable is constructed according to the following scale:

- 0 = no industrial experience
1 = one type of industrial experience
2 = two type of industrial experience
3 = all three relevant types of experience

which again are based on the three dichotomies

- whether the respondent has been a fisherman or not
- whether the respondent has worked in the fishing industry or not
- whether the respondent has been a fish farmer or not

³²According to the theoretical definition, siblings' impact will be less than parents' impact. Therefore in measuring the variable, siblings are given half the weight of the parents' impact.

Technical experience

How many types of fish the respondent has had in storage (an old tradition before fish-farming started)

Measurement: From # 8, the variable is constructed according to the following scale:

0 = no type of fish

1= one type of fish

2= two types of fish

3= three types of fish

4= four types of fish

5= five types of fish

6= six types of fish

(the 6 possible types are: cod, pollack, herring, sprat, mackerel, other).

SOCIAL NETWORK

The measures are based on question #9 in the questionnaire (see Appendix 3)

Figure 7.5.1 Operationalization of social network variables.

Theoretical concept:	Colleagual zone	Industrial zone	Service sector
Operational definition	The number of cod farmers, salmon farmers and fishermen in Ego's network.	The number of fish buyers, distributors/exporters, consumers, persons in Fishermens' Organization/Fish farmers' Organization/Sales organization, employees in research institution.	Employees in Fisheries Extension Service, Head of Economic Planning, banker, politician.
Measurement:	The scans from person 1 to person 8 for the three attributes are added together and then logged.	The scans from person 1 to person 8 for each of the five attributes are added together and then logged.	The scans from person 1 to person 8 for each of the 4 attributes are added together and then logged.

Theoretical concept:	Kin and friends	Network size	Network range
<p>Operational definition:</p>	<p>The number of close friends, spouse and family member.</p>	<p>The number of persons the potential entrepreneur has made contact with from the point of time when he got the idea of starting a business to when the business took off/he decided not to start.</p>	<p>Number of cod farmers, salmon farmers, fishermen, local fish buyers, distributors/exporters, consumers, employees in the Fisheries Extension Service, veterinaries, heads of economic planning, bankers, persons in Fishermens' Organization/Fish Farmers' Organization/ Sales Organization, politicians, employees in research institution.</p>
<p>Measurement:</p>	<p>The scans from person 1 to person 8 for the 3 roles are added together and then logged.</p>	<p>The scans in the column for each person are added vertically. If > 1, the number for that person = 1. This procedure is done for person 1 to person 8. Network size is then the sum of these 8 numbers.</p>	<p>Each attribute is added horizontally, if > 0 then it is set to 1, else it is set to 0. Range is then the sum of these 13 attributes.</p>

Theoretical concept:	Multiple differences	Network multiplexity.
Operational definition:	The average number of 13 possible attributes (see in oper.def for range).	Degree of ties which are both kin/friend and attribute.
Measurement:	The number of attributes for person 1 to person 8 are added together vertically. That number is divided by the actual number of Alter with attributes.	Adding together ties that are both roles (spouse, friend or other family member) and attributes in either the collegial, industrial or service related network.
Variable:	Diversity.	Multiplexity.

BUSINESS RESOURCES

The measures are based on question #10 in the questionnaire (see Appendix 3).

Variable	Affective resource	Adv. bureaucr.	Adv. acco&budg.	Adv. technology
Operational definition	"Encouragement to start cod farming." "Constructive ³³ criticism of ideas and plans".	"Advice on handling the bureaucracy."	"Advice on accounting and budgeting."	"Advice on cages and mooring." "Advice on foddering, sorting, slaughtering." "Advice on healthy production."
Variable	Financing	Labor	Production resources	Marketing/sale
Operational definition	"Financing."	"Labor."	"Living cod." "Production equipment." "Fishing offal to fodder". "Freezer technology/storage."	"Market/sale"

Figure 7.5.2 Operationalization of resource variables (see question # 10 in Appendix 3).

³³ An early analysis of 153 starters and 84 non-starters of this sample showed that whereas encouragement had a positive .307 impact on start-up, constructive criticism had a negative -.365 impact on start-up. I then judged the model to be misspecified as the two items measuring the same theoretical concept had opposite effects on the dependent variable. Constructive criticism was, for that reason, dropped in the further analysis, so that affective resource is only measured by one item "encouragement to start cod farming".

ENTREPRENEURIAL STATUS. Responses in questions #1 and #4.

	# respondents	# respondents	%	Status on dependent variable
"Do not intend to start"	45			
"Do not intend to start" (+ registered firm or got equipment)	15	62	21,5%	103 (non-starters)
"Await the situation" (+ registered firm or got equipment)	2			(36%)
"Contemplating start-up"	22			
"Contemplating start-up" (+ registered firm or got equipment)	16	41	14,1%	
"Lost license" (+ registered firm.)	1			
"In the process of starting" (+ got equipment)	2			
Experimenting	20			
In the process of starting	24	48	16,6%	186 (starters)
Discontinued before sale	4			(64%)
Running a cod farm	84	84	29%	
Started - Discontinued thinking of discontinuing	54	54	18,6%	
		289	100%	

Figure 7.5.3 The process of distinguishing starters from non-starters.

The dependent variable in the study is dichotomous, measuring whether a potential entrepreneur - an individual with a license for cod farming - comes to the point of actually starting cod farming. Questions #1 and #4 (see Appendix 3) were used to measure the dependent variable. I relied most on #4, the objective measure of how far the respondent had come in the process. The criterion for start-up is that the actual "production" has taken place, i.e. the living cod are placed in the cages³⁴. Based on this criterion 103 respondents had not started, whereas 186 had. The non-starting group consists of individuals who, after applying for a license, answered on the questionnaire that they did not intend to start cod farming. Also in this group are individuals who answered "contemplating start-up" or "are in the process of start-up". Some of these have cages and mooring and have registered their firm. Since the dependent variable in the study is dichotomous, it was important to check whether these respondents were actually potential starters. They could technically start after answering my questionnaire. Since the licenses are withdrawn if not used within 2 years, many of these were assumed not to be able to start since their licenses were already too old. All the respondents who had a license from 1991, and therefore could start their business after answering my questionnaire in 1992, were telephoned in 1993 and asked whether they had started or were planning to start. Nobody was planning this and only one of them had started. He was then placed in the starting group³⁵. I am therefore relatively sure that the theoretical concept of dividing a group of potential entrepreneurs into two sub-groups according to whether they, in the course of a certain time period, had started or not is a distinction that fits the data in this empirical setting.

A relevant critique of my criterion for start-up may be: Why was the criterion for start-up not the sale of the fish? (see 9th line in # 4: "Sold farmed cod (first time)"). Are those selling farmed cod not running a farm on a more commercial basis? There are two arguments for not doing this. In fish farming, with a relatively long production period, the entrepreneurs must invest in production

³⁴See the 8th line in Question 4: "Got living cod/spawn to hatchery (first time)". Those respondents who had filled out the year for this activity, met the criterion for start-up.

³⁵He was also asked whether anything should be added to his answers, e.g. if his network and resources had changed since he answered the questionnaire. But this was not the case.

equipment, raw material and actually feed the fish over a long time period until it has grown to full size and can be sold. Sale of fish is therefore not a criterion for start-up, it is whether the fish is put into the water. A second argument is that, since profitability is not measured in the questionnaire, I do not know "how well" each of the respondents are doing. Many of the starters who do sell, do not initially make much profit due to low prices and high start-up costs. Sale of the fish is therefore not a valid criterion for distinguishing "success" from start-up.

What does the starting group look like ? This group includes a few persons who farm cod on an experimental basis. Although they are doing it on a very small scale, and some of them more as a hobby, they do fit the criterion for start-up in this study. The majority, however, consists of persons who have started cod farming, but have not come to the point of slaughtering/selling, i.e. persons who are running a cod farm and those who have been running a business and then discontinued it.

7.6 Validation of indices

In this section the validation of the network and the resource indices is done. This section deals with construct validity, i.e. whether the operationalizations of the indices measure the theoretical concepts they are supposed to measure. Construct validity contains several underlying forms of validity (Reve, 1985)³⁶. Here we will concentrate of convergent and discriminant validity. In addition reliability will be included as an underlying form of construct validity (Reve, 1985).

Reliability

Reliability refers to the consistency of the measurement. Reliability differs from validity in the sense that it is possible to have a reliable, consistent measure regardless of whether it actually measures what it is supposed to (validity) (Bollen, 1989). Reliability is that part of a measure that is free of purely random error; thus

³⁶ Reve mentions here face validity, convergent validity, discriminant validity and nomological validity.

reliability assesses measurement error. Bollen (1989) reviews the four most common tests for reliability: test-retest, alternative forms, split-halves and Cronbach's alpha; this author states that Cronbach's alpha has some advantages over the other classic reliability measures. Cronbach's alpha has a long tradition in the psychometric literature. Nunnally (1967) established a criterion of Cronbach's alpha at .05. In his book of 1978 this criterion was set to .07. In Table 7.6.1 below Cronbach's alpha is shown for our 4 network indices and 2 resource indices.

Dimensions	Number of items	Cronbach's Alpha
Service sector	5	.480
Industrial zone	5	.466
Colleagual zone	3	.344
Kin and friends	3	.079
Advice on technology	3	.776
Production resources	4	.792

Table 7.6.1 Cronbach's alpha for the six indices used in the study (N=289).

The resource measures show a high degree of reliability as both are far above the criteria set by Nunnally (1967, 1978). The network zone measures show fairly poor reliability, and the role measure shows poor reliability. One of the reasons for this is that the network measures in fact do not use all of the empirical data available. Remember here that multiplexity consists of all ties which are both a role and an attribute in these zones. Whenever one tie consists of multiple attributes it shows up in the multiple attribute measure. One reason for the very low reliability of kin and friends may be that whenever kin and friends were combined with an attribute it shows up in another variable (multiplexity)³⁷. A second reason is that the network indicators are not as highly correlated as the resource indicators, i.e. the industrial zone consists of indicators such as banker, veterinary, Head of Economic Planning, employee in the Fisheries Extension Office and politician. What these

³⁷ Another reason is that the index "kin and friends" consists of two continuous dimensions (close friend, other family member) and one dichotomy (spouse).

indicators share substantially is that they represent a network category that is supposed to be the furthest away in social distance and that they supply the prospective entrepreneur with services. But we do not expect that a prospective entrepreneur necessarily makes contact with a politician because he first went to a bank to get a loan. The conclusion is therefore that the assumption of unidimensionality behind Cronbach's alpha does not seem to fit the network indices very well. The network concepts do not seem to be unidimensional, their domain seems to cover items that contribute unequally to the concept³⁸.

Convergent and discriminant validity.

The simplest way to assess convergent and discriminant validity is to analyze the correlation matrix of all the items. Convergent validity requires high correlation between items for the same variable, whereas discriminant validity requires low correlations between items for different variables (Reve, 1985). The correlation matrix of all items for the three network zones is shown in table 7.6.2.

³⁸ Due to the fact that the resource indices show acceptable reliability, compared to the network indices, the latter will be focused in the coming sections.

Correlation coefficients: All attributal items

	Codfarm	Salmonf	Fisherm	Fishbuy	Distexp	Consum	Orgg.	Resea.	Extservi	Veterin	Hecopl.	Banker	Politic
Codfarm	1.0	-	-	-	-	-	-	-	-	-	-	-	-
Salmonf	.0809	1.0	-	-	-	-	-	-	-	-	-	-	-
Fisherm	.2185**	.1476**	1.0	-	-	-	-	-	-	-	-	-	-
Fishbuy	.1932**	.2185**	.1712*	1.0	-	-	-	-	-	-	-	-	-
Distexp	.1050	.1003	.0575	.1861**	1.0	-	-	-	-	-	-	-	-
Consumer	.0831	.1502*	.1179*	.1854**	.0864	1.0	-	-	-	-	-	-	-
Orgsale	.0776	.2180**	.1769*	.1372*	.2832**	.1463*	1.0	-	-	-	-	-	-
Research	.1832**	.1098	.0165	.0047	.2136**	.0774	.1783**	1.0	-	-	-	-	-
Extservi	.0538	.0790	.0256	.0767	.0255	.0755	.1478*	.0909	1.0	-	-	-	-
Veterin	.0694	.0983*	.0318*	.0825*	.2014**	.0785	.1297*	.2398***	.0128	1.0	-	-	-
Hecoplan	.0403	.1822**	.2006**	.1082	.1074	.0968	.1990**	.0919*	.1595**	.1557**	1.0	-	-
Banker	.2182**	.1175*	.1556*	.1227*	.2038**	.1787**	.1860**	.1907**	.0973**	.2108**	.2132**	1.0	-
Politic	.1925**	.1419*	.3353	.2111**	.1712*	.1698**	.1931**	.1496**	.0725	.0920	.2216***	.3489***	1.0

Table 7.6.2 Pearson correlation coefficients of all attributal items (N= 289). Two tailed * $p < .05$, ** $p < .001$, *** $p = .0001$ or $p < .001$. Items not correlating significantly with other indicators of the same concept are bold faces.

Regarding convergent validity, which requires high correlation between items measuring the same concept, we see from table 7.6.2 that two out of three correlations for the collegial zone are significantly positive. For the industrial zone, seven out of ten correlations are significant and for the service zone, six out of ten correlations are significant. It seems therefore that convergent validity is relatively high for the colleagual zone and industrial zone and somewhat weaker for the service zone.

Let us look at the items which do not correlate positively with the other indicators of their common concept (these items are boldfaced in table 7.6.2): **Salmon farmer** does not seem to fit in the collegial zone. Cod farmer and fishermen correlate at .22, salmon-farmer and fishermen somewhat lower (.15), but cod farmer and salmon farmer have no significant correlation. This is understandable since a cod farmer and a salmon farmer represent two different farming cultures. However, since they all fit the theoretical domain for being a colleague, the index will be kept as it was defined theoretically. Another clear pattern is that researcher fits rather badly into the industrial zone, not being significantly correlated with either fish buyer or consumer but significantly correlated with distributor/exporter (.21) and with person in sales organization (.18). Consumer also is not significantly correlated with distributor/exporter. A third pattern also seems clear: employee in the Fisheries Extension Office is only significantly correlated with one item within the same zone - Head of Economic Planning (.16).

The conclusion is therefore: based on the correlation matrix of the items, the three zones show in general a certain degree of convergent validity as the majority of the items within each concept correlates positively with the others. However, in each zone there seems to be a rather misplaced item: 1) In the collegial zone, salmon farmer is not correlated with any of the other two items; 2) In the industrial zone, researcher only correlates with two of the other four items; 3) In the service sector, employee in the Fisheries Extension Office is only correlated with one of the other four items.

Discriminant validity requires low correlation among items measuring different terms. As seen in table 7.6.2, cod farmer correlates significantly with two items in the industrial zone and two items in the service sector. Salmon farmer and fishermen show a lower degree of divergent validity, being significantly correlated with three items in the industrial zone and three items in the service zone. Items measuring the collegial zone therefore do not show a good degree of divergent validity. Regarding the items measuring the industrial zone, we see that fish buyer and consumer correlates significantly with three items in the service zone whereas person in sales organization shows the lowest degree of divergent validity, being significantly correlated with all five items in the service zone. When checking the items measuring the service zone, we see that the items banker and politician correlate significantly with all items in the collegial and industrial zones. The conclusion so far is therefore that the collegial and industrial zones show a higher degree of convergent and discriminant validity than the service zone whose items seem to correlate well with items from the other zones. A likely interpretation of this is that since the entire sample, N= 289, is used for this correlational analysis, industrial zone will necessarily be able to distinguish itself better, since this variable is significantly different between non-starters and starters, where the latter group has a significantly higher mean (see table 8.2.1 in chapter eight). On the other hand, non-starters have contact with both the collegial and service zones for exploring the possibilities for start-up, in fact the non-starters have a higher mean of number of ties to the service sector than the starters.

Let us assess convergent and discriminant validity with another method, principal factor analysis. This method uses, the estimated communalities which are determined by the part of their variance explained by the variables. In table 7.6.3 the factor loadings and the communalities of each of the items are shown when the input in the SAS program was the number of indicators representing each of the theoretical concepts. MSA is Kaisers' Measure of Sampling Adequacy³⁹.

³⁹ The MSA is a summary, for each variable and for all variables together, of how much smaller the partial correlations are than the original correlations. Values greater than .8 are considered good, whereas values less than .5 require remedial action (SAS/STAT User Guide, 1989).

Principal Factor Analysis

Indicator	Factor loadings	Communality
Banker	.5292	.2800
Politician	.4800	.2304
Head of Economic Planning	.4181	.1748
Veterinary	.2920	.0852
Employee in Fisheries Ext.Off.	.1925	.0370
MSA = .617		
Distributor/Exporter	.4777	.2282
Person in Sales Organization	.4575	.2093
Local fishbuyer	.3151	.0993
Employee in research inst.	.3139	.0985
Consumer	.2871	.0824
MSA = .610		
Fishermen	.4002	.1601
Cod farmer	.3554	.1263
Salmon farmer	.2645	.0699
MSA = .542		
Other family members	.1680	.0282
Close friends	.1353	.0183
Spouse	.1172	.0137
MSA = .505		
Advice on foddering	.7235	.5235
Advice on production equipment	.6913	.4779
Advice on healthy production	.6708	.4500
MSA = .698		
Fishing offal for fodder	.7477	.5590
Living cod	.6738	.4540
Production equipment	.6573	.4321
Freezer/storage	.6344	.4025
MSA = .779		

Table 7.6.3 Principal factor analysis of the six indices used in the study (N=289).

The results of the principal factor analysis reflect the pattern of the correlation matrix. In the service zone we see that employee in the Fisheries Extension Service has the lowest factor loading (.19) and the lowest communality (.04). This shows that a relatively small part of the variance is explained by the factor, and more clearly, employee in the Fisheries Extension Office is to a very small degree a linear combination of the other four items. In the industrial zone we see that consumer has the lowest factor loading and the lowest communality. Actually local fish buyer, employee in research institution and consumer are to a lesser degree a linear combination of the other items. In the collegial zone we see that salmon farmer has the lowest factor loading and communality.

The conclusion is therefore that in all three network zones there seems to be an item that ideally, for statistical reasons, does not seem to fit the theoretical concept very well. The factor analysis of the two resource indices reveals that "advice on technology" and "production resources" have acceptable MSA's and high factor loadings. The items seem to be a linear combination of the other items and between 40 to 55 % of the items' variance is explained by the underlying concepts.

Before we start discussing how to proceed with the analysis, given the fact that the data did not show the highest degree of convergent and divergent validity, let us examine the results of a principal factor analysis when all 13 items are used in the analysis. Does a factor analysis pick out the same three factors as we have done for theoretical reasons ? The result of the empirical factor analysis is shown in table 7.6.4.

Factor Pattern

	FACTOR 1	FACTOR 2
Politic	.5317	.1719
Banker	.5047	.0593
Orgsale	.4505	.0965
Distexp	.3946	.2255
Hecoplan	.3900	.0282
Fisherm	.3898	.3288
Fishbuy	.3726	.1766
Samonf	.3548	.0538
Codfarm	.3417	.0776
Verin	.3109	.2763
Consumer	.3045	.0817
Extservi	.1711	.0322
Research	.3324	.3402

Table 7.6.4 Principal factor analysis, factor pattern of attributal items (N=289). Factor loadings above .20 are boldfaced.

The data reveal that two underlying factors are present, not three as in our theoretical model. It is interesting that almost all items load on factor 1, indicating that all items seem to be picked from one universe, as they seem to lie very close to one another. The variance in the items explained by factor 1 are all quite good. Only distributor/exporter, fishermen, veterinary and researcher loads on factor 2. Of the communalities we see that the size of consumer and employee in Extensions Service are relatively low.

However, the first factor analysis did not give us a clear picture because almost all items loaded on factor 1. In order to identify factors that are substantively meaningful, a rotation was done using the varimax method. This method attempts to minimize the number of variables that have high loadings on a factor. Orthogonal rotation is used, i.e. we do not allow correlation between factor 1 and factor 2. The results of the orthogonal factor rotation are shown in table 7.6.5.

Rotated Factor Pattern

	FACTOR 1	FACTOR 2
Politic	.5239	.1944
Fisherm	.5097	.0167
Fishbuy	.4019	.0920
Banker	.3594	.3592
Hecoplan	.3237	.2194
Codfarm	.3163	.1507
Salmonf	.3119	.1775
Consumer	.2897	.1244
Research	.0502	.4730
Distexp	.1701	.4214
Veterin	.0729	.4095
Orgsale	.2939	.3548
Extservi	.1144	.1312

Table 7.6.5 Principal factor analysis, varimax variation of attributal items (N=289). Factor loadings above .20 are boldfaced.

The results here are easier to interpret. We can see that a cluster is emerging where some more items are loading on factor 2: researcher, distributor, veterinary, person in sales organization, these are at the same time not loading well on factor 1. The next step is to allow for correlation between the two factors (oblique rotation), as we see for instance that there are some factors still loading well on both factors: person in sales organization, head of economic planning and banker. For this procedure, oblique rotation (promax) is used. In table 7.6.6 the rotated factor pattern is shown, where the factor loadings are the standardized regression coefficients.

Rotated Factor Pattern (Std Reg Coeffs)

	FACTOR 1	FACTOR 2
Fisherm	.5660	.1619
Politic	.5246	.0660
Fishbuy	.4179	.0120
Codfarm	.3077	.0765
Banker	.2988	.2934
Hecoplan	.2972	.1499
Salmonf	.2956	.1072
Consumer	.2855	.0551
Research	.0726	.5056
Veterin	.0303	.4294
Distexp	.0734	.4152
Orgsale	.2278	.3071
Extservi	.0905	.1120

Table 7.6.6 Principal factor analysis, promax rotation of attributal items (N=289). Factor loadings above .20 are boldfaced.

What are we to make of this ? Does the factor rotation with correlated latent factors reveal a clearer picture ? One issue seems clear: researcher, veterinary and distributor seem to follow in one separate cluster, and constitute the domain of factor 2. Banker and person in Sales Organization seem to be captured by both factor 1 and 2 and employee in the Fisheries Extension Service seem to fit neither factors. Items that fit factor 1 are: fishermen, politician, fish buyer, cod farmer, head of economic planning, salmon farmer and consumer. Which substantial pattern is this compared to our three zone division ? Clearly, this pattern reveals that, contrary to the theoretical domain, researcher and distributor and veterinary are more remote attributes in a prospective entrepreneur's network. Closer to the prospective entrepreneur than originally thought are politician, and Head of Economic Planning. These seem to be the actors in the service sector closest to the cod farmer. The dimension underlying this division seems to be a geographic distinction rather than our theoretical social distance distinction. Geographically, politician and Head of Economic Planning are in the same municipality as the entrepreneur, whereas researcher, veterinary and distributor are people one reaches by telephone, and may live both in a different municipality and a different region. Interesting also is that, of the industrial zone, the local fish buyer and consumer

seem to oust the significance of distributor and person in Sales Organization. This depiction shows an empirical picture of the entrepreneur's network, different than the theoretical one. It makes sense that politician is closer to the entrepreneur, given the rural societies where the study takes place. It also makes sense that the researcher, veterinary and distributor are those who seem to play a lesser role than expected. However, as we know that part of the data are hidden in the multiple attribute and multiplexity variable, we do not actually have the full picture. In addition, a theoretical picture of the division between the items on the two factors seems difficult to form.

In order to proceed with a theoretically sound approach where the operationalizations of the attributes are done according to the theoretical domain, I will continue with the three zones as originally proposed; we should however, state that, as tables 7.6.1 and 7.6.2 reveal, there are items in each of zones 1 to 3 which empirically do not meet our expectations. However, they constitute the best operationalizations we could find of the three concepts collegial, industrial and service zone. Unfortunately, some of the items in each zone did not show the empirical characteristics that we would have liked to have seen, which results in that the theoretical concepts do not hold such a high degree of reliability, discriminant and convergent validity as had been expected. The two resource indices, advice on technology and production resources both show acceptable degree of reliability and validity.

8. Descriptive statistics

In this chapter we will look closer at the quality of the data. Although there is no assumption in regression analysis that the variables have to be normally distributed, a high skewness and kurtosis may result in variables less suitable for statistical analysis. In addition we will check the correlations between the variables within one and the same block in the model. Here, a too high level of correlation may result in multicollinearity which inflates the results. A third goal in this chapter is to do a t-test between starters and non-starters. Although bivariate, such a test tells us which variables are distinct for the non-starters and starters.

8.1 Descriptive statistics and correlation matrices of explanatory variables

In this section the descriptive statistics and correlation matrices of human capital, network and resource variables are given. One reason is to check the distribution of the variables and, in case of high skewness or kurtosis, transform them variables so that they approximate a more normal distribution. Another reason is, through correlation matrices, to detect variables that are so highly correlated that we risk violating the assumption of no perfect multicollinearity.

VARIABLE	MEAN	ST.DEV	VAR	MIN	MAX	SKEW	KUR
Age	42.44	11.62	135.24	16	71	.1048	.7451
Education	2.747	1.140	1.300	1	5	.1402	-.2216
Bus. educ.	.6851	.9248	.8553	0	3	.9844	-.3657
Edudiv.	1.121	.9624	.9262	0	3	.3905	-.8693
Tech.exp.	1.833	1.583	2.507	0	6	.7408	-.0436
Selfempl.	.8823	.5204	.2708	0	2	-.148	.4796
Indu.exp.	1.0276	.5645	.3186	0	3	.1238	.5598
Selffam	.9429	.5490	.3014	0	1,5	-.7860	-.7002

Table 8.1.1 Mean, standard deviation, variance, range, skewness and kurtosis of human capital variables (N = 289).

As seen in table 8.1.1, the respondent's age when receiving a license was 42 years, with a range from 16 to 71 years. The respondent's mean of education is approximately at the upper half of the scale from 0 to 5. The mean of economic education, however, is at the lower end of the distribution, which results in a positive skewness close to 1. The same is the case for technical experience, which has a range from 0 to 6, but whose mean is 1.83. The result is a skewness of .74. Education diversity is in the middle of the distribution, however its kurtosis is negative and relatively large resulting in a relatively flat distribution. Also the mean of number of periods of self-employment is in the middle of the distribution, from 0 to 2 times, the mean is .88. Although two of the variables have a distribution that is too far left (in the lower end) of a normal distribution, these variables were not transformed as they do not exceed the normally used cut off point for transformation at 1 in absolute value. Level of education is also very flat, with a negative kurtosis of -.8693. On the next page the correlation matrix is shown.

Correlation coefficients: Human capital variables

	Age	Bus.educ	Edudiv	Tech.exp	Selfempl.	Education	Induexp
Age	1.000	-	-	-	-	-	-
Bus.educ	-.0500	1.000	-	-	-	-	-
Edudiv.	-.2471***	.3043***	1.000	-	-	-	-
Tech.exp	.0687	-.0903	.0337	1.000	-	-	-
Selfempl.	.1929**	-.0050	-.0893	.0857	1.000	-	-
Education	-.2814***	.4280***	.7397***	-.0963	-.0853	1.000	-
Induexp	-.0410	.0584	.0630	.1758*	.1418*	-.0629	1.000
Selffam.	.0276	.0260	.0164	.0609	.1708*	-.0369	.0947*

Table 8.1.2 Pearson correlation coefficients of human capital variables (N= 289). Two tailed * $p < .05$ ** $p < .001$ *** $p = .0001$

From the correlation matrix we see that the two variables which correlate most are level of education and education diversity. This is not very surprising. Those who have a long education tend also to have several different types of education beyond junior high school level. It is also interesting to see that age is negatively correlated with diversity and level of education. This is also expected. Older people have less education compared to younger generations. Economic education is also correlated with both education level and education diversity.

The descriptive statistics of the resource variables - raw variables - are given below.

VARIABLE	MEAN	ST.DEV	VAR	MIN	MAX	SKEW	KUR
Encouragement	1.3890	1.4911	2.2234	0	7	1.3907	1.9709
adv.bureaucr.	.8200	1.0875	1.1827	0	8	2.7603	12.0379
adv. acc./budg.	.2975	.6021	.3625	0	4	2.3574	6.8165
adv. technology	2.1660	2.4324	5.9167	0	15	1.9040	4.8837
material res.	2.000	2.418	5.847	0	17	2.6113	10.7785
financing	.5051	.8421	.7091	0	4	1.810	3.0986
labor	.3183	.6788	.4608	0	3	2.257	4.6020
market/sale	.7612	.8509	.7240	0	5	1.4317	3.2015

Table 8.1.3 Mean, standard deviation, variance, range, skewness and kurtosis of resource variables (raw variables) (N=289).

Characteristic for all resource variables is an excessive positive skewness and kurtosis. The variables are in the lower end of the distribution, and they are too peaked. A reason for this lies most likely in the measurement instrument. The question about resources was very complex; the respondent had to think thoroughly what each of the network persons had given him of the 14 specific resources. For this reason it does not come as a surprise that the mean is low compared to the scale used.

Since the variables are continuous in nature and are assumed to have a stronger impact on start-up, the more of the person get of the resource item, I did not solve this problem by treating them as discrete variables. In order to keep the continuous aspect of the data, the variables were transformed by taking their logarithm. Below the descriptive statistics are shown for the transformed variables.

VARIABLE	MEAN	ST.DEV	VAR	MIN	MAX	SKEW	KUR
Encouragement	.6948	.5850	.3423	0	2.0794	.2426	.9330
adv. bureaucr.	.4719	.4797	.2301	0	2.1972	.6645	.0747
adv. acco.budg.	.1869	.3514	.1235	0	1.6094	1.6020	1.3603
adv. prod.m.	.9041	.7048	.4968	0	2.7725	.1695	-.8261
prod.res.	.8510	.2760	.4783	0	2.8903	.6916	-.6513
financing	.2944	.4452	.1982	0	1.6094	1.1400	-.0418
labor	.1917	.3778	.1427	0	1.3862	1.765	1.5959
market/sale	.4635	.4455	.1985	0	1.7917	.3432	-.8728

Table 8.1.4 Mean, standard deviation, variance, range, skewness and kurtosis of transformed resource variables (N=289).

Overall the variables come out more normally distributed, however three of the measures above have a relatively large standard deviation compared to their mean: advice on accounting and budgeting, financing, and labor. Their dispersion is then wide, and the result is a low variance. Their range is also lower than the other variables and they have excessive skewness and kurtosis. The other five resource items have good statistical characteristics for analysis; they have a high variance, long range and are not skewed or peaked. The conclusion is that we have to expect less valid statistical results based on analysis containing advice on accounting and budgeting, financing and labor. The correlation matrix of the resource variables are shown in table 8.1.5.

Correlation Coefficients: Resource variables

	Encour.	Bureaucr.	Acco.budg.	Technology	Prod.res.	Financing	Labor	Market
Encour	1.0000	-	-	-	-	-	-	-
Bureaucr	.3537***	1.0000	-	-	-	-	-	-
Acc&bud	.4580***	.4188***	1.0000	-	-	-	-	-
Technology	.4277***	.3488***	.4109***	1.0000	-	-	-	-
Prod.reso	.4715***	.2596***	.3248***	.5759***	1.0000	-	-	-
Financing	.4529***	.3324***	.5152***	.3824***	.4188***	1.0000	-	-
Labor	.2321***	.1259*	.2320***	.2725***	.3862***	.1928***	1.0000	-
Market	.2084**	.1295*	.1816**	.3658***	.3825***	.2209**	.1572*	1.0000

Table 8.1.5 Correlation coefficients of resource variables (N= 289) * = p < .05

** = p < .001

*** = p < .0001

There is significant positive correlation between the resource variables. That is to be expected since they all represent a resource pool used in the entrepreneurial process. However, none of the correlations are too large so as to indicate a too great degree of multicollinearity.

Below is the table of descriptive statistics of the eight network variables shown. Due to excessive kurtosis and skewness, these variables are also logged. Exceptions are size and range which are in their raw form.

VARIABLE	MEAN	ST.DEV	VAR	MIN	MAX	SKEW	KUR
Colleagual zone	.9481	.5534	.306	0	2.397	-.2882	-.4729
Industrial zone	.7930	.5876	.3452	0	2.4849	.0970	-.6747
Service zone	.7586	.5490	.3014	0	2.1972	-.0008	-.9092
Multiplexity	.4085	.5103	.2604	0	2.0794	.8328	-.4956
Kin and friends	.4902	.5412	.2929	0	2.0794	.6220	-.7640
Size	4.3321	2.2715	5.1601	0	8	.1134	-.9702
Range	4.2560	2.522	6.364	0	12	.5158	-.1162
Multiple attributes	.7730	.2301	.0529	0	1.609	-.9591	4.6366

Table 8.1.6 Mean, standard deviation, variance, skewness and kurtosis of transformed network variables (N=289).

Of the eight continuous network variables, there is only one - diversity - which has a low variance and range, and has excessive kurtosis. The other seven variables have a good range and variance and no excessive skewness or kurtosis. Especially network size and network range have good statistical properties, due to a wide range.

The correlation matrix of the network variables is given in table 8.1.7.

Correlation coefficients: Network variables

	Kin/friend	Multiplexity	Colleagual	Industrial z.	Service zone	Size	Range	Multatt
Kin/friends	1.0000	-	-	-	-	-	-	-
Multiplexity	.6673***	1.0000	-	-	-	-	-	-
Colleagual z.	.4375***	.5360***	1.0000	-	-	-	-	-
Industrial z.	.2019**	.1772*	.3302***	1.0000	-	-	-	-
Service z.	.2449***	.1573***	2.958***	.3584***	1.0000	-	-	-
Size	.4851***	.2515***	.5909***	.6073***	.6838***	1.0000	-	-
Range	.3555***	.3522***	.6358***	.7474***	.7370***	.8127***	1.0000	-
Multatt	.2677***	.3981***	.5251***	.4752***	.3030***	.2443***	.5441***	1.0000

Table 8.1.7. Correlation coefficients of network variables (N=289). ** p < .05 *** p = .0001

The variables are correlated as expected. The relatively high correlation between Industrial zone, Service zone and size and range is due to the fact that the index industrial zone counts 5 persons and therefore correlate with both size and range. Service zone counts 5 persons and correlate therefore with both size and range. The highest correlation is between range and size (.8127). When the size of the network increases, one also tends to have more different members in one's network.

8.2 T-tests of differences between starters and non starters

Before testing the hypothesis in a multivariate frame, it is interesting to know which variables are significantly different in the starting and the non-starting group. A t-test reveals this; the results are summed up in table 8.1.8. On the left side in the figure, the 24 different explanatory variables are listed. Then a column shows whether the starters were significantly different from the non-starters for a given variable. The column to the right states the direction of the difference, i.e. whether the mean is higher in the starting or the non-starting group. A more detailed description of the difference between the statistical measures for the two groups is given in Appendix 1.

Variable	Sign. diff.?	Direction
Selffam	Sign.**	non-starters more
Induexp	not s.	
Tech.exp	sign.*	starters more
Bus.educ.	not s.	
Edudiv	sign.**	non-starters more
Education	sign.*	non-starters more
Age	not s.	
Selfemploym.	sign.*	non-starters more
Encourag	not s.	
Bureaucr.	not s.	
Accobudg	not s.	
Adv.tech.	sign.**	starters more
Prod.res.	sign.**	starters more
Financing	sign.**	starters more
Labor	not s.	
Marksale	sign.****	starters more
Multiatt	sign.*	starters more
Multiplexity	not s.	
Size	not s.	
Range	sign.**	starters more
Colleagual zone	not	
Service zone	not s.	
Industrial zone	sign.****	starters more
Kin/friends	not s.	

*Table 8.1.8 T-tests of variables being significantly different between starters and non-starters. * $p < .05$ ** $p = .005$ *** $p = .0005$ **** $p = .0000$*

There are four differences between starters and non-starters that are in the opposite direction than predicted a priori. Interestingly, it is only for the background variables that the differences are opposite to predicted. The data reveal that non

starters have an overall higher education level and that they also have a more varied education. Non-starters also have a higher degree of earlier self-employment, and they have a higher degree of self-employment in the closest family. Although a t-test only reveals bivariate relationships, which may look different in a multivariate sense, when other variables are controlled for, knowledge of these differences is important before we test the hypotheses in a multivariate setting in chapter 9. The non-starters do possess a unique educational compared to the starters, they come from families with more self-employment, and they also have more experience from the start-up of a business earlier in their life. Let us turn to the differences that accord with our hypotheses: starters have more technical experience in terms of having experience from storing several types of fish than the non-starters. That means that they have a more relevant technical practical background than the non-starters. However, they have not had more industrial experience in terms of being fishermen, working in the fishing industry or being fish farmers. Neither age or the level of economic education are significantly different between starters and non-starters.

What about resources, are there differences here ? According to table 8.1.8 there are no significant differences between affective and informative resources, with the exception of advice on production methods. It is mainly with material resources that we find significant differences. The starters have significantly more production resources (cod, cod fodder, equipment, storage), financing and market access. Labor does not differ between the groups. What about network variables ? Only three of the eight variables are significantly different between the groups. The starters have a more diverse network, a wider range and have a higher number of industrial actors in their network compared to the non-starters. Very interestingly, size is not statistically different, but range is. That points to the fact that it is not the number of network members as such which counts, but rather how many statuses are represented in the personal network.

To sum up: Regarding human capital variables, five of the eight had a significantly different mean in the starting group and non-starting group. It is interesting that the non-starters seem to have higher human capital values. Of the eight resources, four

were statistically different. Quite obviously, it mainly the material resources which distinguish between the starters and non-starters. Of the eight network variables only three were statistically different. Starters had a more diverse, wider ranging network than non-starters, and they also had more industrial actors. Viewed as a whole, it is interesting that only three of the network variables are significant, whereas resources and human capital have four significant variables each. This confirms the expectations in the conceptual model that resources lie closer than network to start-up in temporal order. However, the t-test also indicated that human capital variables may have a direct effect on start-up as well, in addition to the predicted indirect effect. We now turn to testing the hypotheses in the following three chapters.

9. Dependent variable: Social network.

In this chapter the results of testing the hypotheses from the first path in the model are presented. There are eight dependent social network variables. The result of the eight regressions will be presented successively.

9.1 Results of testing H1-H8

Below is the result of the regression of five human capital variables on ties to actors in the collegial zone (other business starters).

Dependent variable: Collegial zone.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0104***	.0027	-.2187
Tech.exp	.0432*	.0203	.1236
Selfempl.	-.1063*	.0636	-.0999
Indu.exp.	-.0082	.0578	-.0084
Selffam	.0029	.0586	.0028
* p < .05 *** p < .0005		Adj.R: .0591	F value: 4.620 (p < .0005)

Table 9.1.1 Effects of human capital variables on collegial zone (N=289).

The model is significant, and we can reject the null hypothesis that the effect of human capital on the number of other business starters is zero. Age is negative as expected. Holding every other characteristic of the potential entrepreneur constant, a year's increase in age reduces the number of ties to the collegial zone by 21%, using the standardized coefficient. Technical experience is also significant in the predicted direction, whereas self-employment has an unexpected negative impact. The model does not perform very well. Only 6 % of the variance in the dependent variable is explained.

How can we explain that technical experience is significant, whereas general industrial experience is not? My interpretation here is that technical experience in this study involves familiarity with an old traditional technique which uses nets for the storage of living fish. In this kind of work, which fishermen did between seasons, a huge amount of labor was needed, and fishermen often met other persons than the ones they worked with daily. Storing pollack and herring was done with larger boats; this working environment with more people of different professions stands somewhat in contrast to the work which industrial experience represents, where the respondents have been fishermen, fish farmers or been working in the fishing industry. Since technical experience and industrial experience only correlate at .1758, my interpretation is that technical experience represents those fishermen who have this very special working experience. This may have triggered off a better foundation for knowing a wider range of people, who themselves also had experience as business starters or as fishermen. Another interpretation is that persons with a high degree of technical experience also have been those who had the best background for cod farming and therefore have been particularly motivated to start cod farming. Following this argument they have also been more enthusiastic to make contact with other business starters.

With this background, it is also understandable why self-employment has this unexpected negative impact. Self-employment in this study means generally being a fisherman, which again often means a one-man business. This experience may not, to the same extent as technical experience, represent working with a diverse set of people, and therefore may not be a human capital well suited for triggering off a capability to make ties to other business starters.

Let us move on to test the effect of human capital on the ability to make ties to industrial actors³³ (Industrial zone). The results are shown in the table 9.1.2.

³³Industrial actors include the following actors: local fish buyer, distributor/exporter, direct consumer, person in Fishermens' Organization/Fish Farmers Organization/ Sales Organization and employee in research institution.

Industrial zone.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0028	.0409	-.0568
Bus.educ.	.0881*	.0409	.1386
Educ.	.0031	.0484	.0061
Ed div	.0279	.0536	.0458
Tech exp	.0681**	.0536	.1836
Selfempl.	-.1082*	.0221	-.0958
Indu exp.	.0396	.0627	.0380
Selffam	.0376	.0628	.0351

* p ≤ .05 *** p < .0005 Adj. R.: 0477 F-value: 2.804 (p=.005)

Table 9.1.2 Effects of human capital variables on industrial zone (N=289).

The model is significant and we may reject the null hypothesis that human capital variables have zero impact on the number of industrial actors. When examining the individual coefficients, technical experience and business education are positive whereas degree of self-employment is negative. Technical experience has the largest relative impact, a one unit increase in technical experience increases the ties to the industrial zone by 18%. Age, education, education diversity, industrial experience and self-employment in the family are not significant.

The theory here was that making ties with industrial actors may be more dependent on educational skills. Of the three education variables, only business education was significant. Why? The data seem to indicate that experience from commercial schools, taking basic business courses at college or university level, gives a potential entrepreneur a better foundation for making ties to buyers and other persons responsible for bringing the farmed cod to the market, than a general high level of education or having a diverse education. In other words, an business orientated education rather than a general high

education seems to be more valuable for making ties to actors in the industrial zone.

Why is self-employment also negative here ? My interpretation is based on the assumption that a potential entrepreneur attempts to build relations to actors in the industrial zone in the time period close to start-up. As started earlier, self-employment involves a majority of fishermen. Due to the difficulties with financing, access to cod and low prices many respondents have probably got second thoughts about starting, after receiving their license. In that respect, to withdraw from a risky project before it is too late, must be a rational action for many respondents. What may happen here, is that the more experience one has in starting businesses, the better knowledge one has in judging the riskiness of a new one. It may therefore seem that those with a high degree of self-employment have good reasons to withdraw their project, and have done so before making contacts to the industrial zone. In addition, because self-employment involves being self-employed as fishermen, we know that the introduction of quotas, on the fishing of Arctic cod in 1989, made it difficult for fishermen who wanted to start cod farming because they could not afford not to sell their catch directly and save some of it for farming. Also, this may have contributed to the assumed fact that respondents with a high degree of self-employment may have jumped off of the entrepreneurial process. Therefore they did not make ties to industrial actors because they did not need them.

Again, it is interesting, that technical experience is significant, whereas industrial experience is not. Technical experience are fishermen with a broad work experience background, which does really seem to make the potential cod farmers to make ties to necessary resource persons.

Table 9.1.3 shows the results of six human capital variables regressed on the number of ties to actors in the service zone.

Service zone.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0041 (*)	.0029	-.0871
Bus.educ.	.0521 (*)	.0385	.0878
Educ.	-.0333	.0448	-.0693
Edudiv	.0912*	.0497	.1599
Selfempl.	.0438	.0638	.0415
Selffam	.0253	.0595	.0253
(*) p = .08 * p < .05		Adj. R: .0173	F-value: 1.844 (p=.10)

Table 9.1.3 Effects of human capital variables on service zone (N=289).

The model is only significant at the 10 % level. Only 2 % of the variance is explained. Age and business education are only significant at the 10 % level, in the predicted direction. Diversity of education is also significant in the predicted direction. It also has the largest relative impact. For a one unit increase, education diversity increases number of ties to the service zone by 15 %. Education, self-employment and self-employment in the family are not significant.

It seems that there is a relative shift in the importance of working experience to more educational experience for making contact with actors in the service sector, compared to the other two zones of the network according to the theory (see page 84). Ties to the service sector, which consists of bankers, fisheries extension officers, politicians and veterinarys, seem to require more scholarly based experience compared to industrial experience. For the first time, both business education and education diversity are positive.

Let us see whether human capital predicts ties to kin and friends as hypothesized.

Kin and friends.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0118****	.0027	-.2537
Techexp	.0550**	.0198	.1609
Selfempl.	-.0180	.0618	-.0173
Induexp.	-.0409	.0562	-.0426
Selffam	.0061	.0570	.0062

**** p = .0000 ** p < .005 Adj. R: .0688 F-value: 5.255 (p<.005)

Table 9.1.4 Effects of human capital variables on kin/friends (N=289).

The model was significant, and we can reject the null hypothesis; the effect of human capital on ties to kin/friends is significantly different from zero. However, the model performs only moderately well. Only 7 % of the variance in number of kin/friends is explained. Age is negative as expected. Of the four other variables, only technical experience is significant. Self-employment, industrial experience and self-employment in the family are not significant.

Why is the degree of self-employment in the family not significant in predicting that the potential entrepreneur uses these ties in the entrepreneurial process ? The reason for this is likely to be that, because kin and friends are treated in the same category in an index³⁴, it is not possible to sort out the kin component that may be affected by the fact that parents and siblings have been self-employed. Another problem is due to our treatment of self-employment in the family as a continuous variable, with a four-point scale, where siblings are given half the weight of the parents (see section 7.5). It may be that this is a too

³⁴For the purpose of this study, kin and friends are assumed to serve the same purpose in generating resources. However, as a dependent variable, with human capital variables as regressors, the ideal would have been to treat kin and friends as separate dimensions so that spouse and other family member would be distinguished from close friend.

ambitious, given the fact that we have no substantial support for the effect of siblings.

Again, age is significantly negative. It has the largest relative impact, a one year increase in age causes a 25 % reduction in number of ties to kin and friends. This supports earlier research on networking among the elderly which shows that the elderly clearly have less friends than younger people (Marsden, 1987; Fisher and Oliker, 1983; Blau, 1961). The results here point to the fact that elderly people do not seem to have used their friends/kin in the entrepreneurial process to the same extent as younger people have.

To sum up: making contact with the three different zones of actors requires different background characteristics. Technical work experience predicts the zone closest to the potential entrepreneur. Higher business education, technical experience and less self-employment helps when making contacts in the second zone. In contrast, the third zone requires a variety of education and higher business education. With higher age, one tends to make less ties in all zones. This is especially the case when kin and friends is the dependent variable.

Table 9.1.5 shows the results of human capital on multiplexity, i.e. a kin/friend relation combined with an attribute in one of the three network zones.

Multiplexity.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0083**	.0026	-.1897
Edu div	-.0168	.0315	-.0318
Tech exp	.0529**	.0188	.1641
Selfempl.	-.0693	.0589	-.0707
Indu exp.	.0477	.0535	.0494
Selffam	-.0532	.0542	-.0572
** p < .005		Adj.R.: .0529	F-value: 3.678 (p<.005)

Table 9.1.5 Effects of human capital variables on multiplexity (N=289).

The model is significant, and we can reject the null hypothesis i.e. that the coefficients are zero. However, a lot of unexplained variance remains. Again, age and technical experience are significant. Age has the largest relative impact.

The interpretation is that having a high degree of technical experience involves being in different working environments with different professional statuses. These may be favorable conditions for increasing the possibility of developing friendships with one's colleagues. As a result, these ties may be activated in the entrepreneurial process. It is also understandable that age, again, is negative. To build multiplex relations, i.e. being related to a person who either is business starter, industrial actor or works in the service sector, as a kin or friend is a time consuming and requires energy. The older one is, the less likely it is that one has the ability to build those ties for business purposes.

In table 9.1.6 the result of human capital's impact on network size is shown.

Network size.

Independent variable	Coeff.	St.error	St.coeff.
Age	-.0281*	.0119	-.1441
Bus.educ.	.2470*	.1570	.1005
Educ.	-.0884	.1857	-.0443
Edudiv	.3610*	.2057	.1529
Techexp	.2600**	.6848	.1812
Selfempl.	-.0094	.2615	-.0021
Induexp.	-.2320	.2409	-.0576
Selffam	.0531	.2411	.0128

* p < .05 ** p < .005 Adj.R.: .0613 F- value: 3.352 (p=.001)

Table 9.1.6 Effects of human capital variables on network size (N=289).

The model is significant, and we may reject the null hypothesis that human capital has no impact on network size. 6 % of the variance is explained. Only four of the eight explanatory variables are significant: age, business education, education diversity and technical experience.

Interesting here, is that both business education and education diversity are significant, with the latter having a relatively larger impact. Work experience is significantly positive, in addition to technical experience. The ability to make many ties in the entrepreneurial process seems therefore both to be affected by a higher theoretical background, and education diversity in addition to having this very critical technical experience. Network size seems to be both educational and work experience related as predicted. The relatively large impact of technical experience, a one unit rise increases the network size by 18 %, indicates that persons with high technical experience have been relatively active in the entrepreneurial process and explored the possibilities by building a large social network for business purposes.

In predicting network range, i.e. the number of different attributes covered in Ego's network, the same human capital variables serve as predictors. The results are shown in table 9.1.7.

Network range.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0377**	.0132	-.1741
Bus.educ.	.3232*	.1746	.1185
Educ.	-.0411	.2066	-.0186
Edudiv	.2305	.2288	.0879
Techexp	.2326*	.0943	.1460
Selfempl.	-.2711	.2908	-.0559
Induexp.	.0013	.2680	.0003
Selffam	-.0424	.2681	-.0092

* p < .05 ** p < .005 Adj.R: . 0586 F-value: 3.241(p=.001)

Table 9.1.7 Effects of human capital variables on network range (N=289).

The model is significant, but performs less well than with network size as the dependent variable. Three variables are significant, all in the predicted direction: age, business education and technical experience.

Again, the educational impact on range only works through business education. The industrial impact on range only works through technical experience. When these are controlled, a general level of education and general industrial experience do not affect the building of a network of members with different attributes. Network range seems to require effort from the potential entrepreneur. Older people do not have the energy to build relations with up to 13 different persons, in the same degree as younger persons have.

Table 9.1.8 shows the results of the regression where multiple attributes, i.e. the average number of attributes Alter have, is the dependent variable.

Multiple attributes.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0026*	.0012	-.1330
Bus.educ.	.0202	.0162	.0815
Educ.	-.0065	.0191	-.0322
Edudiv	.0061	.0212	.0256
Tech.exp	.0147*	.0087	.1011
Selfempl.	-.0496*	.0270	-.1123
Indu exp.	.0091	.0248	.0224
Selffam	-.0141	.0249	-.0337
* p < .05	Adj.R: .0242	F- test: 1.895 (p= .06)	

Table 9.1.8 Effects of human capital variables on multiple attributes (N=289).

The model is only significant at the 10 % level. Only 2 % of the variance in multiple attributes is explained by the model. Again, age and technical experience are both significant in the predicted directions, while self-employment has a negative effect opposite to predicted.

The question is again whether earlier self-employment has had a reactive effect on building a network. My interpretation is that respondents with a high degree of self-employment have been less eager to build a goal oriented network for cod farming because some of them have "jumped off" the process, due to the problems which the cod farming industry has experienced.

To sum up: Of the eight hypotheses tests, only six came out significant at the 5 % level. Multiple attributes and service sector were only significant at the 10 % level. A summary of the model fit is given in section 9.3. Now, we will study the extent to which a high degree of multicollinearity may have inflated the results.

9.2 Test for multicollinearity.

In this section we will analyze whether the estimation of the equations violates the assumption of classic linear regression: no exact collinearity between the explanatory variables, i.e. that there are no exact linear relationships between them (Gujarati, 1988). There are several ways of detecting collinearity, e.g. examining the variation inflator factors and examining the condition indices. Here we will use both approaches. The variance inflation factors (VIF) measure the inflation in the variances of the parameter estimates due to collinearity that exists among the regressor variables (SAS/STAT User's Guide, 1989). These factors tell us how much the variance of the parameter estimate and standard error of the parameter have been inflated. A parameter with no inflation has a VIF of 1. A VIF of 2 means that the variance has been inflated by a factor of 2, etc. Unfortunately, there are no clear guidelines distinguishing between an acceptable and a "bad" VIF. As Belsley, Kuh and Welsch state, one of the weaknesses is the "lack of meaningful boundary to distinguish between values of VIF that can be considered high and those that can be considered low" (Belsley et al., 1980:90). Fox (1991) suggests that since the linear relationship among the explanatory variables must be very strong before collinearity seriously degrades the precision of estimation - it is not until the correlation approaches .09 that the precision is halved - the square root of the VIF in preference to the VIF itself should be examined (Fox, 1991).

We may solve this problem by comparing the size of VIF to the other collinearity diagnostics using condition indices. The size of the condition index indicates the degree of multicollinearity. Gujarati suggests a rule of thumb that condition indices between 10 and 30 reflect moderate to strong multicollinearity, and strong multicollinearity if they exceed 30 (Gujarati, 1989:301). We may also see the condition index in relation to the proportion of variance explained by a component. A collinearity problem occurs when a component

associated with a high condition index contributes strongly to the variance of two or more variables (SAS/STAT User's guide, 1989).

The multicollinearity diagnostics are shown in Appendix 4. As seen on page 1 in the appendix, all VIF are on the 1 level and a condition index of 12 does not produce large variance in two or more variables. We may therefore conclude that, in the prediction of the collegial zone, there are no signs of a serious degree of multicollinearity. In predicting the number of ties to industrial actors, we see that education and education diversity have a VIF of 2. There are two condition indices over 10 and below 20, which at the same time produce some variance in two or more variables; however only about half the variance is explained. The conclusion is that there seems to be some degree of multicollinearity between education and education diversity, and between degree of education and age. The same pattern is to be found when the number of persons in service sector is the dependent variable: degree of education and age seem somewhat multicollinear, where the 43 to 61 % of the variance in the dependent variable is explained by the correlation between the variables. In predicting kin and friends (page 2 in Appendix 4) there is no problem with multicollinearity as the high condition index is not combined with explaining high variance in two or more factors. The same is to be said when predicting multiplexity; all VIFs are at 1 level. In predicting network size, range and diversity, some collinearity exists as education diversity and education level have VIF at the 2 level, combined with condition indices between 10 and 20; however only 50 % of the variance is explained.

The conclusion of the extent of multicollinearity in predicting the eight network variables with the eight human capital variables is that we have weak to moderate multicollinearity between education diversity and education level, and between education level and age. We recall that education diversity and level of education was correlated at .74 and age and education level correlated negatively at .28. Respondents with high education tend also to have a greater diversity of education; and the older the respondent is, the less educated he seems to be. As we have seen in this section, the estimated equations which contain education level, education diversity and age are to some degree inflated, i.e. there is variance in the network variables; however this is present in such a moderate degree that it does not require any remedial action.

9.3 Summary

A summary of the eight regressions is given in figure 9.3.1 below. The eight dependent network variables are on the horizontal axis, whereas the eight explanatory human capital variables are on the vertical axis. Only the significant effects are included, "+" indicates a positive effect and "-" a negative effect. When given in parenthesis, the significance level is 10 %.

	Collegual zone	Industrial zone	Service zone	Kin/ friend	Multiple-xity	Size	Range	Multatt
H1 Age	-		(-)	-	-	-	-	-
H2 Buse.		+	(+)			+	+	
H3 Educ.								
H4 Edud.			+			+		
H5 Tech.	+	+		+	+	+	+	+
H6 Self.	-	-						-
H7 Indue.								
H8 Sffam								
Adj. R sq	.059	.047	.017	.068	.052	.061	.058	.024

Figure 9.3.1: Number of times human capital variables predict social network variables (N=289).

Industrial experience, self-employment in the family and education were never significant in predicting a social network variable. Self-employment was significant twice, though in the opposite direction than predicted. Business education was significant four times, and technical experience and age were both significant seven times. Altogether, human capital only explained between 2 and 7 % of the variance in the network variables.

The variable that was consistent with our expectations to the largest degree was age, significant seven of the eight times predicted. Age had a relatively large negative impact on network variables, actually stronger than expected. The only time it was not significant was in predicting industrial actors. The general impression is therefore that the older the individual is, the less able he/she is to build a large number of ties to individuals like other business starters, private and public service units, kin and friends, multiple ties; older people are less likely to have a large, wide ranging network with a high degree of multiple attributes.

Of the other variables, the most puzzling result is that technical experience is the variable that is most often positive in predicting network characteristics. It is significant seven out of eight times predicted. I had expected business education, level of education, diversity of higher education, earlier business experience, industrial experience and family's self employment to come out positive. It's interesting and puzzling that, when all of these are held constant, technical experience was the only variable that could predict the type of ties and characteristics of the network as a whole. As stated earlier, technical experience does really signify those respondents with very specialized and useful work experience for cod farming. They probably have the most relevant work experience for starting cod farming. Compared to industrial experience, technical experience involves work on a larger boat, with more different professions involved. This may yield a broader network basis when the potential entrepreneur is thinking of starting cod farming. In addition, this technical work-experience, due to its relevance for cod farming, may have motivated the individuals to explore their social network for business purposes.

Earlier business experience came out significant only three times, and then in the opposite direction than predicted. Being self-employed as a fisherman means often running a one-man-business on a small boat. In the case of owning a larger boat, the fisherman is the captain of the boat and has some persons employed in the busy part of the season to help with the fishing. Very few fishermen do the bookkeeping themselves. It is normally contracted out to professional firms. With this background, it is understandable why the self-employment variable does not "behave" as it is expected to do. To be self-employed as fishermen does not seem to give the respondents the same business experience assumed

to trigger off an ability to develop a network for resource acquisition. Another interpretation, however, is that persons with prior business experience may, due to the start-up problems in the industry, have a better background to evaluate the project and are therefore less motivated to start up. If this is the case, then it will be reflected in reduced networking behavior for the reason that they have simply "jumped off" the process.

Business education was significant in predicting industrial actors, network size and the service sector (at the 10 % level). Business education seems to trigger off an eagerness to network for business purposes. Education, very unexpectedly, is not significant even once, whereas education diversity is significant twice. When education never comes out significant, whereas education diversity does, this is a sign that the need for higher education may not be so pronounced in this kind of enterprise which is low-tech and practical. On the contrary, a variety of different types of education and a specialization in business education seem to give a more effective background for networking in this industry. A variable that has to be questioned is self-employment in the family. Should I rather have focused on only the father's self-employment instead of the whole family's self-employment ? It may be too ambitious to expect the self-employment of the mother and siblings to have an effect in this male-dominated industry with relatively old respondents.

The general impression is that the use of only human capital variables is too a narrow perspective to explain variance in network variables. Work experience and education, experience as self-employed, and the family's self-employment are not enough to explain why individuals build networks with different characteristics. As stated, some of the explanation may be due to this particular sample; the hypotheses need to be tested on a different sample in the future. In trying to come up with plausible explanations for the lack of fit of the model, three reasons seem likely.

First those respondents with high self-employment background, with a high level of education and broad industrial experience may have a resourcefulness that makes them capable of developing other personal networks than a goal oriented network for cod-farming. They may have after career options available compared to those with high

technical experience background. Likely they have used their energy on other networks including other business or career/projects.

Second, is the need for a social network totally independent of how motivated the individuals are to start a firm? Might it be that some of these respondents, although sampled from a population which has shown interest in starting a business by applying and receiving a license, in fact showed reluctancy towards start-up early in the entrepreneurial life cycle and therefore were less enthusiastic in building a network for business purposes? The significant negative impact of prior self-employment may indicate that their background made them "better" at evaluating the upcoming project and, due to the problems in an industry like cod farming, their motivation for start-up declined and they did not bother to explore the possibilities through their network.

A third factor, that may affect why human capital variables do not have as strong an impact as proposed, is due to where the respondents in this sample are settled. The individuals in this study live in rural environments. Their formal education and work experience may not be the best predictors of networking. Maybe these formal requirements mean more for relationship formation in a more urban setting. Perhaps local status, family history and other informal aspects of individuals living in rural societies with low mobility, may have been reasonable factors for predicting these respondents' social networking.

In the next chapter, business resource is the dependent variable.

10. Dependent variable: Business resources

In this chapter the impact of social network on resources is tested (10.1). Then the total effects of human capital on resources are revealed (10.2) before social network is controlled for and the direct effects of human capital on resources are assessed (10.3). A summary is given in 10.4.

10.1 Social network on resources (H9-H16)

This section shows the tests of the hypotheses of the effects of the social network on business resources. There are eight dependent variables. The results are presented in a specific order, starting with the resources assumed to be needed first in the entrepreneurial process. Below, the effects of network variables on encouragement to start a business are shown.

Encouragement to start a business

Independent variables	Coeff.	St.error	St.coeff.
Network size	-.0296	.0269	-.1152
Network range	.0451*	.0251	.1945
Multiplexity	.1669*	.0905	.1456
Colleagual zone	.1654*	.0819	.1565
Service zone	.1745*	.0857	.1637
Kin/friends	.2281**	.0844	.2110
* p < .05 ** p < .005		Adj. R: .3070	F-value: 22.261

Table 10.1.1 The effects of social network on encouragement to start a business (N=289).

The model is significant and the null hypothesis of non-significance may be rejected. Five of the six predicted effects are significant. Size is the only variable not significant. The

model fits the data well, almost 31 % of the variance is explained.

The results support the theory that affective resources are given by various parts of the network, both from the zone closest to the potential entrepreneur and furthest away from him. Using the standardized coefficients for comparing the relative magnitude, we see that kin/friend is the predominant type of tie for giving encouragement. A one percent rise in ties to kin/friends increases the extent of encouragement by 21%. This supports the notion that the closer - more strongly tied - Alter is to Ego the more likely Alter is to support Ego with encouragement. It is interesting too that size has no significant effect; it is the range of network members that is significant. Range has the best impact, increasing the extent of encouragement by 19%. When size is controlled for, it is a wide range of different individuals that affect the degree of affective resources. This is an important finding given earlier research, as it points to the shift from size to range as a meaningful network variable.

Advice on handling the bureaucracy

Independent variables	Coeff.	St.error	St.coeff.
Size	-.0069	.0229	-.0329
Range	-.0294	.0217	-.1547
Multiple attributes	.2260*	.1365	.1084
Multiplexity	.0549	.0716	.0584
Colleagual zone	.0783	.0685	.0904
Service zone	.5031****	.0680	.5758
Kin/friends	.1438*	.0673	.1623

* p < .05 **** p = .0000 Adj. R: .3545 F -value: 23.593

Table 10.1.2 The effects of social network on advice on handling the bureaucracy (N=289).

This model is also significant. The path between social network and advice on handling the bureaucracy is significantly different from zero. Multiple attributes, service sector and kin and friends are significant. The model fits the data well as 35 % of the variance is explained.

As postulated, the number of persons in the service sector has the largest relative effect. A 1 % increase in ties to the service sector increases advice on the bureaucracy by 57 %. Very interestingly, neither size, range nor multiplexity are significant; neither is the number of business starters. Actors in the collegial zone, like fishermen, other cod farmers and salmon farmers, do not serve as helpers with bureaucratic advice as expected. It does seem that this advice is given mainly by the professional part of the network and by Ego's kin and friends. In addition, ties to persons with many attributes are helpful. People with more than one status seem to be able to help the potential entrepreneur with advice in how to handle the bureaucracy. In other words, it is important to have network members who occupy diverse statuses, individuals who work in the service sector and kin and friends, in getting help with bureaucratic matters.

Advice on accounting and budgeting.

Independent variables	Coeff.	St.error	St.coeff.
Size	-.0252	.0163	-.1629
Range	.0392**	.0150	.2818
Multiplexity	.0539	.0530	.0783
Service zone	.1359**	.0508	.2124
Kin/friends	.1410**	.0533	.2172
** p < .005	Adj.R: .2262	F-value: 17.839	

Table 10.1.3 The effects of social network on advice on accounting and budgeting (N=289).

The model is significant. However, the explained variance is lower than for the resource variables so far.³⁵ 23 % of the variance in accounting and budgeting is explained by the model. Three variables are significant in the predicted direction: range, service sector and number of kin/friends.

The pattern of variables affecting access to advice on accounting and budgeting is similar to the pattern of variables affecting help with the bureaucracy. Again, it is network members from the service zone and kin/friends which are significant. In addition, range has the largest relative impact (28 %). Interestingly, it is the zones closest and furthest away which give Ego access to these resources. A potential entrepreneur increases advice on handling the bureaucracy and advice on accounting and budgeting by making both formal and informal ties.

Advice on technology

Independent variables	Coeff.	St.error	St.coeff.
Size	.0031	.0285	.0102
Range	.1002****	.0240	.3588
Multiplexity	.1515(*)	.0993	.1097
Colleagual zone	.2474**	.0841	.1943
Kin/friends	.1908*	.0927	.1465

(*) p < .10 * p < .05 ** p < .005 **** p = .0000 Adj.R-square: . 4235
 F-value: 43.321

Table 10.1.4 The effects of social network on advice on technology. (N=289).

³⁵The reason why the model fits less well may be due to the fact that the dependent variable is, after a log transformation, still highly skewed and peaked.

The model is significant. The model fits the data very well; 42 % of the variance is explained³⁶. Every variable, except for size, is significant in the direction predicted.

In explaining the variance in advice on technology, both structural and attributal variables are significant. Range has a considerable impact. A 1 % increase in range increases this advice by 35 %.³⁷ A potential entrepreneur also gains by having multiple ties to Alter, by making contact with other business starters and by using kin/friends. As predicted, the more informal part of the network plays the role of giving access to resources. However, a wide range of Alter from this part of the network is needed.

Financing.

Independent variables	Coeff.	St.error	St.coeff.
Size	-.0112	.0200	-.0573
Range	.0817***	.0243	.4631
Multiplexity	.0649	.0655	.0744
Service zone	.1156*	.0703	.1426
Industrial zone	-.0812	.0652	-.1072
Kin/friends	.0864(*)	.0652	.1050

(*) p < .10 * p < .05 *** p < .0005 Adj. R: .2811 F-value: 19.773

Table 10.1.5 The effects of social network on financing (N=289).

³⁶Some of the good fit is likely to be due to the characteristic of the dependent variable itself. Advice on production equipment and method is an index, based on four indicators. This gives a variable with a higher mean, and a wider range, which then better approximates a normally distributed variable (than for instance advice on accounting and budgeting, which has a much shorter range).

³⁷This is very likely due to the fact that the dependent variable is an index consisting of three indicators (advice on cages and mooring, advice on foddering/sorting/slaughtering and advice on healthy production).

The model is significant. Two variables are significant: range and number of persons in the service zone. Kin and friends are only significant at the 10 % level. Financing is not as well explained by the model compared to the other resources. Only 28 % of its variance is explained by the explanatory variables³⁸.

The hypothesis, that multiple ties predict access to financing, was not supported. The hypothesis that industrial actors gave access to financing was also not supported. Again, range has a strong impact compared to the other variables, using the standardized coefficient. A one per cent increase in range increases access to financing by 46 %. In second place comes the number of ties to the service zone. Third comes the number of kin/friends. We expected financing to be a "broad" resource, i.e. a resource to which a wide range of individuals can contribute; and specifically persons in the service sector and the entrepreneurs' kin and friends. Again, both the formal and informal part of the network is needed.

Production resources.

Independent variables	Coeff.	St.error	St.coeff.
Size	.0241	.0206	.0793
Multiplexity	.2738****	.0737	.2020
Colleagual zone	.3919****	.0816	.3135
Industrial zone	.2964****	.0678	.2518
**** p = .0000	Adj.R: . 4004	F-value: 49.089	

Table 10.1.6 The effects of social network on production resources (N=289).

³⁸Again, this may be due to a dependent variable with a low mean and therefore a high positive skewness and a short range.

The model is clearly significant, fitting the data very well. 40 % of the variance is explained.³⁹ Multiplexity, the number of business starters and industrial actors are significant and have strong impacts. Net of the other factors, collegial zone increases production resources by 31 %, second comes industrial zone which increases them by 25% and third multiplexity which increases them by 20 %. Again, size is not significant.

Interestingly, both self-employed colleagues, like fishermen, cod - and salmon farmers, and industrial actors, like local fishbuyers, distributors, persons in important organizations and the research environment, provide the potential entrepreneur with important material resources for start-up. Here the local fish and fish farming environment seem to perform well in serving prospective entrepreneurs with living cod, production equipment, storage and fishing offal for fodder. Therefore, multiplexity also seems important; the closer Ego is tied to Alter as a kin or friend, the more likely he is to receive important resources.

Labor.

Independent variables	Coeff.	St.error	St.coeff.
Size	.0368*	.0178	.2214
Range	-.0226(*)	.0151	-.1512
Multiplexity	.0947*	.0587	.1279
Kin/friends	.1889*****	.0593	.2705

(*) p < .10 * p < .05 ***** p = .0000 Adj. R: . 1714 F-value: 15.890

Table 10.1.7 The effects of social network on labor (N=289).

The model is significant. All four variables are significant in the predicted direction. However, only 17 % of the variance in labor is explained by the explanatory variables,

³⁹Again, access to production resources is a statistically "good" variable, with a higher mean, an acceptable range and no skewness.

probably due to a positively skewed and strongly peaked dependent variable.

The theoretical predictions here were that labor is a "narrow" resource, (Ego's kin and friends and people he/she has multiple ties to) given only by interactional variables and no attributal variables. Range was therefore predicted to be negative. The results seem to confirm our expectations, and they reveal the very small scale in the enterprises we are dealing with. I recall from the telephone interviews that the cod farmers mentioned their sons, cousins, uncles and sometimes their wife and daughters as labor for the enterprise. This result confirms much of the qualitative research done in the salmon farming industry in Norway, where the family business approach has been described as an important rural strategy (Spjelkavik, 1990).

The result of the last regression in this block is given below. Access to the market is the dependent variable.

Access to the market.

Independent variables	Coeff.	St.error	St.coeff.
Size	.0185(*)	.0119	.0949
Multiplexity ⁴⁰	.3818**	.0894	.1546
Industrial zone	.3380****	.0477	.4458
(*) p < .10 ** p < .005 **** p = .0000		Adj. R: 3282	F-value:47.905

Table 10.1.8 The effects of social network on market access (N=289).

The model is significant and we can reject the null hypothesis that social network has no impact or access to the market. 33 % of the variance is explained. All three variables are

⁴⁰ The multiplexity variable here is kin and friends combined with Alter in only the industrial zone, not the general multiplexity variable used in the other parts of the analysis where kin and friends are combined with Alter in all zones.

significant.

The number of industrial actors has the strongest impact, as expected. Also multiple ties based on a combination of kin/friends and attribute in the industrial sector are significant. Size is significant but has a very low impact. The results confirm our hypothesis that access to the market is a "narrow" resource, given only by one sector in the network - the industrial zone. Having multiple ties to Alter in this zone has a positive effect on access to the market. Building a large network is also conducive to gaining access to the market.

10.1.1 Test for multicollinearity

From chapter 8 we recall that some of the network variables did show significant positive correlation. Size and range showed especially strong correlation. The question now is whether this has contributed to a high degree of multicollinearity so that the variance in the resource variables are inflated. The results of the multicollinearity test is shown on page 4 in Appendix 4 (under heading resources). In predicting encouragement, size and range have a VIF of 4; examining the condition index reveals that the correlation between size and range contributes to between 60 to 80 % of the variance in the dependent variable. Also the number of ties to other business starters and the number of ties in the service sector inflate the results.

The conclusion is that a moderate degree of multicollinearity exists between the mentioned variables in predicting affective resources. In predicting access to bureaucratic resources, network size and range have a VIF of 5, combined with a condition index of 19. Also range, number of ties to other business starters and number of ties to the service sector show signs of multicollinearity. The pattern is similar for predicting advice on accounting and budgeting and advice on technology: size and range show moderate multicollinearity. In predicting finance, range has a VIF of 7, size a VIF of 4 and the service sector a VIF of 3. Of the condition indices and the variance proportion, we see that network size and number of ties to the service sector share a high degree of variance. Network size, range and industrial sector show a moderate degree of multicollinearity. Both production resources and market resources show no multicollinearity.

The conclusion in this section must be that some of the network variables show a higher degree of multicollinearity compared to some of the human capital variables. The less explanatory variables in an equation, the lower the likelihood of multicollinearity (i.e. production resources and access to the market have no multicollinearity and both have only four explanatory variables). However, the strength of VIF and the condition indices does not reveal more than moderate multicollinearity, so we may state that the assumption of no perfect multicollinearity is not violated. What we may state is that network size and network range conceptually seem to lie very close to one another. Interesting here, however, is that one of the variables always comes out significant, although they are correlated at .81. This is an example demonstrating that one cannot rely on multicollinearity as an excuse for not obtaining significant results. As shown here, those two variables which are correlated at .81, show moderate collinearity in the eight regressions, yet still one of them always has a significant effect on the dependent variable.

10.1.2 Summary

In section 6.3 the temporal order between the resource variables in the start of the entrepreneurial process was discussed. In summing up how well the eight network variables explain the eight resource variables, we thus discuss whether some of the network variables have their impact in the beginning, in the middle, or in the last part of the process of establishing a business as predicted in 6.3. The figure on the next page shows the resource variables, horizontally, ordered in a temporal sequence. The network variables are shown vertically; "+" indicates a significant positive effect, "-" indicates a significant negative impact. Network size is decidedly the "worst" variable, being only significant once. It seems to play a role late in the process when assembling labor resources. The variable "industrial actors" is only significant twice, however this variable contributes heavily to the variation in production resources and access to the market. Its function seems also to come later in the process. Range and multiplexity, however, were both significant in explaining five different resources over the whole time period. The number of business starters was significant in explaining three resources, also over the time period. The number of network members from the service sector was significant four times. However, it seems that they contributed to resources earlier rather than later in the

entrepreneurial cycle as predicted. The most solid and stable network variable for predicting resources seems to be kin/friend ties. It was significant in predicting six resources as hypothesized.

	Affective H 9	Advice on bureaucr. H 10	Adv. acco& budg. H 11	Adv. tech. H 12	Financing H 13	Labor H 14	Produc- tion H 15	Market H 16
Multatt		+						
Size							+	
Range	+		+	+	+	-		
Multipl.	+			+		+	+	+
Colleag.z.	+			+			+	
Service z.	+	+	+		+			
Industr.z.							+	+
Kin/fr.	+	+	+	+	+	+		
Adj. R sq	.307	.355	.226	.424	.281	.171	.400	.328

Figure 10.1.1 Number of times network variables predict resource variables.

Of the two structural network measures (size, range), range seems the most promising in explaining different resources. What implications can we draw from this ? First of all, range seems a more promising variable than size. Since earlier studies have focused on size, this study has shown that when range is controlled for, size does not add anything to explaining resources. As both variables are in the same eight regressions, and range is significant five times and size only twice this study has shown that range explains more variation in access to resources than size. The theoretical implication of this is that the size of the network itself does not give so much substantial information compared to who

these network members are. Size seems to be a substantially less important network variable which does not add to the analysis when range is held constant. What seems important for a potential entrepreneur is to make contact with a wide selection of individuals, individuals who occupy different statuses. Seen through the entrepreneurial process, it seems that range is important at the time of acquiring affective and informative resources. When it comes to material resources, range is significant in explaining access to financing but negative in explaining labor. Furthermore, it is not significant in explaining material resources or access to the market. This result points to a general lesson. A wide range of different network members seems to be the pattern in the earlier stages of the entrepreneurial process as we assumed in section 6.2. When it comes to actual start up and assembling of material resources, a "narrower" but larger network with ties to industrial actors size seems preferable. The conclusion is that size seems most important late in the process, range early and in the middle of the process.

Of the interactional variables, both multiplexity and kin/friends seem to play an important role for access to resources. Multiplexity shows itself as being a very promising network measure throughout the process and perhaps most at the end. Kin and friends play a very important role - in the idea and planning stage.

What does the picture of the attributal network variables look like ? Of the four variables service sector was significant four times, collegial zone three times, industrial actors twice and multiple attributes only once. As assumed the number of industrial actors seems to play an important role late in the process when assembling material and market resources. The service sector seems to have its impact on resources early in the process, whereas the collegial zone seems to play a role throughout the process.

10.2 Human capital on resources

In this section we will briefly give the significant results of the total effects of human capital on business resources. As stated in the hypotheses section, these effects may be positive because, when we do not control for the social network, human capital may indirectly affect business resources through the impact which social network has. Table

10.2.1 below shows a summary of these effects. The column on the left hand side shows the eight human capital variables, and the top row shows the eight dependent resource variables. Only significant results are revealed.

	Affective	Bureaucracy	Accobud	Techn.	Financing	Labor	Production	Market
Age	-.0116***	-.0061*	-.0064***	-.0090*	-.0053*	-.0039*	-.0148****	-
Buse.	-.0529(*)	-	-	-	-	-.0570*	-	.0469(*)
Educ	-	-	-	-	-	-	-	-
Edudiv	-	-	.0440	-	.0881*	-	-	.0528(*)
Tech	.0365*	.0309*	-	.0614*	-	.0401**	.0336(*)	.0490**
Selfe	-	-	-	-	-.0750(*)	-	.1101(*)	-
Induexp	-	-.0796(*)	-.0732*	-	-	-	.1412*	-
Selffam	-	-	-	.1429*	-	.0532*	-	-
Adj.R	.0599	.009 (n.sign)	.0047	.0801	.0523	.0459	.0908	.0303

(*) $p < .10$ * $p < .05$ ** $p < .005$ *** $p < .0005$ **** $p = .0000$

Table 10.2.1: Human Capital variables that significantly predict resource variables (N=289).

There are two variables that have a clear significant impact on almost all business resources: age does reduce every business resource (apart from market access) and technical experience helps improve the amount of all resources, apart from advice on accounting and budgeting and financing. Business education, education diversity and industrial experience are significant in predicting three of the eight resources. Self-employment and self-employment in the family predict two of eight resources. A great deal of the variance in resource variables remains unexplained. The adjusted R varies from .009 (where the equation was not significant) to .09.

Let us move on to controlling for the social network. Will this picture then look different? As stated in H17, the hypothesis is then that the significant effects we now have seen in table 10.2.1, will not remain when the network is controlled for.

10.3 Human capital and social network on resources (H17)

In this section we will reveal the results of regressing both human capital and social network on resources. The results from this analysis will help us to assess the research questions posed in the introduction: 1) how much of the social network's effect on business resources on start up is spurious and 2) whether all of the effect of human capital on resources goes through social network. The significant effects from human capital on resources in the eight coming tables show their direct effect when social network is controlled for. The effects from social network on business resources here are likely to be reduced from when they were regressed on business resources alone (10.1), and this reduction will be the spurious part of the relation. In the eight tables below we will only briefly comment the effects of human capital variables which were hypothesized to be zero in H17.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0050*	.0027	-.1012
Bus.educ.	-.0563*	.0352	-.0890
Educ.	.0125	.0412	.0244
Edudiv.	.0211	.0460	.0347
Techexp.	.0037	.0193	.0102
Selfempl.	.0069	.0585	.0061
Selffam.	.0035	.0536	.0033
Induexp.	.0388	.0538	.0375
Colleagual zone	.1490*	.0828	.1410
Service zone	.1748*	.0866	.1641
Kin/friends	.1898*	.0864	.1756
Multiplexity	.1696(*)	.0921	.1479
Network size	-.0247	.0274	-.0360
Network range	.0419(*)	.0254	.1810

(*) $p \leq .10$ * $p < .05$ Adj. R: 3073 F-value: 10.127

Table 10.3.1 The effects of human capital and social network on encouragement (N=289).

We cannot reject the null hypothesis that the coefficients are non-zero. Of eight variables, two are significant in predicting encouragement. Age and business education both have negative impacts.

Dependent variable: Advice on the bureaucracy.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0018	.0021	-.0452
Bus.educ.	-.0005	.0281	-.0010
Educ.	-.0391	.0328	-.0930
Edudiv.	.0073	.0366	.0148
Techexp.	.0114	.0153	.0377
Selfempl.	.0095	.0466	.0104
Selffam.	-.0284	.0426	-.0325
Induexp.	-.0609(*)	.0428	-.0717
Colleagual zone	.0749	.0697	.0864
Service zone	.5052****	.0691	.5782
Kin/friends	.1324(*)	.0693	.1494
Multiplexity	.0575	.0732	.0612
Network size	-.0070	.0235	-.0331
Network range	-.0282	.0220	-.1485
Multiple attributes	.2203(*)	.1380	.1057

(*) $p < .10$ * $p < .05$ **** $p = .0000$ Adj. R: 3489 F-value: 11.288

Table 10.3.2 The effects of human capital and social network on advice on bureaucracy (N=289).

Also here the null hypothesis cannot be rejected; although seven coefficients are non-significant and small, one, industrial experience, is significant and has a 7 % decrease in advice on bureaucracy for one units rise in the industrial experience. In table 10.3.3 advice on accounting and budgeting is the dependent variable.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0032*	.0017	-.1085
Bus.educ.	-.0341(*)	.0221	-.0899
Educ.	-.0263	.0259	-.0855
Edudiv.	.0322	.0289	.0883
Techexp.	-.0051	.0121	-.0230
Selfempl.	-.0023	.0367	-.0035
Selffam.	-.0000	.0336	-.0000
Induexp.	-.0730*	.0338	-.1173
Service zone	.1352**	.0509	.2113
Kin/friend	.1078*	.0539	.1660
Multiplexity	.0674	.0532	.0979
Network size	-.0221(*)	.0163	-.1430
Network range	.0379*	.0151	.2725

(*) p < .10

* = p < .05

**p=.005

Adj. R: 2409 F-value: 8.032

Table 10.3.3 The effects of human capital and social network on advice on accounting and budgeting (N=289).

Also here the null hypothesis cannot be rejected. Of eight human capital variables, three have a significant negative impact on the dependent variable. Age reduces advice on accounting and budgeting by 10 %, industrial experience reduces it by 11 % and business education reduces it by 8 %.

In table 10.3.4 advice on technology is the dependent variable.

Independent variables	Coeff.	St.error	St.coeff.
Age	.0003	.0029	.0060
Bus.educ.	-.0025	.0382	-.0338
Educ.	.0782*	.0446	.1266
Edudiv.	.0264	.0498	.0361
Techexp.	.0108	.0208	.0242
Selfempl.	.0201	.0632	.0148
Selffam.	-.1346*	.0580	-.1048
Induexp.	.0269	.0583	.0216
Colleagual zone	.2546**	.0839	.1999
Kin/friend	.1965*	.0935	.1508
Multiplexity	.1280	.0996	.0926
Network size	-.0018	.0286	-.0058
Network range	.0982****	.0239	.3517

(*) $p < .10$ * = $p < .05$ ** $p = .005$ **** $p = .0000$ Adj. R: 4392 F-value: 18.352

Table 10.3.4 The effects of human capital and social network on advice on technology (N=289).

Again the null hypothesis cannot be rejected. Two of the eight coefficients are significantly non-zero. Education increases advice on technology by 12 %, other factors held constant, and a one unit increase in self-employment in the family reduces advice on technology by 10 %. In the next table, 10.3.5, financing is the dependent variable.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0010	.0021	-.0281
Bus.educ.	-.0410(*)	.0270	-.0852
Educ.	-.0052	.0316	-.0133
Edudiv.	.0664*	.0352	.1436
Techexp.	-.0201(*)	.0148	-.0717
Selfempl.	-.0624(*)	.0448	-.0729
Selffam.	-.0276	.0410	-.0341
Induexp.	.0461	.0412	.0584
Service zone	.1263*	.0701	.1558
Industrial zone	-.0697	.0656	-.0920
Multiplexity	.0688	.0658	.0788
Kin/friends	.0699	.0657	.0850
Network size	-.0078	.0200	-.0400
Network range	.0007**	.0245	.4178

(*) $p < .10$ * = $p < .05$ *p < .05 **p < .005 Adj. R: 2977 F-value: 9.722

Table 10.3.5 The effects of human capital and social network on financing (N=289).

The null hypothesis cannot be rejected. Four of the eight variables have a significant impact on the dependent variable. Business education reduces financing by 8 %, net of the other variables. Technical experience reduces financing by 7 %, net of other factors, self-employment reduces financing by 7 %, whereas education diversity increases financing by 14 %, net of the other factors. In table 10.3.6 production resources is the dependent variable.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0077**	.0029	-.1308
Bus.educ.	-.0457	.0380	-.0611
Educ.	.0139	.0445	.0230
Edudiv.	.0170	.0496	.0237
Techexp.	-.0221	.0208	-.0507
Selfempl.	-.0228	.0634	-.0172
Selffam.	-.0557	.0578	-.0442
Induexp.	.1253*	.0580	.1022
Colleagual zone	.3626****	.0811	.2901
Multiplexity	.2433***	.0739	.1795
Industrial zone	.2934****	.0679	.2493
Network size	.0266(*)	.0207	.0876

(*)p < .10 *p < .05 **p < .005 ***p < .0005 ****p = .0000 Adj. R: 4214 F-value: 18.483

Table 10.3.6 The effects of human capital and social network on production resources (N=289).

Again, the null hypothesis cannot be rejected. Two of the eight human capital variables have significant effects on production resources. Everything else being equal, age reduces production resources by 13 %, whereas industrial experience increases production resources by 10 %. In table 10.3.7 labor is the dependent variable.

Independent variables	Coeff.	St.error	St.coeff.
Age	-.0011	.0019	-.0354
Bus.educ.	-.0472*	.0247	-.1157
Educ.	.0028	.0289	.0085
Edudiv.	.0204	.0323	.0519
Techexp.	.0223(*)	.0135	.0934
Selfempl.	.0152	.0409	.0209
Selffam.	.0537(*)	.0376	.0780
Induexp.	-.0100	.0378	-.0150
Multiplexity	.0910(*)	.0593	.1230
Kin/friends	.1704**	.0602	.2441
Network size	.0336*	.0180	.2021
Network range	-.0200(*)	.0152	-.1341

(*) $p < .10$ * = $p < .05$ *p < .05 **p < .005

Adj. R: 1789 F-value: 6.229

Table 10.3.7 The effects of human capital and social network on labor (N=289).

The null hypothesis cannot be rejected. Three of eight variables are significant in predicting labor. Everything else being equal, business education reduces labor by 11 %, technical experience increases it by 9 % and self-employment in the family increases it by 7 %. In the next table, 10.3.8, market/sale is the dependent variable.

Independent variables	Coeff.	St.error	St.coeff.
Age	.0015	.0020	.0398
Bus.educ.	.0128	.0263	.0267
Educ.	-.0464(*)	.0308	-.1189
Edudiv.	.0326	.0344	.0704
Techexp.	.0166	.0144	.0592
Selfempl.	-.0126	.0437	-.0147
Selffam.	-.0387	.0401	-.0478
Induexp.	.0275	.0402	.0349
Multiplexity	.3665**	.1254	.1504
Industrial zone	.3274****	.0487	.4318
Network size	.0199(*)	.0122	.1015

(*) p < .10 ** p < .005 Adj. R: 3266 F-value: 13.699

Table 10.3.8 The effects of human capital and social network on market/sale (N=289).

Also here, the null hypothesis must be accepted. Education is significant in predicting market/sale. Net of the other factors, a one unit increase in education reduces market/sale with 11 %.

To sum up: we were not able to validate H17, as we could not reject the null hypothesis that human capital should have a non zero impact on resources, when social network is controlled for. In predicting the various eight resources, between one and four human capital variables had a significant direct effect when the social network was controlled for. These results did not support the conceptual model, as the data indicates that there are direct paths from human capital to resources when social network is controlled for. These direct effects will be commented on in more detail in the summary in 10.4.

10.4 Summary

In this summary we will discuss two questions: 1) How much of the effects of social network on business resources is spurious and 2) Whether the causal chain model as postulated is able to transform all of the effect of human capital on business resources through social network.

Regarding 1) I will present eight tables that show the total effect of social network on resources (from tables 10.1.1 to 10.1.8) and the effect when human capital is controlled for (from table 10.3.1 to 10.3.8). Based on these numbers I will show the spurious component and the spurious proportion of the total effect.

Dep.var: encouragement

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Colleagual zone	.1654*	.1490*	.0164	.099
Service zone	.1745*	.1748*	-.00003	.0001
Multiplexity	.1669*	.1696*	-.0027	.1061
Network size	-.0296	-.0247	.0049	.1655
Network range	.0451*	.0419(*)	.0032	.0709
Kin/friends	.2281**	.1898*	.0383	.1679

Table 10.4.1: Assessing the spurious proportion of the network's impact on encouragement (N=289).

As seen in table 10.4.1, three of the five significant network variables have a reduced impact on encouragement when human capital is controlled for. Network range has the smallest spurious component, second comes multiplexity and third kin and friends. When dividing the magnitude of the spurious component by its total effect, we get the proportion of the total effect which is spurious. This is largest for kin and friends, where .16 of the total effect is spurious. Interestingly, there are two variables that increase their effect on encouragement when human capital is controlled. The service zone and multiplexity have

a negative spurious proportion, called a suppressor effect (the variable performs better when the effects of other variables are controlled for). In using the last column, multiplexity is the variable that has the largest proportion of the total effect caused by human capital.

This analysis has therefore shown that, although the effects are rather small, some of the social network variables' impact on encouragement is (up to .03), due to the fact that human capital is affecting social network as well as degree of encouragement.

The next table shows advice on bureaucracy as the dependent variable.

Dep.var: Advice on bureaucracy

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Colleagual zone	.0783	.0749	.0003	.04
Service zone	.5031****	.5052****	-.0021	.0041
Multiplexity	.0549	.0575	-.0026	.0473
Network size	-.0069	-.0070	-.0001	.014
Network range	-.0294	-.0282	.0012	.0408
Multiple attributes	.2260*	.2203(*)	.0057	.0252
Kin/friends	.1438*	.1324*	.0114	.0792

Table 10.4.2: Assessing the spurious proportion of the network's impact on advice on bureaucracy (N=289).

Table 10.4.2 reveals that out of the three significant variables, service zone has a rather small suppressor effect, multiple attributes has a rather small spurious component, whereas kin and friends has a somewhat larger spurious component. The proportion of the total effect of kin and friends that is caused by human capital is .07. Some of the social network's impact on advice on bureaucracy is then a result of variables appearing earlier in temporal order.

Dep.var: advice on accounting and budgeting

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Service zone	.1359**	.1352**	.0007	.0051
Multiplexity	.0539	.0674	-.0135	.2504
Network size	-.0252	-.0221	.0031	.1230
Network range	.0392**	.0379*	.0013	.033
Kin/friends	.1410**	.1078	.0332	.2354

Table 10.4.3: Assessing the spurious proportion of the network's impact on advice on accounting and budgeting (N=289).

Interesting in table 10.4.3 is that of the three significant variables, kin and friends loses its significant impact on advice on accounting due to controlling for human capital. Its spurious component, due to human capital, comprises .2354 of its total effect, which must be said to be a relatively large proportion. Kin/friends' impact on advice on accounting and budgeting is, to a relatively high degree, a spurious relationship, affected by human capital.

Dep.var: advice on technology

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Colleagual zone	.2474**	.2546**	-.0072	.0291
Kin/friends	.1908*	-.1965	-.0057	.0298
Multiplexity	.1515(*)	.1280	.0235	.1551
Network size	.0031	-.0018	.0013	.4193
Network range	.1002****	.0982****	.9018	.9

Table 10.4.4: Assessing the spurious proportion of the network's impact on advice on technology (N=289).

Of the four significant variables, two of them lose their significant impact on advice on technology when human capital is controlled. Multiplexity has the largest amount of its

total effect reduced (by .15). The most severe spurious relation, however, is the impact of range on advice on technology. The spurious proportion of the total effect is as large as .9.

Dep.var: financing

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Industrial zone	-.0812	-.0697	.0115	.1416
Service zone	.1156*	.1263*	-.0107	.0925
Multiplexity	.0649	.0688	-.0039	.0600
Network size	-.0112	-.0078	.0034	.3035
Network range	.0817***	.0737**	.008	.0979
Kin/friends	.0864(*)	.0699	.0165	.1909

Table 10.4.5: Assessing the spurious proportion of the network's impact on financing (N=289).

Of the three significant network variables, kin and friends lose its significant impact on financing due to human capital, which makes 0.19 of its total effect spurious. Service zone and range have relatively small spurious proportions.

Dep.var: production resources

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Colleagual zone	.3919****	.3626****	.1719	.4388
Industrial zone	.2964****	.2934****	-.003	.0101
Multiplexity	.2738****	.2433***	.0305	.1113
Networksize	-.0241	.0266(*)	-.002	.0829

Table 10.4.6: Assessing the spurious proportion of the network's impact on production resources (N=289).

Of the three significant variables, colleagual zone has the most severe spurious relation with production resources. Of its total effect, .4388 is due to human capital's impact.

In table 10.4.7 labor is the dependent variable.

Dep.var: labor

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Multiplexity	.0947*	.0910(*)	.0037	.0390
Networksize	.0368*	.0336*	.0032	.0869
Network range	-.0226(*)	-.0200(*)	.0026	.1150
Kin/friends	.1889****	.1704**	.0185	.0979

Table 10.4.7: Assessing the spurious proportion of the network's impact on labor (N=289).

The spurious component is largest for kin and friends which reduces its impact by .01 when human capital is controlled. Range has .11 of its total effect caused by human capital.

Dep.var: market access

	Total effect	Effect when HC controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC
Industrial zone	.3380****	.3274****	.0106	.0313
Multiplexity	.3818***	.3665**	.0153	.0400
Network size	.0185(*)	.0199(*)	-.0014	.0756

Table 10.4.8: Assessing the spurious proportion of the network's impact on market access (N=289).

Industrial zone and multiplexity have here relatively small spurious components and a small proportion of their total effect is spurious. Network size improves its effect when human capital is controlled, having a relatively small suppressor effect.

To sum up: Is there any pattern in the sense that some network variables are more spurious than others ? It seems that kin and friends is the most spurious, if any, of the network variables. Its effect on encouragement, advice on accounting and budgeting and financing was, to the largest extent, a result of spuriousness due to the fact that human capital variables affect both kin and friends and the mentioned resources. Recalling the result of human capital on kin and friends (table 9.1.4 page 163) it was age and technical experience that significantly predicted kin/friends. These variables are also likely to have significant effects on encouragement, advice on accounting and budgeting and financing. This can be seen in table 10.4.9 below that shows the direct effects of human capital on resources, when social network is controlled for.

Table 10.4.9 below is based on tables 10.3.1 - 10.3.8. This table allows us to answer 2) the question whether, as postulated, all the effect of human capital on resources goes through the social network. Let us take table 10.3.1 (page 188) as an example. Age and business education are the only human capital variables that come out significant on the degree of encouragement when the social network is controlled for. In using the standardized regression coefficient, we may state that a one unit increase in age, everything else being equal, reduces the degree of encouragement by 10 %. Business

education has a slightly lesser effect. For a one unit increase in business education, the degree of encouragement decreases by 8 %. Age and business education therefore have significant direct paths to a business resource variable, encouragement, independent of the social network. It is this direct effect of age that makes the relation between kin/friends and encouragement spurious, as stated in the last section.

	Encouragement	Bureaucracy	Accobud	Tech.adv.	Financing	Labor	Prod	Market
Age	-.0050* (-.1012)	-	-.0032* (-.1085)	-	-	-	.0077** (-.1308)	-
Busedu	-.0563* (-.0890)	-	-.0341(*) (-.0899)	-	-.0410(*) (-.0852)	-.0472* (-.1157)	-	-
Educ	-	-	-	.0782* (.1266)	-	-	-	-.0464(*) (-.1189)
Edudiv	-	-	-	-	.0664* (.1436)	-	-	-
Techexp	-	-	-	-	-.0261(*) (-.0717)	.0223(*) (.0934)	-	-
Selfemp	-	-	-	-	-.0624(*) (-.0729)	-	-	-
Induexp	-	-.0609(*) (-.0717)	-.0730* (-.1173)	-	-	-	.1253* (.1022)	-
Selffam	-	-	-	-.1346* (-.1038)	-	-	-	-

(*) $p < .10$ * $p < .05$

Table 10.4.9: A summary of the significant direct effects of HC on BR when SN is controlled (N=289). Numbers in parentheses are standardized coefficients.

The next column in table 10.4.9 shows that industrial experience reduced bureaucratic advice by 7 %, independent of the social network. Age reduced advice on accounting and budgeting by 10 %, net of other factors, business education reduced it by 8 % net of other factors, and industrial experience reduced it by 11 %, net of other factors. Education

factors, and industrial experience reduced it by 11 %, net of other factors. Education increased advice on technology by 12 % whereas self-employment reduced it by 9 %. Business education reduced financing by 8 %, self-employment reduced it by 7 % whereas education diversity increased it by 14 %. Business education reduced labor by 12 %, technical experience reduced it by 7 % and self-employment in the family increased it by 8 %. Age reduced production resources by 12 % and industrial experience increased it by 10 %. Education reduced market access market access by 12 %.

To sum up: Age is significant three of eight times. Its effect is negative and indicates to that the older the prospective entrepreneur is, the lower degree of encouragement, advice on accounting and budgeting and production resources he is able to acquire. Business education is significant four out of eight times. The higher education in business the less encouragement, advice on accounting and budgeting, financing and labor he receives. Education is only significant twice and goes in both directions, which makes it more difficult to interpret. It increases advice on technology, but reduces access to the market. Education diversity is significant only once; the more diverse an education one has, the more access to financing one gains. Technical experience is also significant only once, reducing access to labor. Are people with technical experience less inclined to need labor? Self-employment is significant twice, it reduces advice on technology and the availability of financing. The latter may indicate that people who have started many businesses before may have trouble in convincing the bank to lend them money for a new project. Industrial experience is significant three times. It is negative in predicting access to bureaucracy and accounting and budgeting which may indicate that industrial experience may make prospective entrepreneurs need less advice on how to handle bureaucratic matters and on accounting and budgeting. But industrial experience predicts access to production resources positively, which makes sense; having been employed in related industries makes one more capable of receiving raw material, production equipment and room for storage. The degree of self-employment in the family is significant only once, predicting the amount of labor positively. This also makes sense: self-employment in the family, which in this industry is likely to mean having brothers and sons employed in various parts of the fishing sector, means that needed labor is within easy reach.

Summary: We were not able to validate H17 (when social network is controlled, the effect of human capital on business resources becomes zero). The null hypothesis that the direct effects of human capital was non zero could not be rejected. The data indicates that social network does not fully transmit the effect of human capital on resources as postulated in the conceptual model. Human capital variables have a significant direct impact on business resources even when social network is controlled for. On the other hand it must be stated that on average only two of the human capital variables predicted a business resource significantly. In addition, the direct effects were rather small, varying from .003 to .1346 using the unstandardized coefficients and from .07 to .1436 using the standardized coefficients. We must therefore conclude that the majority of social network variables in fact were able to transmit the effect of human capital variables on to business resources, which supports H17; however as, on average there was always two of the eight human capital variables that suggested the opposite, we cannot say that the entire part of H17 was supported.

11. Dependent variable: Start-up

In this chapter business resources' impact on start-up are tested (11.1). Then the total effects of social network and human capital are assessed (11.2). In 11.3 both business resources, human capital and social network are regressed on start-up. A summary follows in 11.4.

11.1 Business resources on start-up (H18a-H18h)

In this section the result of the third and find path in the model are given. The hypotheses are that the eight different resources have positive impacts on the probability of start-up. The result of the logistic regression is shown below.

Independent variable	Coeff.	St.err.	St.coef
Encouragement	-.3338	.3065	-.1076
Adv.bureaucr	-.5856*	.3596	-.1549
Adv.acc&budg.	-.3987	.5483	-.0772
Adv.technology	.0439	.2705	.0170
Financing	.3783	.4182	.0928
Labor	-.7158*	.4330	-.1491
Production resources	.6852*	.2972	.0010
Access to market/sale	2.6317****	.3947	.6464

Table 11.1.1 Effects of resources on start up (N=289).

Chi-square:	88.383 (p = .0001)	*	p < .05
Log likelihood:	294.080	****	p = .0000
Pseudo R-square:	.360		
Corr. betw. pred.prob. and observ outc.	.566		

The model is significant at the .0001 level. The chi square, 88.383, is the difference between 376.463, the log likelihood of a model with the intercept only, and 294.080, the log likelihood of the theoretical model. We can clearly reject the null hypothesis that the model's impact is zero.

The model fits the data well, but Table 11.1.1 reveals that only four of the eight variables are significant. More unexpectedly; only two of them, production resources and access to the market, are in the predicted direction. Of these two, market resources has the strongest impact. In exponentiating the coefficient, a one unit increase in access to the market multiplies the odds of starting a business by 13.897. Production resources multiply the odds of starting by 1.984. The other two significant variables, labor and advice on how to handle the bureaucracy, have a negative impact on start-up. A one unit increase in access to labor multiplies the odds of starting by .488. A one unit increase in advice about bureaucracy multiplies the odds of starting by .585. Advice on technology and financing are positive as predicted, but not significant. Encouragement, advice on accounting and budgeting have opposite signs than expected (negative) but are not significant.

A very interesting finding is the significant negative impact of advice on the bureaucracy on the probability of start-up. Why does this not effect start-up positively ? We also have an unexpected difference when checking the mean in tho two groups (see Appendix 1). The starters have got less advice on the bureaucracy than the non-starters (.795 vs. .864). From the regression of network variables on resources, we know that advice on the bureaucracy was given by Alter in the service zone and by kin and friends. The result here indicates that this advice has not been helpful enough to move the potential entrepreneur further in the process. However, with my knowledge of the industry and the comments many cod farmers have given me about the public service, the result is not surprising. My impression is that in many instances potential cod farmers have been very dissatisfied with the service they got there. The following quotations from three respondents on why they did/did not start (see question 11 in Appendix 3) illustrates this point:

Respondent X

"..... basically, much of the public bureaucracy and rules and regulations are some of the most important obstacles to developing innovation in the economic life, both in this and other industries".

Respondent Y

"I would like to point out the negative attitude towards cod farming from the public civil service (Fisheries Extension Service among other things). The possibility of financing has suffered because of this..."

Respondent Z

"... Help from the Head of Economic Planning has been miserable (non-existent). The Fisheries Extension Office has in addition worked against everything cod farming (here, I understood that low profitability was the reason).

A puzzling result is the negative influence of labor. The t-test revealed that there were no significant differences between the groups (starters have .3279 and non-starters have .3009). However, it is interesting that the non-starters have such a high mean on labor resources. Knowledge from the telephone interviews make this result interpretable. In the telephone interviews, many non-starters talked about the labor resources they had in their family (son, wife, cousin) who they would use if they should start. It may be that the telephone situation in some sense triggered off some "prospective resources" that postal respondents had not ticked off themselves. Since the non-starting group were over-represented in the group that were telephone interviewed, there may be an unusually high degree of labor represented in their network. Seen apart from this measurement error, caused by different measurement techniques, the conclusion must be that labor resources seem to be available in both the non-starters' and starters' network. It does not seem to be a critical resource for start-up. That is reasonable given this particular setting where start-up is on a small scale, often carried out as family businesses. In addition, there was a surplus of labor in Norway at the time of the study. For that reason it is reasonable that labor does not turn out significantly positive as originally expected. Still it is difficult to interpret why, when every other resource is held constant, labor should reduce the odds of start-up.

Production resources and market resources, had a considerable impact as expected.

The results indicate that, when all other resources are controlled, production resources and

access to the market significantly increase the odds of start-up. The findings are not "revolutionary" in the sense that it is not unexpected that the resources assumed to lie closest to start-up in temporal order are also those which have the largest relative impact on the probability of start-up. The results, however, indicate that, in this industry, access to the market was in fact the one factor that helped most (using the standardized coefficients) to distinguish those who managed to start from those that had not. The results indicate that the commercial resources obtained through the network were the most predictive resource for start-up.

11.1.1 Results when outliers are removed

Since relatively few of the variables were significant, let us explore whether the model is sensitive to influential outliers. Table 11.1.2 shows the result when 15 cases were removed using the 5 options in logistic regression for detection of influential outliers.

Independent variables	Coeff.	St.err.	St.coef
Encouragement	-.4831	.3732	-.1543
Adv. bureauc.	-.9826*	.4458	-.2570
Adv. acc & budg.	-.8761	.7218	-.1667
Adv. productm	-.0648	.3289	-.0246
Financing	1.0551*	.5385	.2556
Labor	-1.5193**	.5492	-.3066
Production resources	1.1277**	.3804	.4147
Access to market/sale	4.1221****	.5394	.9960

Table 11.1.2 Effects of resources on start up. 15 influential outliers removed (N=274)

Chi-square:	131.857	*	p < .05
Log likelihood:	219.218	***	p < .005
Pseudo R-square:	.577	****	p = .0000
Corr. betw. predicted probability and observed outcome	.6840		

When influential outliers are removed, the chi-square increases by 43.474. The pseudo R-square increases by 22 %. The correlation between the predicted probability and observed outcome increases by 12 %. This must be said to be a considerable improvement of the fit when less than 5 % of the sample are taken out because they represent extreme cases.

One more variable comes out significant; access to financing. A unit increase in access to financing multiplies the odds of starting a business by 4.716. Production resources multiplies the odds by 3.088 and access to market/sale multiplies the odds by 61.688 ! Labor decreases the odds by .21 and bureaucracy decreases the odds by .374. The conclusion is therefore that the model, with 15 outliers removed still gives the general picture from the analysis: material resources are the key to start-up.

11.1.2 Test for multicollinearity.

The test for multicollinearity is revealed on page 6 in Appendix 4. As seen there none of the VIF's are above 2; and none of the condition indices reveal any large numbers. We may therefore conclude that bivarately, there is no indication of any multicollinearity among the resource variables in predicting start-up.

11.1.3 Summary

The analysis of the final path, resources regressed on start-up, gave some interesting results. In comparing the relative effects of each of the variables when the others are held constant, only access to the market has a considerable positive impact. When access to the market is controlled, one extra unit of production resources adds little to the probability start up. In addition, advice on handling the bureaucracy and access to labor reduces the probability to start-up. This result indicates that the effect of different resources have had a very peculiar impact on start-up in this study. Resources that were predicted to have a positive effect, work in fact negatively. Why ?

A very likely interpretation here is that the quality of one of the informative resources, advice on handling the bureaucracy, has not been good enough to help the potential

entrepreneur move forward in the process to the point of start-up. Due to the problems in this industry, these informative resources given by persons in the service sector seem to have given the potential entrepreneur second thoughts about starting, rather than motivation to go ahead. Start-up of cod farming may be a risky project if the cod farmer is dependent on buying cod for farming and if he is not successful in finding well paying buyers in niche markets. In a new industry, which has not had time to develop its potential, informative advice from the private and public service, from the potential entrepreneur's kin and friends and other business starters may give a warning sign rather than motivation. What we have here is that the quality of business resources to which access is given through the network - is not independent from what is happening in an emerging industry. We may state that the social network has had a disfunctional impact on moving the prospective entrepreneur from idea to start-up. Not all resources given through the network are good resources for helping the potential entrepreneur move forward. This is an example of how the social network, because it is constituted of actors who have their own views on the business project may express their scepticism towards entrepreneurship. Social networks are not neutral social systems. The actors that constitute an entrepreneur's social network do not act towards the entrepreneur independent of the characteristics of the enterprise.

The model was very sensitive to influential outliers. When 15 extreme cases were removed, the magnitude of the coefficients increased, especially for production resources and financing which in fact came out significant. The picture then looked a bit different: all material resources have a strong positive impact on the probability of start-up, except for labor which is negative. A likely reason for the model's sensitivity is that many non-starters have filled out the potential resources which they would get access to through their network if they should start. On the other hand, a survey like this will always have starters that do not fill out in detail what kind of resources they have. When these two extreme sub-groups within the start and non-starting group get removed, a much "cleaner" picture emerges, material resources are conducive to start-up in general.

There should be no doubt that access to material resources is the clue to starting farming of cod. However, although both affective and some informative resources came out

negative when material resources are controlled, it does not mean that they have not had their impact on a potential entrepreneur along the start-up process. A preliminary path analysis of parts of this material, where the temporal order between the resources was estimated, revealed that both affective and informative resources explained 40 to 50 % of the variance in material resources (Foss, 1993). In other words, affective and informative resources may very well push the potential entrepreneur further in the process to the point of getting material resources. If this is the case, they may have an important indirect effect on start-up. In estimating the total effect from these variables on start-up, the direct negative effect must be subtracted from the positive indirect one.

However, it should be clear that this analysis showed that affective, informative and material resources do not count equally for start-up. Material resources are the mediator for start-up, with access to the market as the major driving variable.

11.2 Social network and human capital on start-up

In this section we will show the results of the total effects of human capital and social network on start up. These may be positive, as business resources are not controlled for.

11.2.1 Results of total effects of human capital

In table 11.2.1.1, the results of the total effects of eight human capital variables on start-up are shown.

Independent variable	Coeff.	St.err.	St.coeff.
Age	-.0077	.0118	-.0477
Bus.educ	-.0898	.1539	-.0457
Education	.1577	.1840	.0991
Edudiv	-.5558**	.2040	-.2949
Selfempl.	-.5278*	.2650	-.1514
Induexp.	.5325*	.2484	.1657
Tech.exp.	.1824*	.0892	.1592
Selffam	-.5076*	.2510	-.1536
Chi.sq. :	26.102	* p < .05 ** p < .005	
Log likelihood:	350.361		
Pseudo R square	.1235		
Correl. betw. predicted and observed outcome:	.2926		

Table 11.2.1.1 Total effects of human capital variables on start-up (N=289).

The model is significant, and we cannot maintain our hypothesis that the coefficients are zero. The data show that the coefficients are significantly non-zero. Five individual coefficients are significant. Education diversity, self-employment and self-employment in the family are all negative. Industrial and technical experience are positive.

Since these coefficients were predicted to be zero, our interpretation of their impact must now be based on only post-hoc exploratory reasoning. The pattern is, however, very interesting. The data indicates that both industrial experience and technical experience have been a good type of work experience for start-up. Not unexpectedly, individuals who have worked as fishermen, fish farmers in the fishing industry and with the storage of herring, pollack etc. have a higher likelihood of start-up. This points to a lesson that work experience which involves similar technology to the new project of value for a potential business starter. These results also support empirical studies reviewed in chapter four. The positive impact of technical experience is supported by Johannisson (1990) who found that

technical training was significant for success. The positive impact of industrial experience is supported by Brüderl, Preisendörfer and Baumann (1991) who found that industrial experience predicted survival significant.

Why then are education diversity and own and family self-employment negative ? Here, we have to take into account the difficulties which the industry has faced. How do individuals, who come from self-employed families and who themselves have been self-employed, react to starting a business under such difficult circumstances ? It is very likely that they have a different background of evaluating a risky start-up and may be more reluctant to actually start a business. When these variables come out so clearly negative, it must be because human capital may have a reverse impact on the probability of start-up when the enterprise considered is somewhat problematic. We have the same case with a negative effect of education diversity. These individuals have a broad educational background, with a majority from practical education (naval officer, coastal certificate, vocational school, training course for fishermen and agricultural training). This puts them in a special category because have skills that make them better able to evaluate a new job. In fact they may be busy with the work they already had when applying for license. This is also an argument we may apply to the individuals with high degree of self-employment. It is likely that they were self-employed when applying for a license, and may actually not need cod farming as a second income.

The negative impact of education diversity, prior self-employment and self-employment in the family do not get supported for findings in human capital studies, reviewed in chapter four. However, prior studies have also not supported a positive relation between these human capital variables and survival/success. Brüderl, Preisendörfer and Baumann (1991) did not find that experience as self-employed predicted survival significantly. Chandler and Jansen (1992) found that number of business previously initiated was not strongly related to performance. Prior entrepreneurial experience did not effect venture success/survival significant in the studies of Sandberg and Hofer (1987) and Cooper, Woo and Dunkelberg (1988).

Let us see how the model fits when outliers are removed.

11.2.2 Results when outliers are removed

Independent variable	Coeff.	St.err.	St.coeff.
Age	-.0053	.0131	-.0337
Bus.educ	-.1836	.1696	-.0922
Education	.2860(*)	.2086	.1770
Edudiv.	-.8332***	.2345	-.4334
Selfempl.	-1.0234***	.3108	-.2823
Induexp.	.8597**	.2928	.2593
Tech.exp.	.2629**	.1021	.2250
Selffam	-.7201**	.2779	-.2183
Chi.sq. :	46.011	(*) p = .08 * p < .05 ** p < .005 *** p < .0005	
Log likelihood:	307.662		
Pseudo Rsquare	.2404		
Correl. betw. predicted and observed outcome	.3846		

Table 11.2.2.1 Total effects of human capital variables on start-up. 15 infl.outliers removed (N= 274).

The log likelihood is significantly better than the model with the outliers in the sample. The chi-square increased by 19.909. The pseudo R-square increased by .1169, and the correlation between the predicted probability and the observed outcome of the dependent variable increased by 9 %. In addition to the five significant coefficients from the model with outliers included, this analysis shows that, when outliers are removed, the education variable comes out statistically significant, however only at the 10 % level. Evidently, the size of the coefficients is larger when outliers are removed.

This path must also be said to be sensitive to influential outliers. Interestingly, education, which is now significant has an opposite effect on start-up than education diversity. Here, we have to recall that education diversity reflects broadness in more practical education, whereas education reflects the level of education, where we know that only 9 % have a

college or university degree. These variables may have opposite effects: individuals with a broad education may be occupied already, some of those with higher education may actually be some of the more professional cod-farmers, similar to many of the well educated salmon farmers, who left well-paid or secure positions in order to start a new business (Holm et al., 1990). The data, without the 15 outliers, indicate that the level of education along with industrial and technical experience have a positive effect on start-up, whereas education diversity and own and family self-employment all have a negative impact.

11.2.3 Social network on start-up

According to the perspective in this thesis, social network influences start-up through "producing" resources and does not increase the chances of start-up directly. The results of a test of total effects are given below.

Independent variables	Coeff.	St.err.	St.coeff.
Network size	-.1285	.1496	-.1609
Range	.2048	.1808	.2848
Multiple attributes	-.1745	.8293	-.0221
Multiplexity	.3460	.4131	.0973
Kin/friends	-.3475	.3947	-.1037
Colleagual zone	-.2350	.5077	-.0716
Industrial zone	1.1277*	.4806	.3653
Service zone	-.6475	.5373	-.1960

* $p < .05$

Chi. Sq.: 34.378 (p= .0001)
 Log likelihood: 342.085
 Pseudo R.square .1576
 Corr. betw. pred. prob
 and observed outcome: .3436

Table 11.2.3.1 Total effects of network variables on start-up (N=289).

The results do not support the underlying hypothesis in the model, i.e. that the direct effects of network variables on start-up are zero. The model is significant at the .0001 level. Although this model is significantly better than a model with the intercept only, it is very interesting that only one of the eight variables is significant. Industrial actors have a significant positive effect on the probability of starting a business. This supports the argument proposed in this work: Network structures mean less than the characteristics of

the network members with whom Ego is interacting. Making contact with the "right" persons is important for start-up, not having a personal network with certain structural characteristics. Attributal network variables have a relatively larger impact than structural variables.

Although this result does not support our hypothesis of a zero direct effect of social network variables on start-up, we do see that the social network does a worse job than resources. The model explains only 15 % of the variance in start up, compared to 36 % when resources were used to predict start-up.

Compared to the conventional wisdom in the network literature, these results are not at all promising. The traditional view in the network literature has been that starters have a larger, more diverse network with more professions involved. These results, however, indicate that it is contact with industrial actors that distinguishes the starters from the non-starters. Again, it is very interesting that size is not significant. This is likely to be due to the fact that we have not unlike earlier studies, measured size with the question "With how many would you judge you have discussed your business ideas", which is a too uncommitted question to a respondent, making it easy to just answer with an arbitrary number. These results show that when respondents are forced to think and describe their network members, the actual difference between the starters and non-starters is not so pronounced; and size comes out insignificant and in fact in the opposite direction⁴¹. Again, range (however not significant) seems to be factor that distinguishes that starters more from the non-starters.

⁴¹ A critical comment against measurement of network size in this study, is that the possibility of mentioning more than eight persons may have distinguished the starters more from the non-starters. We always run a risk when predetermining the upper end of the scale.

11.2.4 Results when outliers are removed

Since the model as such was significant, but very few of the single coefficients came out significant this is likely to be due to some observations which are too extreme compared to the main observations. An analysis of the same model, when 14 influential outliers are removed, is shown below.

Independent variables	Coeff.	St.err.	St.coeff.
Network size	-.0766	.1768	-.0958
Range	.3514*	.2115	.4861
Multiple attributes	.2852	.9000	.0355
Multiplexity	.7071*	.4505	.1948
Kin/friends	-.5251	.4281	-.1496
Colleagual z.	-.9121(*)	.6110	-.2709
Industrial z.	1.2271*	.5426	.3916
Service z.	-1.3378*	.6202	-.4039

(*) $p < .10$ * $p \leq .05$

Chisq: 48.88 (p = .0001)
 Log Likelihood: 305.638
 Pseudo R.square: .245
 Corr. betw. predic. prob. and
 observed outcome: .406

Table 11.2.4.1 Total effects of network on start up. 14 influential outliers removed (N=275).

The model is very sensitive to influential outliers and shows a significantly better fit to the data when outliers are removed. The log likelihood decreased, so that the chi-square increased by 14.502. The Pseudo R square increased by about 9 %.

Now, four more variables are significant in addition to industrial actors. Two of them - range and multiplexity - are positive.

The other two significant variables - collegial zone and service zone - come out unexpectedly negative.

It is interesting that multiplexity has a significant impact. It points to the fact that role relations to persons with attributes are conducive to start-up. Multiplexity gives access to important resource persons in different zones, compared to kin/friends who are pure role dimensions. When outliers are removed from the analysis, multiplexity adds significantly to start-up when other network variables are controlled. Again range seems more promising for start-up than size. A variety of network members is more conducive to start-up than having many members. It is the diversity of network members that seems to have a positive impact on start-up.

Unexpectedly, collegial zone has a negative impact, however only significant at the .10 level. The significant and relatively strong impact of the service sector is more evident. This confirms the results in earlier chapter's- the service sector has, in this study, not had a supportive function towards the prospective entrepreneurs. Also, their direct effect on start-up is negative, in addition to their indirect negative impact.

11.3 Business resources, human capital and social network on start-up (H19)

In this section H19 will be tested. This hypothesis stated that when business resources are controlled, the direct effects of human capital and social network on start-up will be zero. We have now seen that the total effects of human capital and social network, when each are not controlled for, are in fact significant. The question in this section is whether these significant total effects remain when business resources are controlled. According to our hypothesis, they should not remain due to the theory that the mediator to start-up - business resources - is able to transmit all effects from factors occurring earlier in an entrepreneur's life cycle. The result of the regression with business resources, human capital and social network (=24 variables) is shown in Table 11.3.1 below.

Independent variables	Coeff.	St.err.	St.coeff.
Age	-.0170	.0153	-.1452
Bus.educ	-.2849(*)	.1937	-.1452
Educ.	.2574	.2267	.1618
Edudiv.	-.8944***	.2725	-.4745
Tech.exp.	.1653(*)	.1140	.1443
Selfempl.	-.5413*	.3398	-.1553
Selffam	-.3105	.2998	-.0939
Induexp	.4540(*)	.3243	.1413
Encouragem.	-.2833	.3491	-.0913
Adv.bureaucr.	-.5561	.4564	-.1470
Adv.acco&budg.	-.3847	.5977	-.0745
Adv.technology.	.3829	.3309	.1488
Financing	.7342(*)	.4746	.1802
Prod.res.	.6986*	.3418	.2664
Labor	-.6331	.5055	-.1218
Market/Sale	2.8363*****	.4787	.6967
Colleagual z.	-.2556	.6588	-.0780
Industrial zone	.4522	.6010	.1464
Service zone	.1603	.7260	.0485
Kin/friends	-.2172	.5079	-.0648
Multiplexity	-.0214	.5187	-.0060
Size	-.2364	.1852	-.2960
Range	.0237	.2323	.0329
Multiple attributes	-.1903	.9777	-.0241

(*) $p < .10$ * $p < .05$ *** $p \leq .0005$ ***** $p = .0000$

Chi sq.: 118.090
Loglikelihood: 258.372
Pseudo R.square: .50121
Corr. betw. pred. and
observ. outcome: .61998

Table 11.3.1 Direct effects of human capital, network and resources on start-up (N = 289).

The model is significant, with 50 % of the variance in the dependent variable start-up explained.

Regarding the hypothesized zero effects from human capital and social network an interesting pattern is revealed in table 11.3.1. We can reject the null hypothesis that the social network has significant effects, but we cannot reject the null hypothesis that human capital has significant effects. Human capital has five significant coefficients, business education, education diversity, technical experience, self-employment and industrial experience.

Since the social network does not seem to have any significant direct effects when business resources and human capital are controlled, they were deleted from the model in a new analysis in order to see whether a more parsimonious model would do significantly worse or not. This analysis, with 16 explanatory variables had a chi-square of 110.035. When comparing this to the chi-square in the model above, with 24 variables, 118.090, this reveals that the increase 8.055 is not significant for 8 degrees of freedom. In other words, we do not gain by including social network variables in the model, in addition to human capital and resources. Comparison of pseudo R square reveals this too: the model with human capital and business resources has a pseudo R square of .48 which is only 2 % less than this model which has 8 more explanatory variables.⁴²

The interpretation of these findings is that network does not seem to add enough directly to start-up when human capital and resources are controlled. This supports the main argument in this work; social network is conducive to start up only indirectly, through its effect in channeling business resources. What did not support our original model, however, is the significant impact of human capital variables on start up, when resources are controlled. Human capital variables seem to have a stronger direct impact on start up, compared to its indirect effect through social network. Compared to the total effect to human capital - the direct effect of business education now becomes significant. The negative impact indicates that the respondents with more formal schooling in business also

⁴² A check for multicollinearity for the model with human capital and resources as explanatory variables were done. The last page in Appendix 5 reveals moderate multicollinearity between education level and education diversity and between age and education.

become more risk - averse. We have no direct support from any of the human capital studies reviewed in chapter four. However, Cooper, Woo and Dunkelberg (1988) found that survivors did not have more business courses - than non-survivors, which indirectly supports the finding in this study.

However, as we see that the standard errors of the social network variables are large compared to the size of the unstandardized coefficients, there is a chance that the social network part is specifically sensitive to influential outliers; when these are removed, even social network may reveal significant direct effects on start-up. In table 11.3.2 the results are revealed when influential outliers were removed from the analysis.

Independent variables	Coeff.	St.err.	St.coeff.
Age	-.0258	.210	-.1629
Bus.educ	-.4816*	.2766	-.2477
Educ	.1102	.2970	.0705
Edudiv	-.9224*	.3925	-.4812
Techexp	.3386*	.1636	.2952
Selfempl	-.7174(*)	.4728	-.2049
Selffam	-.2472	.3797	-.0756
Induexp	.7085*	.4543	.2141
Encourage	-.6205	.4889	-.1980
Bureaucracy	-.1482	.6233	-.0387
Adv. bureaucracy	-2.7396**	.9502	-.5137
Adv. technology	1.1937*	.5111	.4576
Financing	1.4321	.6935	.3448
Labor	-1.4529*	.7093	-.3006
Production resources	1.9237***	.5252	.7218
Market	5.3171****	.8078	1.2698
Colleagual zone	-1.6830*	.9632	-.5134
Industrial zone	.0813	.8099	.0261
Service zone	-.8944	1.0203	-.2642

Kin/friends	-1.0612(*)	.7317	-.3117
Multiplexity	.2919	.7185	.0808
Network size	-.4422*	.2646	-.5434
Network range	.4694(*)	.3349	.6420
Multiple attributes	-.4917	1.2437	-.0596

(*) p = .10 * p < .05 *** p ≤ .0005 **** p = .0000

Chi sq.:	194.218
Loglikelihood:	158.602
Pseudo R sq.:	.7836
Corr.betw. pred. and observ. outcome:	.7716

Table 11.3.2 Direct effects of human capital, network and resources on start up. 16 influential outliers removed (N = 273).

We then see that the social network part of the model was extremely sensitive to influential outliers. With 16 cases removed, three variables come out significant. Industrial actors and range have a clear positive impact, whereas size has a negative impact. Interestingly, collegial zone and kin and friends have significant negative impact. This result indicates to that persons assumed to be closest to Ego in fact do not have any positive impact on start-up, after the resources to which they have given Ego have been controlled.

11.4 Summary

The question now is to assess: 1) how much of the effect of business resources on start-up is spurious; 2) whether all of the effect of human capital and social network on start-up goes through business resources as posulated.

Regarding 1), table 11.4.1 below shows the difference between the total effect of business resources on start-up (when no other variables are controlled) and the effect when other variables are controlled. The difference between column one and two give the spurious

component, shown in column three. The last column is the number that comes out when the magnitude of the spurious component is divided by the total effect, i.e. the spurious proportion of the total effect.

	Total effect	When HC and SN controlled	Spurious component (+) Suppressor effect (-)	Proportion of total effect that is caused by HC and SN
Encouragement	-.3338	-.2833	.0505	.1512
Bureaucracy	-.5856*	-.5561	.0295	.0503
Acco & bud.	-.3987	-.3847	.0140	.0351
Adv. technology	.0439	.3829	-.3390	7.722
Financing	.3783	.7342(*)	-.3550	.9384
Prod. resources	.6852*	.6986*	-.0134	.0195
Labor	-.7158*	-.6331	.0827	.1155
Market	2.6317****	2.8363****	-.2046	.0777

Table 11.4.1 Assessing spurious effects of business resources when HC and SN are controlled (N=289).

Table 11.4.1 reveals that four of the variables, encouragement, advice on bureaucracy, accounting and budgeting, and labor have very small spurious components in the range from .01 to .08. However, encouragement, financing and labor have relatively large proportions of their total effect caused by human capital and the social network (from .11 to .93). There are four suppressor variables advice on technology, financing, market access and production resources; the three first have relatively large suppressor effects (from .20 to .35). Financing has a very large proportion of its total effect caused by human capital and the social network.⁴³

The pattern is as follows: resources that predict start-up negatively (encouragement, bureaucracy, accounting and budgeting and labor) have their largest effects when human capital and social network are not controlled. Their total effect on start-up, which is negative, is higher due to their correlation with human capital and social network which also predict start-up negatively. When these factors are controlled, encouragement, advice on bureaucracy, advice on accounting and budgeting and labor have their effects reduced.

⁴³Unfortunately, I am not able to explain the large number 7.722. I have rerun the analysis and the total effect of advice on technology is right, so is its effect when HC and SN is controlled.

Advice on technology, market access, production resources and financing, which predict start-up positively, have their largest effect when the negative impact of social network and human capital on start-up is removed, i.e. when social network and human capital are controlled. When these are not controlled, the total effect of advice on technology, market access, production resources and financing is reduced due to their correlation with human capital and social network which affect start-up negatively.

The conclusion regarding the size of the spurious/suppressor effects and also their relative proportion of the total effect is: Most of the spurious effects of business resources on start-up is due to a relationship with human capital. The interesting finding here is that advice on technology and financing have increased effects on start-up to a such large degree when human capital and the social network are controlled. As we recall from table 10.4.9, financing was negatively predicted by business education, self-employment and technical experience, where the two former also predicted start-up negatively. Clearly, when human capital affects both financing and start-up negatively, financing has an increased positive effect on start up when the impact of human capital is removed. Advice on technology was also negatively affected by family's self-employment, which also affects start-up negatively. Again, when this impact is removed, advice on technology has an increased effect. It is mainly the prior influence through human capital that make the suppressor effects of the two resource variables so large. It seems that human capital, not social network, is the reason for the extent of spuriousness found in the relationship between business resources and start-up.

Regarding 2): Can we assess whether all of the effect of human capital and the social network on start-up goes through business resources ? In answering this question we will examine the effects of human capital and social network when resources are controlled (table 11.3.1). These numbers show the direct impact of human capital and the social network on start -up; this impact works independently of business resources. In table 11.3.1 there is a clearly different pattern between human capital and the social network. Five of the eight human capital variables predict start-up significantly, even though social network and business resources are controlled for. This shows that, opposite to the prediction in H19, human capital has a clear and relatively strong direct impact on start-up. The pattern is as follows: business education, education diversity and prior experience

from starting a business have made the prospective entrepreneurs in this industry more risk averse. But industrial experience and technical experience have made people start cod farming. Everything else equal, even when networking has been done and resources have been acquired, individual abilities are with the prospective entrepreneur to the point of time when deciding to start or not. This is a very significant, though unexpected, finding that human capital does not get overshadowed by structural factors. This does not accord with the hypothesis presented in this thesis. It is not as stated in this thesis so that individual capabilities only helps predicting social network and so the rest it decided by structural factors. Just the opposite; human capital is with the prospective entrepreneurs all the time.

The non-significant paths from the social network contrast with the clear direct impact of human capital on start-up. This result accords to my hypothesis and to one of the main thoughts behind incorporating business resources as a result of social network. The results here indicate that there are no significant direct effects from social network on start up when business resources are controlled. In other words, what the social network does in the entrepreneurial process is to "produce" business resources but it does not seem to have any direct impact on the probability of start-up. The function of the social network in the entrepreneurial process seems to be to act as a vehicle for resource acquisition not for increasing the probability of start-up directly. We may therefore conclude that the idea that social network has an indirect, rather than direct impact on venture creation was confirmed by these results.

12. Summary

In this chapter a short summary of the findings are given (12.1) then a revised model will be argued for (12.2). Then the total effects from human capital and social network on start-up are assessed (12.3) and finally a summary of the degree of spurious effects and the fit of the causal chain model is given.

12.1 Summary of the findings

The part of the theoretical model that was supported in the hypotheses testing was that the data confirmed that there are non-zero paths from human capital to social network, from social network to resources and from resources to start up. However, the three paths had different strengths. Below, figure 12.1.1. shows the degree of variance explained in testing the conceptual model. Whereas the two last paths really fitted the data well, with an explained variance from 20- 40 %, the first path had a relatively bad fit with only 2- 7% of the variance explained.

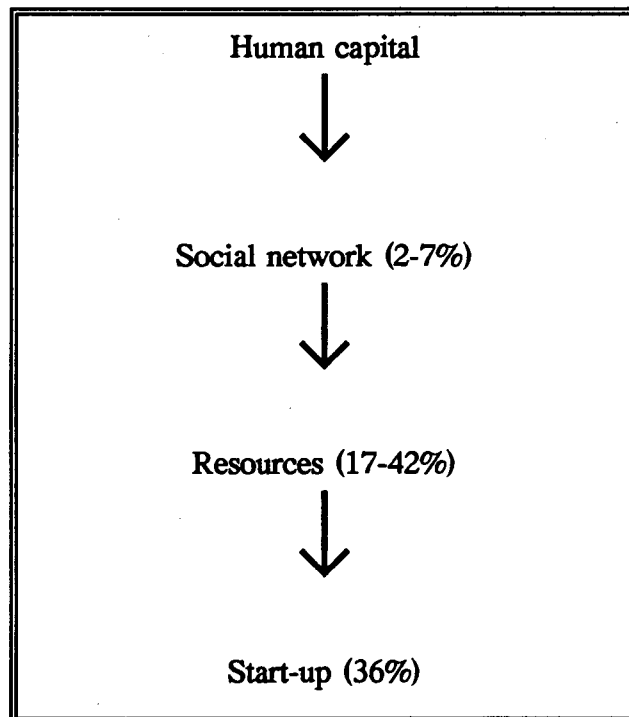


Figure 12.1.1 Variance explained in testing the conceptual model (N=289).

Path 1: The effects of human capital on social network

Characteristic for the first path was that, in predicting eight network variables, the average significant number of the human capital variables was only 2.87, i.e. not even three of the possible eight variables. The pattern of the significant variables showed that age had a stable negative impact on seven of the eight social network variables. Technical experience was also stable, predicting all seven social network variables it was supposed to affect. Business education was significant four of the five times predicted. Degree of self-employment was significant only three of the eight times and then in the opposite direction to predicted. Education, industrial experience and self-employment in the family never came out significant in predicting any social network variable. What does this tell us? Firstly, it shows that when, every other human capital variable is controlled for, a one year increase in the respondent's age clearly reduces both structural, interactional and attributive aspects of the social network. This does support the notion that networking requires time and effort and, with everything else held constant, older prospective entrepreneurs do not match the network efficiency of younger people.

Secondly, when work-experience counts for networking, it is only through technical work experience not broader general industrial experience. This clearly shows that a much narrower work-experience is conducive to building a business network for this kind of enterprise not general experience including fishing, fish-farming or fishing industry experience. Thirdly, it shows that educational human capital only affects networking through business education and education diversity. What these dimensions do, as expected, is to positively affect size and service zone. In addition, business education affects industrial zone and range. This shows that business education and education diversity were the best educational triggers to explore the possibilities of venture creation through a large and broad network and to the category of Alter to whom the prospective entrepreneur has the largest social distance. This supports the notion that networking is dependent on Ego's education. Broader education and more business courses are likely to increase one's ability to develop more and more varied ties and ties to a more difficult Alter category to reach, compared to people with lower scores on these variables.

Fourthly, the puzzling negative effect of prior self-employment indicates that respondents with a high degree of prior self-employment were less interested in starting a new

enterprise and were therefore less tempted to explore the possibilities through collegial and industrial ties and Alter with many attributes. It may also indicate that respondents with a strong prior self-employment background may be less dependent on networking with other colleagues and industrial actors due to their own built up human capital. Fifth and last, the unexpected non-significant impact of industrial experience and education must be seen to be caused by the fact that other human capital variables from the same conceptual group cancelled out their impact. One variable however, degree of self-employment in the family, has to be questioned. The interpretation of the lacking effect of this variable must be that self-employment in family is so early in the prospective entrepreneur's life cycle, that when we controlled for human capital variables appearing later, it loses its effect. Another interpretation is that I may have overemphasized the effect of siblings and the variable should be kept categorical (0= no parents self-employed, 1= parents self-employed).

Path 2: The effects of social network on business resources

This part was strongly supported by the data. The variables that had the hypothesized and significant effects were multiple attributes and kin and friends. Industrial actors, the service sector, collegial zone and multiplexity and range were significant the majority of times they were predicted to have an effect. Size was the network variable that behaved the most unexpectedly. It was only significant once of the eight times predicted. In the hypothesis section, I revealed the idea that some resources were expected to be "narrow", i.e. generated by only one zone and/or kin and friends. Other resources would be "broad" i.e. generated by at least two network zones and roles as kin/friends. The results only supported this as true for affective resources which was confirmed to be "broad" and labor and market resources which both were "narrow". In addition, the theory also predicted that, due to the temporal order between resources, I believed that some network variables had their main function early, in the middle or late in the process. Here the data confirmed this view; Multiplexity was important for resource acquisition throughout the process, whereas range was important through the beginning and middle stages. Size, however, was only important for one resource late in the process. Service sector was important in the beginning and the middle. Collegial zone was, as predicted, important for a few resources through the whole process. Kin/friends was as predicted, believed to be important in the beginning and the middle but are less important the closer it comes to

actual production and selling. Multiple attributes are only important for early informative resources whereas industrial zone was, as predicted, the only zone which is important at the last stage of the process. Given that my assumption about the temporal order between resources is correct, these results confirm a clear variation in the need for various network characteristics throughout an entrepreneurial process.

To conclude: the analysis revealed two interesting findings. Firstly, range performs better than size in explaining variation in resources. A wide range of individuals with different statuses is the "key" to resources rather than the actual size of the network. It does not help a prospective entrepreneur to make contact with many persons if they all possess the same status or attributes. What seems to count for resource acquisition is that a prospective entrepreneur makes contact with persons who hold different characteristics. Secondly, attributal network variables add significant explanatory power compared to an analysis using only structural variables. Attributal network variables concern where Alter is situated within the total network, and the results seem to confirm that important micro network characteristics perform better than the overall network structures.

Path 3: The effects of business resources on start-up

The results regarding resources' impact on start-up were interesting. Access to the market has the largest relative impact on the probability of start-up as expected; second comes production resources. When these resources are controlled, none of the other of the six predicted resources increase start-up positively. This result indicates strongly that it is basic material resources that are the critical factor for start-up. The very strong impact of market resources indicates that are the commercial business resources which need to be arranged to get a business started. Production and market resources; believed to appear latest in the process, play an overshadowing role compared to the other resources. Very unexpectedly, two of the four significant variables were negative in predicting start-up. Advice on handling the bureaucracy has the largest negative impact; second comes access to labor. The negative effect of advice on the bureaucracy must be interpreted as a sign that the service sector has not been able to produce advice that has had a conducive effect on prospective entrepreneurs' probability of start-up. As stated in section 11.1 quotations from some respondents supported this interpretation. The practical implication for

developing this industry further should be clear: the service actors in the service zone are giving is not sufficient for bringing prospective entrepreneurs to start-up. If we see this result in relation to the empirical setting of the study, and recall that cod farming represents an emergent industry, an explanation of this negative effect becomes clear. Very likely the negative effect of advice on the bureaucracy - which was mainly given by the service sector - has to do with the starting problems in an emergent industry such as low infrastructure, problems with access to raw material, high product price, problems with convincing banks to give financing, first-time buyers etc. When these things are not sorted out, even the service sector - which is supposed to assist entrepreneurs - react with negative feedback on start-up. The negative effect of labor is likely to be due to a measurement error due to different measurement techniques. The non-starters have a higher mean of labor resources than the starters (Appendix 5). The non-starters were overrepresented in the telephone interviews where I recall that the respondents told us about the labor resources they had in their family and which they should use in case they started. Such "prospective resources" may therefore have been triggered off in an interview session compared to when the respondents filled out the questionnaire themselves. The relative need for each of the resources may vary from industry to industry. That makes replication of this study necessary, i.e. a need for testing the same hypotheses in a different industry. If the same results are replicated, then the results of this study may have some general aspects. If quite opposite results are obtained, then it may be time to develop theories about whether the effects of human capital, social network and business resources do differ according to the characteristics of the enterprise - whether the industry is emerging or maturing in which the prospective entrepreneur seeks to start his/her business (Porter, 1980).

12.2 A revised model

The conceptual model did not allow direct paths from human capital and social network to start-up. The theory was that factors early in a prospective entrepreneur's life cycle get subsumed by factors appearing later in time. The last factor in the temporal order, resources, was the only one predicted to be the mediator to start-up. In testing H19, that the direct effects of human capital and social network on start-up would be zero when resources are controlled for, we got some interesting results. In addition to the predicted path from resources to start-up, the analysis showed that human capital has a significant direct impact on start-up, even when resources were controlled. This does not support the conceptual model, where the idea was that human capital had an intervening effect, by influencing other variables that in turn predicted resources for start-up. The clear significant non-zero impact of human capital variables on start-up even when business resources were controlled, shows that individuals' background in fact "counts" for whether to start a business or not, even when the individual has acquired the necessary resources through his/her network. Although resources like market access and production resources are required, an additional increase in industrial experience and technical experience still increases the prospective entrepreneur's chances of start up. Even when market access and production resources are required, an increase in business education or education diversity or the degree of self-employment reduces the chances of start-up. In that sense, human capital works as close in temporal order to start-up as resources do, i.e. they are both mediators to start-up. Given that the individual has a certain degree of human capital, an increase in access to production resources and market resources increases the chances of start-up, whereas advice on how to handle the bureaucracy and access to labor reduces the chances for start-up.

A revised model therefore suggests that individual and structural explanatory factors side by side explain the largest variation in start-up. Individual factors have a role as an additional explanatory factor of resources i.e. later in the life cycle than originally proposed. Comparing the number of significant variables business resources have four out of eight of the business resource variables are significant, whereas human capital have six out of eight. That supports a strong impact of individual capabilities as a necessary explanatory factor beside business resources.

However, the other part of H19, that the social network would reveal zero effects when business resources were controlled for, was confirmed by the data. Social network does not add anything to explaining the variance in start-up when human capital and resources are controlled, which supported the conceptual model. This confirms one of the main thoughts in this work, i.e. that the "function" of social network in the entrepreneurial process is mainly to "produce" business resources, but when these are secured by the prospective entrepreneur then social network does not increase his/her chances for start-up any further.

Since the additional explanatory power in predicting start-up increased significantly when adding human capital to resources in the last path, the question is whether this should tell us to "listen to the data" and suggest that a new path is needed from human capital to start-up. The data indicates that a model with 16 explanatory variables, structural variables such as business resources and individual variables like human capital, jointly affect a prospective entrepreneur's probability of starting a business. Theoretically that supports the idea that not only structural factors such as business resources are the mediator to start-up, but that also individual factors like human capital add help to explain the variance in this phenomenon. In addition to predicting structural variables such as the social network, human capital predicts start-up when structural factors later in the prospective entrepreneur's life cycle are controlled. This means that the latest structural variables in the life cycle are not able to subsume the prior impact of individual variables, contracting our hypothesis. The explanatory power in the last path increases by 12 % when allowing for direct effects from two sorts of explanatory variables⁴⁴. I therefore argue for a revised model based on the the results of a strong direct impact of human capital on start-up. The analysis revealed that whereas social network does not significantly increase the explanatory power, human capital does. Theoretically, the revised model gives more credit to the human capital tradition, than the conceptual model.

⁴⁴ When a model is estimated with 16 explanatory variables, human capital and business resources. Social network is then deleted from the analysis since none of the variables were significant in predicting start-up when business resources and human capital were controlled.

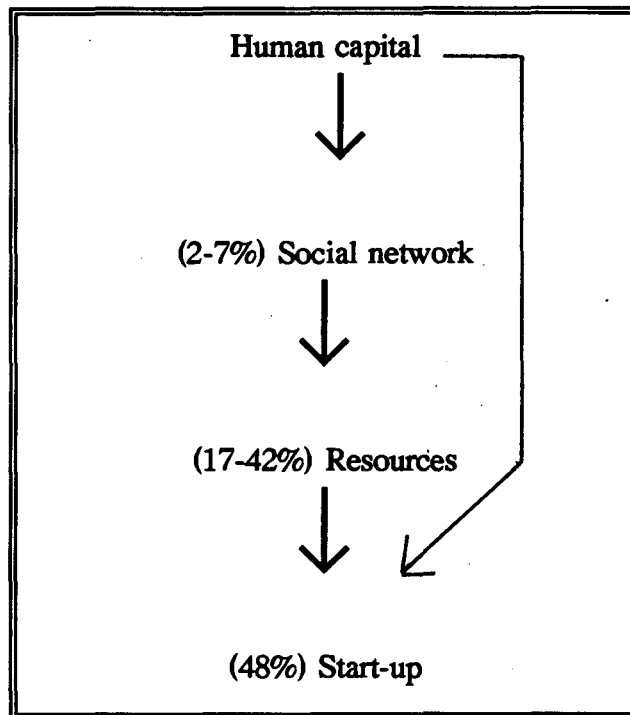


Figure 12.2.1 Variance explained in testing the revised model (N=289).

12.3 Assessing the direct, indirect and total effects of human capital and social network on start-up

As stated in section 5.1, an important part of this work is to assess the total effects of human capital and the social network on start-up by adding their indirect effects together with their possible direct effects. The strength of the indirect paths from human capital and social network to start-up will be assessed. The last path in the model involves logistic regression. These coefficients are not compatible with the regression coefficients used in testing the first and second paths. A method for doing path analysis on discrete data is revealed in Winship & Mare (1983). In using this method, we can make the paths compatible and assess the total effects of the continuous variables human capital and social network on a categorical dependent variable like start-up.

Effects of human capital variables

In section 11.3 the analysis revealed that the direct impact of human capital variables on start-up was not zero as predicted in the model. Some of the human capital variables had a considerable impact on start-up, even when resources were controlled. In this section the total effects of human capital variables on start-up are assessed, which is the result of adding the significant indirect effects- through social networks and resources - to the significant direct effects.⁴⁵

The formula for assessing the total effect is:

$$\frac{d_p (d_x = 1)}{d_x} = \alpha_1 P_x (1 - P_x) + \alpha_2 \beta_2 \beta_1 P_x (1 - P_x)$$

(Total effect = direct effect + indirect effect)

where $p_x = p (d_x = 1)$ is the probability that $d_x = 1$ (= the respondents have started).

α_1, α_2 = maximum likelihood coefficients

β_1, β_2 = unstandardized regression coefficients

$$P_x = \frac{\text{starters}}{N} = \frac{186}{289} = .6435$$

In figure 12.3.1 the sum of the indirect effects of human capital variables on start-up is shown. The direct effects are added and the total effects are revealed.

⁴⁵ Also here the direct effects are taken from the analysis without the social network included, as these variables were not significant in predicting start-up when business resources and human capital were controlled, and therefore did not perform significantly better than a model with eight less explanatory variables.

	# of indirect effects	Sum of indirect effects	Direct effect	Total effect
Age	10	-.0017	-	-.0017
Buseduc.	6	.0217	-.0701	-.0484
Educ.	-	-	.0697	.0697
Edudiv.	3	-.0056	-.2129	-.2185
Tech. exp.	11	.0279	.0362	.0641
Selfempl.	4	-.033	-.1234	-.1564
Selffam.	-	-	-.0875	-.0875
Indu.exp.	-	-	.1036	.1036

Figure 12.3.1 Indirect, direct and total effects of human capital variables on start-up.

The eight human capital variables have interesting paths. Three of them, education level, self-employment in the family and industrial experience, have no indirect impact through social network and resources on start-up. Since individuals' education, entrepreneurial family background and work-experience from related industries do not increase/decrease social network, the effects of these human capital variables are not mediated through the four resources that predict start-up. In other words, the intermediate variables in this study, network and resources, are not capable of reflecting the effects from a prospective entrepreneur's education, family-background and industrial experience. On the other hand, they do have significant effects on start-up through some processes we have not been able to track here. The total effects reveal that for a one unit increase in education, the probability of start-up increases by almost .07. For a one unit increase in the degree of self-employment in the family, the probability of start-up is reduced by almost .09. And for a one unit increase in industrial experience, the probability of start-up increases by .1.

Let us take a look at the five human capital variables that have significant indirect paths to start-up. Technical work experience has 11 indirect effects on start-up. That is a result of the combination of being significant in predicting seven network variables which again predict 4 resources. The sum of its indirect effects (.0279) is slightly less than its direct effect (.0362). Added together, a one unit increase in technical experience increases the probability of start-up by .06. Age also has a high number of indirect effects. The sum of these indirect effects is negative. Interestingly, age only works indirectly. Its direct effect

is not significant when other human capital variables and resource variables are controlled for. The total effect is marginal (in using the standardized coefficients, if using the standardized it would have been larger). A one unit increase in age reduces the probability of start-up by .001. Business education has six significant paths to start-up. Interesting here, is that business education has a significant positive indirect impact on start-up. It increases the network which gives necessary resources. However, its direct effect is negative; it reduces start-up by .07. Its total effect therefore adds up to be negative. A one unit increase in business education reduces start-up by .05. This indicates that, although a higher level of business education makes one build a more efficient network for allocating business resources, those with a high level of business education are still more risk averse when it actually comes to starting the firm. Diversity of education has a clear negative impact on start-up, both indirectly and directly. A one unit rise in education diversity reduces the probability of start-up by .22. This is a key result in this study. It reflects the fact that prospective entrepreneurs with a diverse education background were not tempted to start a business in this industry. Interesting is that education diversity predicts the number of ties to persons in the service industry. However, as the bureaucratic advice they get there in fact reduces the chance of start-up, this part of the network does not have an effect which is conducive for starting. Interesting also is that education diversity increases network size. However, as size only predicts labor and access to the market, it does not help much. Access to the market increases the chance of start up, but labor does not. Since network size and the number of ties to the service sector are not efficient aspects of the network for acquiring resources it does not help that persons with a diverse education build that kind of network in the first place. Its negative direct effect is considerable. This study shows that persons with a broad education background really jumped off of the entrepreneurial process. The same may be said about the degree of earlier self-employment. Persons with this background have in the first place no network efficiency whatsoever. It reduces significantly the number of ties to industrial actors, ties to other business starters and network diversity. Neither do persons with earlier business experience have so much human capital that it reduces the need to be dependent on resources channeled through the social network. It is likely that these persons are still occupied in existing work and have applied for a license for part time cod farming. When the difficulties in the industry started, they realized that earning profit required too much work.

Effects of social network variables

Below the indirect effects of social network on start-up through the various business resources are added. There are no direct effects of social network on start-up according to the analysis done.

	# of indirect effects	Through	Direct effect	Total effect
Colleagual zone	1	Production resources	0	.0545
Industrial zone	2	Production resources and market resources	0	.2637
Service zone	1	Advice on the bureaucracy	0	-.0811
Kin and friends	2	Advice on the bureaucracy and labor	0	-.0602
Multiplexity	2	Production resources + market resources	0	.2159
Size	2	Labor + market	0	.0050
Range	1	Labor	0	.0044
Multiple attributes	1	Advice on the bureaucracy	0	.0364

Figure 12.3.2 Indirect, direct and total effects of social network on start-up.

The picture that emerges when assessing the total effects of the social network on start-up, is that the social network's contribution to start-up is indirect, through some resources which contributed significantly in predicting the probability of start-up. Actors in the industrial zone increase start-up by .26 and multiplexity enhances start-up by .22. The service sector reduces start-up by .08 and the colleagual zone enhances start-up by .05. Multiple attributes increases start-up by .03.

It is interesting that it is one attributal and one interactional variable which have the two strongest impacts. Again, these two types of network variables show themselves as more promising than structural network variables. Size and range have only minor effects compared with attributal and interactional variables.

12.4 Summary of the degree of spurious effects and the fit of the causal chain model.

In this section, a summary of the answers to question: 1) degree of spuriousness and 2) the fit of the causal chain model are given.

The analysis of the extent to which the effect of social network on business resources is spurious - due to effects from variables earlier in time (human capital) - revealed that there are few network variables that have any spurious relation to the eight business resources. The most severe of them all was kin and friends, which had relatively high spurious component and proportion of its total effect in predicting three resources: encouragement, advice on accounting and budgeting and financing. This is because human capital variables like age and technical experience both affect kin and friends and the three mentioned resources. Network range was spurious in its effect on advice on technology, where .9018 of its total effect was reduced when human capital was controlled. The conclusion must be that the analysis does reveal that some of the eight network variables' effect on some of the eight resources are spurious. However, the majority of network variables have no excessive spurious relationship.

The second question is whether the causal chain model works so that all of the effect of human capital on business resources does really get transmitted through the social network. The analysis showed that, in predicting each of the eight resources, on average two human capital variables had significant direct effects. This then does not support H19, as we cannot confirm that the social network is able to fully transmit the impact of human capital on business resources. The data reveal that even when network variables are controlled, human capital variables have a significant direct effect on business resources. Can we, albeit post-hoc, try to explain these relations and which implications can we draw from this? The extent to which business resources are obtained do not solely depend on the the quality of the social network. In addition to this, the individual's own capabilities affect resources obtained: age does not only reduce social networking, it also reduces resources obtained. Those with a high degree of business education seem to need less encouragement, advice on accounting and budgeting, financing and labor than those with a lower level of business education. The level of general education seems to make the respondents more eager to receive technical advice, but less inclined to seek contact with

the market. Education diversity increases access to financing. Is this because persons with a more varied educational background are more able to set up a business plan and convince the banks that their project is worth investing in ? Those with a high degree of technical experience received less financing: did they have the majority of the equipment for cod farming already available and therefore needed less money from the bank ? But technical experience increased access to labor. Did they, more than people without this experience, come from fishing families where labor for cod farming was more available ? Degree of prior self-employment contributed negatively. This may indicate that people with prior self-employment may have had trouble in getting loans in banks or that these people were less inclined to start cod farming and therefore received less financing. Industrial experience predicted advice on bureaucracy and advice on accounting/budgeting negatively. A likely interpretation of this is that those with the most industrial experience - who have been working in fishing, the fishing industry and fish farming - do not need the same amount of advice on the bureaucracy and advice on accounting and budgeting as others who have less industrial experience. That industrial experience predicts production resources positively is also understandable; through their experience they have better access to such resources. That people who come from more entrepreneurial families need less technical advice is likely to be due to the fact that they possess this advice themselves.

To sum up: The significant direct effects from human capital on business resources may indicate a substantial explanation not considered in the conceptual model. The degree of business resources acquired is not independent of the qualities which the prospective entrepreneur already possesses. When people have a high degree of business education they do not need advice on accounting and budgeting. When people have work experience from three relevant industries, they perhaps do not need advice on how to handle the bureaucracy or advice on accounting and budgeting. As we did not start out with any theoretical prediction about this relationship, we also now have no theoretical guidance in how to interpret the unexpected results. These results do indicate though that the eagerness to obtain a high degree of business resources does dependent on which capabilities the individual has him/herself.

The second test for spuriousness and for the effect of the casual chain model is related to business resources' impact on start-up. In testing the extent of spuriousness in the resource variables' impact on start-up, an interesting picture emerged. As human capital was negatively related to business resources when the social network was controlled, and most human capital variables also affect start-up negatively, the four resource variables that predict start up positively are suppressor variables, i.e. they have larger effects when human capital and social network are controlled. Of the suppressor variables, it was particularly advice on technology and financing that had a large proportion of their total effect due to variables in time order. There were four variables that were spurious, that had their effect reduced when human capital and social network were controlled. Since human capital predicts start-up negatively - as do these resource variables - its removed impact reduced the size of the resource coefficients. Encouragement and labor were the two variables with the largest proportion of their total effect caused by human capital and the social network. The conclusion is that the spuriousity of four of the eight resource variables is mainly due to human capital and not social network.

Regarding the fit of the causal chain model, the analysis showed that business resources do subsume the impact of the social network on start-up as hypothesized. Social network has no significant direct impact when business resources are controlled. On the other hand, business resources do not subsume the impact of human capital, which had strong direct impact on start up when social network and business resources were controlled for. What does this mean ? The answer is likely to be that a prospective entrepreneur does not build up a social network for exploring the possibilities of starting an enterprise as an end in itself, but rather this social network is made mainly for getting access to business resources. This study has shown that the social network does not add anything to start up when business resources are controlled for. Besides generating resources, social network has no "function" towards start-up. It is the opposite is it with human capital, which to some degree leads people to a purposeful social network. In addition, however, it represents a human capability that is useful for evaluating a future project; those capabilities are even necessary for deciding whether to start or not, even after Ego has made his network and gained access to resources. The conceptual model was therefore confirmed by a zero direct path from social network on start-up, but was not confirmed as the paths from the human capital variables were significantly different from zero.

13. Implications and conclusion

In this chapter we will discuss the theoretical (13.1), methodological (13.2) and managerial (13.3) implications of the study. Limitations (13.4) and advice for further research (13.5) will also be discussed before the conclusion of the thesis is drawn (13.6).

13.1 Theoretical implications

In this section three themes related to the testing of the conceptual model will be discussed: 1) Increasing the causal picture of factors effecting start-up can be improved by comparing the indirect effects to the direct effects; 2) Weak support for human capital's effect on social network - do we need to adress context ? 3) Disfunctional effects of some business resources - do we need to adress characteristics of the industry ?

1) Increasing the causal picture by comparing indirect and direct effects on start-up.

Human capital had a significant effect on the probability of start-up even when the business resources were controlled for. This very clear impact indicates that human capital has its main impact directly on start-up. In a revised model, human capital variables added significant explanatory power beside of business resources to start-up. Is it the same human capital variables that significantly affected social network that also significantly predicted start-up ? Age was negative in predicting seven network variables and had also a negative impact on start-up (however weak and insignificant). Degree of self-employment had a negative impact although on three network variables and at the same time reduced the probability of start-up. This indicates, as we have indicated earlier, that those with high a degree of prior self-employment were reluctant to start up this project quite soon after receiving a license for starting. Technical experience had a positive impact on seven network variables and also affected start-up positively. This indicates that those with technical experience have been quite motivated to start from the very beginning. The more puzzling finding, however, is that business education and education

diversity, both affected two to four network variables positively, but at the same time had a clear negative direct effect on start-up. This indicates on the one hand that business education and education diversity are valuable human capabilities for exploring a social network for business venturing⁴⁶. On the other hand, the analysis of the two next blocks in the conceptual model revealed that the majority of resources to which business education and education diversity gave access in fact did not improve start-up. Although business education and education diversity serve prospective entrepreneurs in building social networks that a priori were thought to enhance the access to business resources significant to start-up, those resources - such as advice on handling the bureaucracy - actually reduces the chances for start-up. In addition two different processes seem to exist: Business education and education diversity are individual capabilities that make one build more effective network structures. On the other hand, apart from the indirect effect through the network, business education and education diversity seem to make the prospective entrepreneur more risk averse. In the case of business education, section 12.2 revealed that the indirect effect is positive whereas the direct effect is negative. In the case of education diversity, both the indirect and the direct effects were negative. Substantially, this shows that positive effects from human capital on social network is only "half the way" to business success. Although some of the human capital variables affected social network positively and social network adequately predicts resources, their indirect positive effect on start-up is insignificant. The indirect positive effect of both human capital and the social network do not get positively transmitted to start-up, if the resources they produce are not effective positive predictors. This study has therefore shown that positive indirect effects at one point help a prospective entrepreneur move further in the entrepreneurial process. However, start-up must be positively predicted by the factor that lies closest in temporal order. Start-up is not secured by resourceful entrepreneurs with efficient networking behavior only. If the resources which networks secure do not serve the prospective entrepreneur in the stage prior to

⁴⁶ Business education helps the prospective entrepreneur to build ties to industrial actors, the service zone, and to build a large network with high range. Education diversity helps to build ties to the service sector and to build a large network.

start-up, then adequate human capabilities and a large, wide ranging network do not have a positive impact. The theoretical implication of this should be clear: a path model with individual and structural factors appearing after one another in temporal order reveals a more detailed picture of the entrepreneurial process. We may see that individual resources help the prospective entrepreneur some way along the process, but that structural factors later in the life cycle prevent its further effect. Positive effects between variables early in the life cycle may not be conducive on start-up as they get mediated to start-up through a negative effect later in the life cycle. And in assessing the total effects from an early factor in the life cycle on start-up, we have seen that a positive indirect effect may be overshadowed by a strong negative direct impact on start-up. To conclude; individual and structural factors do not necessarily have the same direction on their effects. Revealing how positive effects may be stopped by negative effects later in the life cycle is an improvement in understanding the process of entrepreneurship and have implications for understanding what seem to be the critical factors in such a process.

2) How to explain the weak support for the effect of human capital on social network.

There may be many reasons for the relatively weak empirical support for the first path in the model, the impact of human capital on social network. Although one for statistical reasons should not post hoc point to other alternative theoretical perspectives, I have to discuss whether the explanation for the relatively bad fit has substantial and/or methodological.

First of all it must be stated that the hypothesis about the impact of individual resources on social network variables implies only a part of a prospective entrepreneur's total social network. The model includes only a goal oriented social network, oriented towards one project in a prospective entrepreneur's life. When the fit of the data is as low as 2-7 % of the variance, one must not forget that this may show that this purposive business network is only one of many networks which prospective entrepreneurs build. It is very likely that respondents who come

from families with high a self-employment background, with a high general level of education and broad industrial experience have individual resources that open up many other career paths than just cod farming. Through their resources, respondents with high human capital have various projects as alternatives and they may build up rich networks (with the same characteristics hypothesized here), for a different project or a different job. The network measured in this study is only a part of several networks, and when respondents for various reasons tend to drop out of the entrepreneurial process even before they develop a network, they may in fact build up other networks. Still, human capital may be conducive for networking in a more general sense. For obvious reasons this is not a part of the model tested here.

Secondly, it is of course problematic to predict a social network on the basis of only the focal actor's own individual resources. I have probably only captured a tiny part of all the factors that may predict variation in a prospective entrepreneur's business network. The high degree of unexplained variance in network variables may be due to significant differences in the availability of potential network members among respondents from various geographical places. In other words, external factors are affecting what is potentially available for social networking, for instance dimensions related to the size of the community, the degree of entrepreneurial infrastructure, the extent of a general business infrastructure. For my further work it seems necessary to get information about the regional characteristics and the business traditions in the municipality from which the respondents come in order to check whether an external factor actually contributed to various network possibilities for some respondents.

A third factor, is that individual resources such as education level and varied work experience may be more important for networking in more urban areas. Since we here are dealing with mainly rural respondents there may be other mechanisms than the formal requirements of education level and varied work experience that count for the type of ties one build to persons in the local community.

What are the theoretical implications of this ? The three reasons for the relative bad fit of human capital's impact on social network do all point to that networking is done by prospective entrepreneurs and network members in a wider context than what is reflected in the model. The results point to that an efficient business network rely on so much more than the individual capabilities of the focal actor himself. The context which is embedding entrepreneurship has several dimensions: whether it is within an urban/rural part of the society, whether it is done on a geographically central or peripheral location and which other projects prospective entrepreneurs are using their social network capacity on.

3) Business resources: a disfunctional impact on start-up.

This study has revealed that not all network dimensions are qualified to produce resources that actually assist the prospective entrepreneur from idea to start-up. A part of the networking has resulted in resources that have a disfunctional impact towards start-up. This means that social network is not always conducive in the entrepreneurial process, it may also even have a negative impact. This is an aspect of networking that has not been presented before. The trend in the literature has been that network has a constructive effect on entrepreneurship. This study has shown that some of the resources which networks produce in fact reduce the chances of start - up. Of the eight positively predicted resources, four were significant, but only two in the predicted direction - access to the market and production resources. Labor and advice on the bureaucracy were negative. Whereas the former may be due to a measurement bias the latter - bureaucratic assistance - has shown that its "quality" was not sufficient to aid start-up: in fact its "quality" seemed to prevent prospective entrepreneurs from starting up. The theoretical implication of this is that one may also gain in controlling for third variables by holding the industry constant in future entrepreneurship studies. The results here, with disfunctional impact of some resources, are likely to be due to the emergent character of the cod farming industry. With weak infrastructure and low legitimacy, the new industry faces a service sector that does not generate resources conducive for start-up. The further implication is that the theoretical field would gain in being more specific in theories of entrepreneurship and build models

that take into account characteristics of the industry. This study has shown that prospective entrepreneurs likely take every aspect of the the future enterprise into consideration when they move along in the entrepreneurial process. Their actions are not done isolated from the type of enterprise and their views on the industry. Their network members are also acting towards the prospective entrepreneurs based on their views on the project. To conclude: it is difficult to distinguish the entrepreneur from his/her enterprise. It is difficult not to understand the social network as a collection of actors behaving towards the prospective entrepreneur's with their own ideas and attitude towards his project.

13.2 Methodological implications

The methodological implications of this study will be discussed in terms of:

1) Defining an entrepreneurial population; 2) The characteristics of the measurement instrument; 3) Controlling for third variables.

1) Sampling from an entrepreneurial population - a reference group to compare the starters to is secured.

One of the methodological contributions of the study was to define a "real" entrepreneurial population and sample individuals who at one point of time showed interest in starting a business. This secures a better a reference group to which to compare the starters than was achieved in prior studies (Aldrich et al 1986; Aldrich et al 1987; Greve and Foss 1991). Although one can never be sure of not sampling non-entrepreneurs⁴⁷ the problem in this study seems not to be as severe as sampling entrepreneurial students or entrepreneurial interest organizations. The

⁴⁷ In this study we may have some non-entrepreneurs in the sense that some respondents may have applied for a license with the purpose of only securing themselves a prosperous location for eventual farming of other species. Since applying for a license was free until 1988, it is likely that the respondents with the oldest licenses are more likely to be non-entrepreneurs. An aim in my further work is therefore to analyze and compare those respondents who applied at a time where licenses were given for free with those who had to pay NOK 7.000 to get the applications processed. This will detect any sign that the respondents with the oldest licenses were very quick to remove themselves from the entrepreneurial process.

strategy may be followed in future studies: when individuals must apply to start a business and pay for getting their application processed, they may constitute a prospective entrepreneurial population for entrepreneurship studies.

2) The characteristics of the measurement instrument - a visual format equal for the network and resource questions.

What seems to have been an effective measurement characteristic in this study is the visual design of exploring the respondents' networking resource acquisition. A pretested list of 16 network items means that all network variables are gathered on one single page in the questionnaire. A pretested list of 14 resource items means all resource variables are gathered on one page. The resource question was coupled to the network questions on the prior page so that the logic was clear to the respondents. On one page they gave information about the network persons, on the next page they specified what each of them had given him/her. The advantage of this format is that it may have helped to enhance the respondents' memory and therefore enhanced the detail in the respondents' answers. The causal ordering was secured empirically. One avoided that the respondents had to describe their network persons with written words. I think the visual format with a wide range of pretested items enhanced the detail of answers on the questions: with whom have I made contact ? and what has that person given me access to ?⁴⁸

3) Controlling for third variables

Controlling for third variables by choosing a homogeneous setting seemed to have contributed to the relatively high internal validity and statistical conclusion validity in the study. The relatively clear causal picture, with significant effects and much of the variance explained, appears to be enhanced by holding constant a factor such as industry. What we have lost of course is external validity. However, as

⁴⁸ It is often difficult to avoid that some respondents do interpret the pretested items differently than the majority of respondents. A preliminary analysis of 237 of the 289 respondents revealed that "encouragement to start cod farming" was interpreted as something positive whereas "constructive criticism of ideas and plans" was interpreted as something positive by some respondents and as something negative by other respondents. An additional data inquiry of 20 respondents supported this. The item was therefore deleted from the further analysis.

theories normally do not specify the target population, setting or times to generalize to or across (Cook and Campbell, 1979) it seems wise to sacrifice external validity in order to gain a setting where causal hypotheses can be falsified empirically.

13.3 Managerial implications

The results of this study have consequences that should be of interest for future entrepreneurs as well as for the service sector and governmental planning. For the single entrepreneur, the normative component of these results would be that networking is essential for resource acquisition, and that different networking strategies are needed dependent on which resources are essential.

Future entrepreneurs

Regarding the impact of social network on start-up, which this study suggests is indirect through the effect that networking has on resource acquisition, the normative implications are as follows: A prospective entrepreneur develops the most effective network for start-up if he/she succeeds in developing ties to many industrial actors and in general also develops multiplex ties, i.e. when a tie to another actor with a certain attribute is also a kin/friend. The industrial zone seems to be the most resource prosperous network zone as it gives access to the resources needed most for start up: production resources and access to the market. The results in this study do not indicate to the service sector as an effective network category for acquiring resources. The only resource which the service sector generates that came out significant for start-up was advice on the bureaucracy; this had a negative effect on the probability of start up. Until the service sector manages to give resources that actually assist the prospective entrepreneur in his effort to start-up, the normative guidelines here cannot be other than that, with the way in which the industry functions today, the prospective entrepreneur does not increase his/her chances of start-up by making ties to all possible actors in the service sector. Also kin and friends, who only serve as roles towards entrepreneurs,

are in fact not efficient for resource acquisition; the resources to which they contribute - advice on handling the bureaucracy and labor - in fact reduce the chances of starting. This study has shown that roles have to be combined with attributes in order to prove conducive to obtaining the necessary resources. Future entrepreneurs need to seek wider ties than to just their closest kin and friends to acquire resources. They need to take advantage of the status or the attributes of their network members. To be related to persons such as fish buyers, direct consumers, distributor/exporter or in the industrial zone is however valuable. Network size and network range and ties to other business starters are other aspects of social network, that to a lesser degree, seem to be conducive for start-up. Size is only helpful via market resources and this shows that when the project is so far that selling is needed, then the size of a social network is of importance. Range was important primarily because it reduced access to labor, which again predicted start-up negatively. Ties to other business starters seem valuable as they provide the entrepreneur with production resources. To conclude: What future entrepreneurs in the cod farming industry should be aware of is to concentrate their networking mainly on the industrial zone and to some extent the collegial zone. Here they get access to resources which seem to serve their business purposes. Strengthening these ties seems to be conducive to resource acquisition.

Governmental planning

The service sector was the great disappointment in predicting resources in this study. Some of it is understandable, i.e. that the banks have not been able to give access to satisfactory financing, given the economic difficulties the Norwegian banks had at the time of the study. Apart from that it is puzzling and should be somewhat worrying that the actors who are in fact paid to serve cod farmers - such as the Fisheries Extension Office, Head of Economic Planning, and veterinary - are not able to produce one resource that could significantly predict start-up. The implication of this study is that the service sector today has to renew its efforts towards future cod farmers. The very clear negative impact of advice on the bureaucracy that the service sector mainly generates may contain some of the

negative attitude toward fish farming in general, as some of the quotations in this study have revealed. In any case, if it still is a governmental wish to develop this industry any further, one must ensure that the service sector benefits future entrepreneurs more than this study has shown.

13.4 Limitations

The limitations in this study lie in both: 1) The use of retrospective questions; 2) Having network measures that show a low degree of unidimensionality; 3) The question of industry specific results and lacking degree of generalizability.

1) Using retrospective questions

The clear limitation in this study is the retrospective design of the measurement instrument. Research has shown that people can recall or predict less than half of their communications, measured either by amount or by frequency (Bernard, Killworth, Kronenfeld and Sailer, 1984). The credibility of this study lies therefore in how well the temporal order is accounted for and whether the measurements follow this temporal order. Firstly, the information letter explicitly mentions to the respondents that it was the events before eventual start-up that were to be described. Secondly, the temporal order was repeated when the social network and resource questions were asked. Thirdly, I placed the resources assumed to be needed first at the top of the page and the material resources assumed to be needed last at the bottom of the page. This format makes it more likely that the last resource needed does not get ticked off, rather than the first needed. However, we can never know whether some respondents who had started in fact described only their networking behavior and resources during the pre start-up period, and not their network when running their business. A different aspect, which is difficult to assess, is whether the non starters - because they for obvious reasons are less interested in the future of cod farming - are less concerned with reporting their networking behavior and their resource acquisition. The relatively clear picture of the differences between the non-starters and starters found in this study may not

only consist of "real" differences but may also be a result of a measurement problem, due to the fact that the networking behavior and resource acquisition of non-starters is less vivid and less interesting to report. The only way this was worked against in the study, is that the non-starters were overrepresented in the telephone interviews which secured a higher motivation to give answers.

2) Having network measures that show a low degree of unidimensionality.

In the validation of the indices (section 7.6) we saw that four of the six indices showed a relatively low degree of reliability. A further analysis of the three zone measures showed a relatively low degree of convergent and divergent validity. I did not achieve statistical correlations and sufficiently large correlations for all items supposed to measure the same construction. A factor analysis also supported this picture from analyzing the correlation matrix. The service zone was not well measured by the items veterinary and employee in the Fisheries Extension Office. The industrial zone was not well represented by the items employee in research institution and consumer. And the collegial zone was not well represented by the item salmon farmer. In the index kin and friends, spouse contributed little to the concept.

Since the operationalizations were in accordance with the theoretical domain, I did not find substantial reasons to drop the items that fitted relatively poorly in the indices. My knowledge of the industry and the telephone interviews have given us some knowledge on why some of the items did not come out better in the analysis. That spouse fits poorly into kin and friends may have two explanations. The main one would be that male cod farmers are likely not to "use" their spouses in venture creation in this traditionally male dominated industry. A methodological explanation would be that framing of the network question "With whom have you been in contact regarding the craft of cod farming?" is not the best one to trigger off responses of network members which many respondents take for granted but which one has made contact with in the process. However, as spouse is an empirical operationalization of the concept kin, it cannot be dropped for empirical reasons. The same is true of salmon farmer. The non-significant correlation

between salmon farmer and cod farmer is likely to be due to the fact that they represent two different farming cultures and a prospective cod farmer may not need to make contact with both cod and salmon farmers in the entrepreneurial process. However, salmon farmer correlates significantly with fishermen which means that a prospective entrepreneur is more likely to have that combination in his network. Therefore, since salmon farmer theoretically represents a colleague of a prospective cod farmer I kept the index as proposed theoretically. The principal factor analysis with rotation and correlated factors came up with two zones instead of the three suggested in this work. Further, this method showed a pattern that did not substantially have any meaningful distinction other than a pure geographical distinction between the two zones. I therefore chose to keep industrial zone and service zone as proposed theoretically.

The strength of this approach is to keep the theoretical distinction between the zones as the criterion for operationalizations and not let a statistical method choose to which concept each item belongs. It was important here to distinguish between a service zone and an industrial zone, where the former contains all publicly and privately financed services towards future cod farmers, whereas the latter consists of all actors that are related to the cod farming industry. Through measure validation, we have seen that the researcher is more distanced to a prospective cod farmer than originally thought and for that reason could have been placed in the service zone. Politician correlates significantly with the items in the collegial and industrial zones as well as items in the service sector and may appear closer to the prospective cod farmer than originally proposed. The Fisheries Extension Office correlates significantly with items in the collegial zone and with one item in the industrial zone in addition to two items in the service zone. However, since this status represents a publicly provided service, I chose to keep the service zone index as proposed theoretically.

The weakness of this approach is that we do not take into account that there is no empirical clear cut distinction between the zones (the factor analysis did not show an interpretable solution before the zones were correlated at .47) as theoretically

proposed. The items across zones are more correlated than expected and this makes the distinction somewhat more blurred. In addition we do not get unidimensional concepts where all items actually reflect the same construction. This makes the variable less suited for empirical regression analysis. However, the multicollinearity diagnostics only showed moderate multicollinearity between the collegial zone and the service zone in affecting the degree of affective resources, and between the service zone and the industrial zone in giving access to financing. The network measures still were able to predict 17-42 % of the variation in resources. The conclusion is therefore that we are likely to have obtained stronger results if we operated with more unidimensional constructs.

3) The question of generalization to the population with an unrepresentative sample.

Generalization across populations, settings and time (which requires deliberate sampling for heterogeneity) have not been given priority in this study since we have given priority to statistical conclusion validity and internal validity which require homogeneous respondents. The question still remains: with a 59 % response rate, can I generalize the results of 289 analyzed questionnaires in this study to a well-defined target population (the 508 persons having a license for cod farming between 1989 and 1991) ? To answer this question, a study of non-response bias should have been conducted in this study. When this is not done, a second best way is to check the significant differences in human capital among the non-starters and the starters and try to argue how I believe that this sample is not a too distant representation of what is going on in this industry. First of all I am inclined to believe that this study contains most of the starters in the industry. They at least had an incentive to answer. Then there was the difficult task of trying to reach respondents who had not answered postally. In telephoning the respondents, there were always some numbers which we could never reach.

Very likely these people are not farming cod, as that requires steadily inspection. My guess would be that those who have not answered the questionnaires are the likeliest non-entrepreneurs as they have the smallest incentive to answer.

I cannot see any pattern that should be revealed in a systematic non-response.

The 103 non-starters included in the study have a significantly higher degree of self-employment in the family are also more often self-employed and they have a higher education diversity and a greater level of education. It is therefore difficult to believe that the non-starters in general should be less resourceful than the starters. If we assume that it is mainly the non-starters which we have not captured in this study, then one is almost tempted to say that when the non-starters represented here have so much human capital, it would surprise me that they represent a very small fraction of the possible group of non-starters available. On the other hand, if we believe that it was the least motivated and the least non-entrepreneurs who did not answer the questionnaire; do we assume that they have the same amount of human capital or less than those represented in the study ? This is a difficult question to answer all the time it seems too easy to believe that the least non-entrepreneurs have lower human capital. A more likely guess is that they, due to their non-response, are occupied in other businesses or other jobs. In that respect, one would assume that the largest group of those who have not answered are likely to have relatively high human capital as the non-starters in the study show. I therefore believe that people did not answer because they are not capable of writing or do not possess the skills for handling a questionnaire. I am more likely to believe that they applied for a license in order to obtain of a prosperous location and that they possess relatively high human capital equal to the non-starters in this study.

13.5 Further research

Regarding social network variables, it seems wise to progress further from this study with a few structural variables and continue to emphasize the interactional and attributal network variables in order to predict resources. If one should focus on some specific variables from this study, it seems that network range has more explanatory power than network size. Multiple attributes, defined as the average number of attributes of Alter in Ego's network, seemed to be too much of a macro variable. This variable should in the future rather be defined as multiple attributes within the three zones. I.e. that Alter with multiple attributes within one zone

should be more likely to give access to resources compared to Alter with only one attribute. In other words, the number of attributes within one zone strengthens the position in the zone. To sum up: for future research, range, multiplexity, kin and friends and the three zones - collegial, industrial and service - should be tested in empirical analysis in other settings than in this study. If multiple attributes should be included, it needs to be defined on a micro level, i.e. degree of attributes within one zone.

A replication of this study should be done in a different empirical setting than this one in future work. This would involve operationalizing the variables in a different industry and testing whether structural, interactional and attributal network variables still predict variation in resources. This would provide a test of the general argument that social network has a universal impact on business start-up, regardless of which industry the enterprise is within. My assumption here is that various dimensions of social networks are likely to have different impacts on resources due to the difference in resources needed in various industries.

In relating back to the theoretical implications in section 13.1 it must be discussed how future studies can take care of what one has learned from the results in this study. First, it seems necessary to conduct in depth case studies of the other parts of the social network prospective entrepreneurs are engaged in and compare it to the smaller goal oriented business network studied here. Are prospective entrepreneurs only engaged in one business network related to one project or to what extent and how does the rest of their social network look like ? Such knowledge will give us a more fully picture of which types of business and career networks entrepreneurs are engaged in. Secondly, we do need research that contrasts the effect of human capital on social network on enterprises that are carried out in a rural setting compared to the same kind of enterprise carried out in an urban setting. We need to know: Are there different paths to an efficient business network dependent on whether the prospective entrepreneurs are networking in an urban or a rural context. Are there different kinds of human capital required ? Thirdly, we do need to investigate how strongly entrepreneurial

networks rely on the availability of an entrepreneurially friendly local context. Are there significant differences in entrepreneurs' social network in communities that represent various degree of size and general business climate and infrastructure ? Fourthly, this study which represent a very different kind of enterprise compared to other entrepreneurship studies points to that we seem to have with different entrepreneurial cultures. The entrepreneurs in this study are far more closer to a fishing/hunting culture than they are to a business culture. It seems to me that we need to know more about entrepreneurs' different enterprises and whether the culture for different enterprises may affect what is needed of both human capital, social network and business resources. And fifth, the stage of the industry of which the enterprise is a part seems to lay conditions for how prospective entrepreneurs view the business project and the motivation for building a goal oriented business network. Further the quality of the feedback from the social network may also depend on how "good" the business idea is viewed, and how the quality of the resources may be affected of this. We need more knowledge of how the decisions taken in an entrepreneur's life cycle, and how the impact of human capital, social network and business resources are affected by the characteristics of an emergnet vs a mature industry.

13.6 Conclusion

The aim of this study has been to develop and test a life cycle model of entrepreneurship, where individuals' resources are hypothesized to affect the social network that a prospective entrepreneur builds for business purposes. The network is hypothesized to generate business resources, which are hypothesized to be the mediator to start-up. Related to the research problem in this study were the following questions: **to what extent does social network generate business resources needed for start up ? to what extent are business resources' impact on start-up caused by variables prior in temporal order ?**

The answer to the first question is that social network does indeed generate business resources. The model got clear support for networks' impact on resources,

17 to 40 % of the variance in resources was explained. Of the eight network variables, three attributal variables (service zone, industrial zone, collegial zone), the two interactional variables (multiplexity and kins/friends) and one structural variable (range) performed very well. Size and multiple attributes performed less well. The analysis therefore showed that attributal and interactional network dimensions add significant explanatory power to a model in addition to structural characteristics. The network members' status and how the network members are related to the prospective entrepreneur has a considerable impact on the degree of resources obtained. Further the analysis showed that it is the range of network members that counts for resource acquisition, not how many network members a prospective entrepreneur has. The study also showed that the specified resources contributed well to explain variance in start-up, the analysis showed a pseudo-R-square of 36 %. Of the eight resource variables, four came out as significant, two in the expected direction (market resources and production resources) and two in an unexpected negative direction (advice on the bureaucracy and access to labor). When 16 outliers were removed, 58 % of the variance was explained and also access to financing came out as significant, in the predicted direction. The fact that only half of the resources came out as significant - indicates that there may be a temporal order between affective, informative and material resources, as assumed in section 6.3. When resources late in temporal order (production resources and market resources) are controlled, then resources earlier in temporal order (advice on technology) do not come out significant. The main resources that affect start-up positively are material resources: production resources and access to the market. Related to the research question of the indirect impact of social network on start-up, the main idea in this thesis is that social network do not affect start-up directly, its function is only indirect. In testing this hypothesis, the proposed zero effect from social network on start-up, when resources were controlled, the conceptual model was confirmed: social network did not add anything significant to start-up. The meaning of social network in the entrepreneurial process is mainly to generate business resources. Social network does not seem to have a significantly direct impact on start-up as predicted in earlier research. This is probably due to the fact that business resources are controlled for. Resources are the mediator to start-up

compared to social network. A main finding in this study, compared to earlier research, is that the role of social network is not to enhance the probability of start up directly, but to have an important indirect impact, serving as a channel for resource acquisition. In itself, networking does not increase the probability to start-up, when the resources it produces are controlled for.

To what extent then, is the effect of business resources on start-up a result of prior variables' impact? The analysis of the extent of spuriousity revealed that of the eight resource variables, four variables had very small spurious components due to impact from prior variables. Interestingly, we found that four variables actually had a larger impact on start-up when social network and human capital were controlled (suppressor effects). Of these, financing and advice on technology, had relatively large proportion of their effect on start-up due to prior influence. It is actually very understandable that financing is the most spurious variable, due to that is it negatively predicted by human capital which also affect start-up negatively. When these effects are removed, financing increases its impact on start-up positively. The interesting part here, is that of the few variables that have a relatively high degree of spuriousity it is mainly due to human capital which is the prior variable that significantly predict both resources and start-up negatively. The spurious part does not seem to be related to the prior social network variables, as they predict resources positive, but has non-significant impact on start up. The conclusion therefore is there are a few business resource variables that have a spurious relation to start-up. These spurious relations are mainly due to human capital. The consequence of this is that it is mainly human capital who have an ability to influence all factors later in temporal order, whereas social network's role seems primarily to generate resources. Therefore, the effect of business resources are to a very little degree a result of influence from prior variables.

The research problem consisted of the same questions for the "upper part" of the model; how well does human capital predict social networking, and to what extent is social network's impact on business resources a result of impact from human capital? The first path in the life cycle model was not very well confirmed by the

data. Only 2 to 7 % of the variance in social network were explained by five of the eight predicted human capital dimensions. And two of the eight paths were only significant at .10 level. The most likely reason for this relatively bad fit is as follows: The analysis showed that respondents with high degree of self-employment tend to have less ties to the collegial zone, industrial zone and to people with multiple attributes. Respondents who comes from families with a high degree of self-employment and who in addition have a high education and higher industrial experience have not build any more efficient network for business purposes. These high human capital values on four of the eight human capital factors must have triggered off a clear reluctancy towards starting cod farming. That may have caused them to drop off the entrepreneurial process quite early after receiving the licence and therefore so that many even have not explored the possibilities for start-up by exploring their network. Very likely these respondents have - due to their human capital - had more options for future careers than those with high technical experience who seem to have been the most eager to explore the possibilities through networking. Due to the high human capital, respondents' other opportunities, they may simply not have developed a purposive business network for establishing a cod farm. The low variance explained in this part of the model must be seen on the background that the zero impact from many of the human capital dimensions are likely due to that they may have a higher variance explained in other parts of their social network, outside the idea of starting a cod farm.

To what extent is social network's impact on business resources result of an impact from human capital ? In assessing the spurious parts of the social network's impact on business resources, we revealed in section 10.4 that kin/friends were relative spurious in predicting encouragement, advice on accounting and budgeting and financing. It is age and technical experience of the human capital variables that affect both kin/friends and the three resource variables. Collegial zone was relatively spurious in predicting production resources. 43 % of its effect on .3939 on production resources were due to influence from human capital, which we know both affects production resources and social network. The conclusion is therefore

that two social network variables are relatively spurious in predicting four of the eight business resources. However, this can not be taken as a large extent to which social network's impact on business resources are spurious. We may therefore state that this study showed that social network seems to have its own strong effect on resources, relatively independent of human capital. The effect networking has on resource acquisition does not seem to rely too heavily on the fact that a prospective entrepreneur's human capital has determined the network characteristics.

As stated in chapter 1 and chapter 5, the idea was that individual and structural variables work together in an interplay in explaining start-up. Human capital affects what social structures the prospective entrepreneur builds, which again decides what business resources he may require, which again increases his chances of start-up. The result of the study, however, suggest that only some human capital are important background factor for social networking. Human capital have instead a strong direct impact on start-up, even when factors thought to appear later in time (resources) are controlled. This study has shown that the direct effect of human capital on start-up is greater than its indirect impact. In assessing the indirect impact of human capital variables the analysis showed that age and education diversity had a very small negative impact on start-up (-.0017 and -.0056). Degree of self-employment had a negative impact of .03. Business education and technical experience affected start-up positively with .02. When we compare these indirect effects with the direct effects on start-up there is a clear discrepancy. Business education decreases start-up with .07, education diversity with .21, self-employment with .12 and self-employment in the family with .09. Education increases start-up with .07, technical experience with .04 and industrial experience with .01. In other words, seven of the human capital variables had significant direct impact on start-up, whereas five had significant indirect impact.

Human capital seems to play a greater direct role in increasing/decreasing the probability to start-up, than in helping prospective entrepreneurs in making efficient network relations. Human capital does not serve as an effective background for developing networks - rather it assists the prospective entrepreneur

to decide for start-up after networking has taken place and the resources are required. A prospective entrepreneur's human capital is with him through the entire entrepreneurial process, to the final decision whether to start the firm or not. Substantially, this finding supports the human capital tradition, more than it supports incorporating individual resources in social network analysis. The proposed intervening impact with individual factors causing variation in structural factors did not hold in this study. Instead what seems to be supported is that individual factors supplement the structural factors close to start-up in temporal order. In other words, just before the business is to be started, individual resources are decisive for whether the business becomes started even when important resources are acquired. This finding indicates that the main impact of individual resources are late in the life cycle - later than we expected - its significance is to the point shortly before the business gets started or not. The conclusion is therefore that the interplay between individual and structural factors works differently than proposed in the conceptual model. Individual resources seem to work less as background for structural factors. Instead they seem to work in addition to, as a supplement to structural factors (resources) in predicting start-up. Individual and structural factors seem to work side by side in explaining the start-up phenomena - not to be interwoven in a time sequence where individual resources decides which social networks to be built.

Related to the above question about the interplay is the main thesis proposed in the introduction chapter: **All variables appearing later in the prospective entrepreneur's life cycle will take over all effects from variables appearing earlier in time order.** Applied on the model this means: social network is able to transmit all effect of human capital on resources. Business resources are able to transmit all effects of social network and human capital on start-up. What is the answer to this main thesis ? The analysis showed the following: The majority of the network variables were able to transmit the effect of human capital on business resources. On average always two of the eight human capital variables had significant direct effects on the eight business resources, when social network was controlled. Interestingly, it was degree of financing and degree of advice on

accounting and budgeting that had the most significant direct effects from human capital. The interpretation here is that the extent of received advice on accounting and budgeting was not independent of the capabilities the individual entrepreneur has. He/she seems to need less advice on accounting and budgeting the older he/she is, the more business education one has, and the more industrial experience one has. Similarly, business education, technical experience and degree of self-employment reduced the degree of financing obtained, whereas education diversity increased it. The interpretation here is that the respondents with these characteristics have less need for financing, due to that they were not motivated for starting.

The conclusion is: since always two out of eight human capital variables did predict business resources significant, when social network is controlled, the first part of the main thesis in this work was not fully supported. On the other hand, when six out of eight human capital variables show no direct effect when social network was controlled, the conclusion must be that the majority of the social network variables were fully transmitting the effect of human capital on business resources. Of the few variables that had significant direct effects are age and business education the easiest to interpret. With age one's chances of receiving resources decline and those with high business education seem, due to the difficulties in the industry, less motivated to start-up and therefore also less motivated to achieve business resources.

The other part of the main thesis: **Are business resources able to fully transmit all effects from human capital and social network on start-up ?** To this question the analysis in 11.3.1 revealed a very clear pattern. Five of the eight human capital variables have significant direct impact on start-up when social network and business resources are controlled. The implication of this is that business resources are not able to transmit the impact of human capital on start-up. Human capital have a clear and strong direct impact on start-up. Individual capabilities do not get overshadowed by structural factors as hypothesized in this study. These findings indicate that the role of the prospective entrepreneurs' own

capabilities plays a much larger role than just serving as a background for developing of social networks. Human capabilities have a role as explaining a part of the variance in start-up that is not caused by business resources. Individual factors add something to predict start-up beside of the achieved business resources, opposite to the hypothesis in this work. What supported my hypothesis, however, was the non significant direct paths from social network on start-up, when human capital and business resources were controlled for. This finding support the idea that business resources are able to transmit fully the impact of social network on start-up. The impact of social network on start-up is only indirectly as predicted.

Can the direction of the relationships between the variables add anything new to the field ? The results of the analysis with human capital variables showed that some dimensions were dysfunctional for both networking and start-up. Self-employment in the family predicted three network dimensions negatively, and the direct effect on start-up revealed that business education, education diversity, self-employment had significantly negative effect on the probability to start-up. Regarding resources we saw that advice on bureaucracy and labor reduce the probability to start-up. What does this mean ? In a more general sense this study has shown that dependent on the enterprise where in the life cycle the industry is, we may find that the effects assumed to assist prospective entrepreneurs in the entrepreneurial process, in fact has the opposite effect, it has a dysfunctional effect on the probability to start-up. This finding is likely a result of controlling for industry, and that we are able to get a more detailed picture of the entrepreneurial process for prospective entrepreneurs who have been issued a licence to start in the same industry. The result in this study seem to point to that an industry needs to come over a treshold, where the government, the banks view venture creation as a rational strategy. It has to be a large enough market, the technology has to get cheap enough to use and the general scepticism among people have to be reduced. In short the support functions need to be there. The more educational related entrepreneurs seem to need to see clear profitability before they dare to start-up. This study has, however, shown that before this general support system is secured, it is mainly some special entrepreneurs with some experience related human capital

and less education related human capital who still are so persistent to start with a business everybody else are shaking their heads to. Maybe we do need such entrepreneurs, who in some sense are acting "irrational" and start a new venture in a small scale that do not give them a lot of profits. Maybe they are needed in order to trigger off new enterprises in a new industry.

This study shows that it is difficult to make a general theory about entrepreneurship. Perhaps future research needs to take into consideration which enterprise is to be started and whether the enterprise is within a maturing or emerging industry. In an emerging industry, like the industry studied in this thesis, we have seen that both human capital, social network and business resources can have quite opposite effects as predicted. Prospective entrepreneurs take into consideration the expected profitability of the enterprise, and when they have high human capital, as higher business education and higher education diversity and have higher degree of self-employment, they are more likely to jump off the entrepreneurial process and not develop an business efficient social network as predicted here. Also some of the resources received through social networking show themselves in this study as reducing the probability to start-up. In an emergent industry, the enterprise involves a product which implies first-time buyers (Porter, 1980). The finance sector is sceptic to help a new industry settle, and the legitimacy for a new product and its technology is low. Cod farming as an emerging industry faces so many environmental and economical problems, that it is likely to reflect the quality of the personal social networks of prospective entrepreneurs, and the quality of the resources generated through social network.

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Tromsø, den 30. april 1992

Hva skal til for å starte torskeoppdrett ?

Fiskeri- og oppdrettsnæringa har noen vanskelige år bak seg. Etablering av ny virksomhet har ikke vært noen enkel oppgave. Formålet med denne undersøkelsen er å få bedre kunnskap om hva som skal til for å skape noe nytt, som torskeoppdrett. De første som prøver nye ting møter mange barrierer. Hva har disse vært for deg ?

Spørreskjemaet er sendt til alle tidligere og nåværende konsesjonsinnehavere. Det er på 5 sider og inneholder 15 spørsmål. Det omhandler tida fra du fikk idéen om å starte med torskeoppdrett til anlegget eventuelt kom i drift. Du som har drevet anlegget i flere år bes tenke tilbake på tida før vanlig drift. Likeså du som har startet, men siden lagt ned virksomheten. Regnskap, arkiver o.l. trenges ikke for å svare på spørsmålene !

Jeg ber deg besvare skjemaet selv om du eventuelt

- søkte konsesjon uten helt sikkert å ha til hensikt å bruke den,
- har slått i fra deg idéen om å starte med torskeoppdrett.

Du bes svare utifra den tida du hadde interesse for torskeoppdrett.

Verdien av undersøkelsen er avhengig av at du tar deg tid til å besvare skjemaet og returnerer det i vedlagt frankerte svarkonvolutt. Det står et identifikasjonsnummer øverst på spørreskjemaets første side. Det trenger jeg for å vite om du har svart eller om du må kontaktes igjen. Opplysningene i skjemaet blir anonymisert under bearbeidelsen og skal ikke kunne spores tilbake til deg.

Som takk for bryderiet vil du, om du sender tilbake skjemaet i utfylt stand innen 23. mai, være med i loddtrekningen av en pengegevinst på kr 2.000. Om ønskelig vil du få tilsendt resultatene fra undersøkelsen.

Har du problemer med skjemaet, så ring meg på telefon (083) 45 560 (dagtid) eller (083) 51 676 (etter kl 17).

Jeg håper på et godt samarbeid. På forhånd, takk !

Vennlig hilsen

Lene Foss
Stipendiat ved
Norges fiskerihøgskole

Vedlegg



To respondents who have had their licences withdrawn.

Norges fiskerihøgskole (NFH)
UNIVERSITETET I TROMSØ

Tromsø, den 30. april 1992

Hva skal til for å starte torskeoppdrett ?

Fiskeri- og oppdrettsnæringa har noen vanskelige år bak seg. Etablering av ny virksomhet har ikke vært noen enkel oppgave. Formålet med denne undersøkelsen er å få bedre kunnskap om hva som skal til for å skape noe nytt, som torskeoppdrett. De første som prøver nye ting møter mange barrierer. Hva har disse vært for deg ?

Spørreskjemaet er sendt til alle tidligere og nåværende konsesjonsinnehavere. Det er på 5 sider og inneholder 15 spørsmål. Det omhandler tida fra du fikk idéen om å starte med torskeoppdrett til anlegget eventuelt kom i drift. Har du drevet anlegget i flere år, bes du tenke tilbake på tida før vanlig drift. Likeså du som har startet, men siden lagt ned virksomheten. Regnskap, arkiver o.l. trenges ikke for å svare på spørsmålene !

Jeg vet at du har fått inndratt konsesjonen og ber deg besvare skjemaet utifra den tida du hadde planer om å starte torskeoppdrett. Jeg ber deg også besvare skjemaet selv om du eventuelt søkte konsesjon uten helt sikkert å ha til hensikt å bruke den. Det er viktig for undersøkelsen å få fram erfaringene du har gjort deg.

Verdien av undersøkelsen er avhengig av at du tar deg tid til å besvare skjemaet og returnerer det i vedlagt frankerte svarkonvolutt. Det står et identifikasjonsnummer øverst på spørreskjemaets første side. Det trenger jeg for å vite om du har svart eller om du må kontaktes igjen. Opplysningene i skjemaet blir anonymisert under bearbeidelsen og skal ikke kunne spores tilbake til deg.

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Vennlig hilsen

Lene Foss
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Norges fiskerihøgskole

Vedlegg

Appendix 1. Descriptive statistics of starters and non-starters

RESOURCE VARIABLES

<i>Variable</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Var</i>	<i>Min</i>	<i>Max</i>	<i>Mode</i>
Encouragn.	1.145	1.577	2.487	0	7	0
Adv.bureau	.795	1.050	1.103	0	7	0
Adv.acco&b	.311	.640	.410	0	4	0
Adv.tech.	2.446	2.563	6.572	0	15	0
Prod.res	2.333	2.453	6.018	0	17	1
Financing	.569	.887	.786	0	4	0
Labor	.327	.693	.481	0	3	0
Market/sale	1	.798	.637	0	5	1

Table 1: Descriptive statistics of resource variables for starters (N=186).

<i>Variable</i>	<i>Mean</i>	<i>St.dev.</i>	<i>Var</i>	<i>Min</i>	<i>Max</i>	<i>Mode</i>
Encouram.	1.252	1.318	1.739	0	6	0
Adv.bureau	.864	1.155	1.334	0	8	1
Adv.acco&b	.271	.527	.278	0	2	0
Adv.tech.	1.660	2.093	4.383	0	12	0
Prod.res.	1.398	2.241	5.026	0	17	0
Financing	.388	.744	.553	0	3	0
Labor	.300	.654	.428	0	3	0
Market/sale	.330	.771	.595	0	4	0

Table 2: Descriptive statistics of resource variables for non-starters (N=103).

HUMAN CAPITAL VARIABLES

<i>Variable</i>	<i>Mean</i>	<i>St.dev</i>	<i>Var</i>	<i>Min</i>	<i>Max</i>	<i>Mode</i>
Tech.exp.	1.962	2.658	2.749	0	6	2
Age	42.24	11.78	138.92	16	70	38
Edudiv.	1.005	.921	.848	0	3	1
Education	2.655	1.119	1.253	1	5	3
Selfempl.	.884	.511	.262	0	2	1
Bus.educ.	.629	.886	.785	0	3	0
Induexp.	1.069	.560	.314	0	2	1
Selffam	.892	.554	.307	0	1.5	1

Table 3. Descriptive statistics of human capital variables for starters (N=186).

<i>Variable</i>	<i>Mean</i>	<i>St.dev</i>	<i>Var</i>	<i>Min</i>	<i>Max</i>	<i>Mode</i>
Tech.exp.	1.601	1.416	2.006	0	6	0
Age	42.81	11.38	129.68	19	71	48
Edudiv.	1.330	1.003	1.007	0	3	2
Education	2.912	1.164	1.355	1	5	3
Selfempl.	.951	.530	.281	0	2	1
Bus.educ.	.786	.986	.973	0	3	0
Induexp.	.951	.566	.321	0	3	1
Selffam	1.033	.529	.280	0	1.5	1.5

Table 4. Descriptive statistics of human capital variables for non-starters (N=103).

SOCIAL NETWORK VARIABLES

<i>Variable</i>	<i>Mean</i>	<i>St.dev</i>	<i>Var</i>	<i>Min</i>	<i>Max</i>	<i>Mode</i>
Multatt	1.270	.523	.274	0	4	1
Multiplexity	.784	1.128	1.272	0	7	0
Size	4.435	2.222	4.939	0	8	3
Range	4.569	2.466	6.084	0	12	3
Coll.z..	.969	.546	.298	0	2.398	1.098
Indus. z.	.918	.560	.314	0	2.498	.693
Serv.z.	.756	.561	.315	0	2.197	.693
Kin/friend	.479	.545	.297	0	1.945	0

Table 5. Descriptive statistics of network variables for starters (N=186).

<i>Variable</i>	<i>Mean</i>	<i>St.dev</i>	<i>Var</i>	<i>Min</i>	<i>Max</i>	<i>Mode</i>
Multatt	1.132	.417	.173	0	2.33	1
Multiplexity	.660	.985	.971	0	4	0
Size	4.145	2.357	5.557	0	8	4
Range	3.689	2.536	6.431	0	11	3
Coll.z..	.909	.566	.321	0	1.945	1.098
Indus.z.	.566	.569	.324	0	1.945	0
Serv.z.	.762	.527	.278	0	1.791	.693
Kin/friend	.510	.535	.286	0	2.079	0

Table 6. Descriptive statistics for network variables for non-starters (N=103).

SITUASJONEN NÅ

1. Hvilken situasjon er du i torskeoppdrett nå ? (Sett ett kryss)

- | | |
|---|--|
| <input type="checkbox"/> Akter <u>ikke</u> å starte | <input type="checkbox"/> Er i <u>ferd med</u> å starte |
| <input type="checkbox"/> <u>Vurderer</u> å starte | <input type="checkbox"/> Har <u>starta</u> og <u>driver</u> torskeoppdrett |
| | <input type="checkbox"/> Har <u>starta</u> og <u>lagt ned</u> virksomheten |

PROBLEMER

2. Har noe av dette vært et problem for deg ? (Sett ett kryss for hver linje)

	ikke noe problem	lite	middels	stort problem
Konsesjon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finansiering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilgang på levende torsk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilgang på torskeyngel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pris på levende torsk/ungel (hvis kjøp)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjøpsgodkjenning av levende fisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tilgang på fór	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sammensetning av fór	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finne egne salgskanal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pris på oppdrettstorsk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lønnsomhet i hele produksjonen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kannibalisme/sjukdom/havari	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annet: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(spesifiser)			

FINANSIERING3. Har du hatt **startkapital** i form av: (Sett ett kryss for hver linje)

	Nei	Ja
Egenkapital (penger)	<input type="checkbox"/>	<input type="checkbox"/>
Egenkapital (driftsutstyr)	<input type="checkbox"/>	<input type="checkbox"/>
Lån	<input type="checkbox"/>	<input type="checkbox"/>
Tilskott fra kommune	<input type="checkbox"/>	<input type="checkbox"/>
DU - midler	<input type="checkbox"/>	<input type="checkbox"/>

AKTIVITETER

4. Når gjorde du hva ? (Skriv årstall på hver linje. Sett strek hvis det som står ikke er relevant.)

År

Fikk idé _____
Søkte konsesjon _____
Ordna finansiering _____
Fikk konsesjon _____
Stifta bedriften _____
Fikk kjøpsgodkjenning for levende fisk _____
Skaffa merd, fortøyninger, nøter _____
Skaffa levende torsk/ungel til anlegget (første gang) _____
Fikk solgt oppdrettstorsk (første gang) _____
Avslutta virksomheten _____
Konsesjonen inndratt _____

ETABLERINGSBAKGRUNN

5. Har du tidligere vært sjølstendig næringsdrivende ?

Nei Ja _____

(spesifiser bransje og stilling)

6. Har dine foreldre eller søsken vært sjølstendig næringsdrivende ?

Nei Ja _____

(spesifiser hvem, bransje og stilling)

YRKESPRAKSIS

7. Hva slags yrkespraksis har du ? (Angi yrke og varighet. Sett kryss foran det yrke du hadde da du fikk idéen om å starte torskeoppdrett.)

Yrke	Antall år	Yrke	Antall år
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Har du erfaring fra låssetting/oppbevaring av fisk ? Nei Ja

Hvis ja, hvilken art ? Torsk Sei Sild Brisl. Makr. Andre
(flere kryss kan settes)

La person 1, 2, 3 osv. være de samme som i forrige spørsmål.

10. Hva har kontakten med disse personene gitt deg/gitt deg tilgang på ?

Sett ett eller flere kryss nedover i rekka for hver person.

Eksempel: Nils Nilsen har gitt deg oppmuntring til å starte, råd om merd/fortøyninger/nøter, samt salg av fisken. Tre kryss er satt av.

	Eksempel N.N.	Person 1	Person 2	Person 3	Person 4	Person 5	Person 6	Person 7	Person 8
Oppmuntring til å starte med torskeoppdrett	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Konstruktiv kritikk av idéer og planer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd mht. å komme seg fram i byråkratiet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd om regnskap og budsjettering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd om merd/fortøyninger/nøter	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd om fóring/sortering/slakting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Råd om sunn drift	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finansiering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levende torsk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Produksjonsutstyr	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arbeidskraft	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fiskeavfall til fór	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kjølerom/Fryselager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Markedskontakt/Salg	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DIN GRUNN FOR START / IKKE START

11. Du som har klart/er i ferd med å starte: Angi **to grunner** til det. Du som ikke har klart å starte: Angi **to grunner** til det.

Hovedgrunn: _____

Nest viktigste grunn: _____

KOMPETANSE

12. Hvordan var din kompetanse **før** anlegget eventuelt kom i drift ?
(Sett ett kryss for hver linje)

ingen svak middels god

Vedlikehold av merd/fortøyninger ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vedlikehold av fiskeredskaper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fóring/Sortering/Slakting/Pakking ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sjukdomsforebyggende tiltak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Finansieringsplan og regnskap	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Salg/Markedsføring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

UTDANNING

13. Angi din utdanning **utover** folkeskolen. (Flere kryss kan settes)

- | | |
|--|---|
| <input type="checkbox"/> Ingen utdanning utover folkesk. | <input type="checkbox"/> Yrkesskole/Yrkesfaglig studieretning |
| <input type="checkbox"/> Realskole/Ungdomsskole | <input type="checkbox"/> Videregående kurs akvakultur - |
| <input type="checkbox"/> Fiskarfagskole | VK 1, VK 2, VK 3 (Sett strek under) |
| <input type="checkbox"/> Landbruksskole | <input type="checkbox"/> Gymnas/Allmennfaglig studieretning |
| <input type="checkbox"/> Styrmann/Maskinistutdanning | <input type="checkbox"/> Høgskole/Universitet |
| <input type="checkbox"/> Kystskippereksamen | <input type="checkbox"/> Annen utdanning: _____ |
| | (spesifiser) |

14. Har du utdanning/kurs i økonomi?

- Nei Ja

(Sett ett eller flere kryss)

- | |
|--|
| <input type="checkbox"/> Handelsskole |
| <input type="checkbox"/> Regnskapskurs for fiskere |
| <input type="checkbox"/> Brevkurs/Friundervisning/AOF |
| <input type="checkbox"/> Inntil 2 års høyere økonom. utdanning |
| <input type="checkbox"/> Annet: _____ |
| (spesifiser) |

FØDSELSÅR OG KJØNN

15. Fødselsår: _____

Kjønn: Mann Kvinne

Tilføy gjerne andre momenter som har hatt betydning for om du har starta/ikke starta, på baksiden av dette arket.

TAKK FOR AT DU TOK DEG TID TIL Å BESVARE SPØRRESKJEMAET!

Appendix 3. Questionnaire (English version)

THE SITUATION NOW

1. In what phase are you at present? (only one x)

- | | |
|--|--|
| <input type="checkbox"/> Do <u>not</u> intend to start | <input type="checkbox"/> Is in <u>the process</u> of starting |
| <input type="checkbox"/> <u>Contemplating</u> start up | <input type="checkbox"/> Have <u>started</u> and is currently <u>running</u> an cod farm |
| | <input type="checkbox"/> Have <u>started</u> and <u>closed</u> the farm |

PROBLEMS

2. Have you experienced any of the problems listed below? (Only one x each line)

	no problem	insigni ficant	signi ficant	consider able
Licence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to living cod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to cod spawn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price on living cod/spawn (if purchased)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Buying licence for living cod .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Access to fodder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fodder mix	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Find relevant marketing channel.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Price on farmed cod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Profitability in production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cannibalism/illness/serious accidents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: _____ (specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

FINANCING

3. Have you acquired the necessary capital to start?: (one x on each line)

	Yes	No
Own money	<input type="checkbox"/>	<input type="checkbox"/>
Loan	<input type="checkbox"/>	<input type="checkbox"/>
Municipal	<input type="checkbox"/>	<input type="checkbox"/>
Regional development grant	<input type="checkbox"/>	<input type="checkbox"/>

ACTIVITIES

4 When did you do what? (Mark the year on each line. Indicate with - if the alternative does not apply.)

Year

- Got idea..... _____
- Applied for licence..... _____
- Got financing..... _____
- Got licence..... _____
- Registered the firm..... _____
- Got bying licence for living cod..... _____
- Got cages and mooring..... _____
- Got living cod/spawn to hatchery (first time)..... _____
- Sold farmed cod (first time)..... _____
- Discontinued the business..... _____
- Licence withdrawn..... _____

BACKGROUND AS ESTABLISHER

5. Have you ever run a business before?

No Yes

(specify industry and occupation)

6. Have your parents or siblings ever run a business?

No Yes

(specify industry and occupation)

WORKING EXPERIENCE

7. What kind of work experience do you have? (Indicate by x your occupation at the time you had the idea of starting cod farming)

Occupation	Number of years	Occupation	Number of years
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. Have you had any previous experience with storage of living fish?

No Yes

If yes, on which arts? (Several x may be used)

cod pollack herring sprat mackerel other

YOUR REASON FOR START/NON START

11. If you have been able to/is in the process of starting: Give two reasons for that. If you have not been able to start: Give two reasons for that.

Main reason _____

Second most important reason _____

COMPETENCE

12. How do you rate your competence/expertise **before** the hatchery was up and running? (Only one x on each line)

	none	weak	middle	good
Maintenance of equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance of fishing gear..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Foddering/Slaughtering/ Packing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Measures to prevent illness..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financing plan and accounting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sales/Marketing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

EDUCATION

13. Describe your education after elementary school. (use several x if necessary)

<input type="checkbox"/> No education beyond elem. school	<input type="checkbox"/> Vocational school
<input type="checkbox"/> Secondary school	<input type="checkbox"/> Courses in aquaculture -
<input type="checkbox"/> Training course for fishermen	VK1, VK2, VK3 (<u>underline</u>)
<input type="checkbox"/> Agricultural training	<input type="checkbox"/> High school
<input type="checkbox"/> Education as naval officer	<input type="checkbox"/> University
<input type="checkbox"/> Coastal certificate	<input type="checkbox"/> Other education _____
	(specify)

14. Have you any education/courses in economic/financing?

No Yes

(one or several x)

- Commercial School
- Accounting for fishermen
- Course by Correspondance
- Up to 2 years higher financial education
- Other: _____
(specify)

YEAR OF BIRTH AND SEX

15. Year of birth: _____

Sex: Male Female

Please do mention other things which you think important for whether you have started or not. Use the back of this page.

THANK YOU FOR TAKING YOUR TIME ANSWERING THE QUESTIONNAIRE!

Appendix 4. Multicollinearity diagnostics

SOCIAL NETWORK

Dependent variable: Collegual zone

Variable	Variance inflation
Selffam	1.036
Induexp	1.064
Selfempl	1.095
Techexp	1.041
Age	1.048

Dependent variable: Industrial zone

Variable	Variance inflation	CI = 10.944	CI = 19.502
Selffam	1.042		
Induexp	1.100		
Selfempl	1.101		
Techexp	1.072		
Educat	2.668	.489	.469
Busedu	1.254		
Edudiv	2.331		
Age	1.143	.540	.548

Dependent variable: Service zone

Variable	Variance inflation	CI = 16.423
Selffam	1.038	
Selfempl	1.071	
Busedu	1.235	
Educat	2.542	.432
Edudiv	2.231	
Age	1.130	.610

Dependent variable: Kins/friends

Variable	Variance inflation
Selffam	1.036
Induexp	1.064
Selfempl	1.095
Techexp	1.041
Age	1.048

Dependent variable: Multiplexity

Variable	Variance inflation
Selffam	1.037
Induexp	1.066
Selfempl	1.099
Techexp	1.043
Edudiv	1.073
Age	1.109

Dependent variable: Network size

Variable	Variance inflation	CI = 10.944	CI = 19.502
Selffam	1.042		
Induexp	1.100		
Selfempl	1.101		
Techexp	1.072		
Edudiv	2.331	.540	
Educat	2.668	.489	.469
Busedu	1.254		
Age	1.143		.548

Dependent variable: Range

Variable	Variance inflation	CI = 10.944	CI = 19.502
Selffam	1.042		
Induexp	1.100		
Selfempl	1.101		
Techexp	1.072		
Edudiv	2.331	.540	
Educat	2.668	.487	.469
Busedu	1.254		
Age	1.143		.548

Dependent variable: Multiple attributes

Variable	Variance inflation	CI = 10.944	CI = 19.502
Selffam	1.042		
Induexp	1.100		
Selfempl	1.101		
Techexp	1.072		
Edudiv	2.331	.540	
Educat	2.668	.489	.469
Busedu	1.254		
Age	1.143		.548

RESOURCES

Dependent variable: Encouragement

Variable	Variance inflation	CI = 10.986	CI = 13.535
Nesize	4.560		
Range	4.894		.812
Multiplexity	2.593		.635
Colleagual zone	2.496	.645	
Service zone	2.693	.625	
Kin and friends	2.538		

Dependent variable: Advice on bureaucracy

Variable	Variance inflation	CI = 11.571	CI = 11.954	CI = 19.192
Nesize	5.266	.324		.636
Range	5.850		.444	.515
Multiplexity	2.595	.270		
Colleagual zone	2.787		.424	
Service zone	2.708		.453	
Kin and friends	2.576	.203		
Multiplexity	1.915			.660

Dependent variable: Accounting and budgetting

Variable	Variance inflation	CI = 12.451
Nesize	4.144	.857
Range	4.331	.762
Multiplexity	2.212	
Service zone	2.350	
Kin and friends	2.513	

Dependent variable: Advice on technology

Variable	Variance inflation	CI = 12.565
Nesize	4.217	.939
Range	3.704	.740
Multiplexity	2.587	
Colleagual zone	2.179	
Kin and friends	2.532	.308

Dependent variable: Financing

Variable	Variance inflation	CI = 11.010	CI = 15.269
Nesize	4.187	.670	.313
Range	7.635		.957
Multiplexity	2.264		.230
Service zone	3.018	.402	.284
Industrial zone	2.967	.291	.378
Kin and friends	2.516	.227	

Dependent variable: Labor

Variable	Variance inflation	CI = 11.335
Nesize	3.999	.951
Range	3.554	.825
Multiplexity	2.190	
Kin and friends	2.513	

Dependent variable: Material resources

Variable	Variance inflation
Nesize	2.202
Multiplexity	1.421
Colleagual zone	2.048
Industrial zone	1.593

Dependent variable: Access to the market

Variable	Variance inflation
Nesize	1.640
Multiplexity	1.068
Industrial zone	1.586

START-UP

Dependent variable: Start-up (resources as independent variables)

Variable	Variance inflation
Encour	1.593
Bureau	1.296
Accobud	1.632
Advtech	1.465
Financi	1.590
Labor	1.200
Prodres	1.778
Market	1.182

Dependent variable: Start-up (resources and human capital as indep.var.)

Variable	Variance inflation	CI = 14.381	CI = 26.101
Encour	1.626		
Bureau	1.324		
Accobud	1.691		
Advtech	1.518		
Financi	1.653		
Labor	1.276		
Prodres	1.881		
Market	1.260		
Age	1.267	.257	.590
Educat	2.739	.574	.381
Edudiv	2.386	.526	
Busedu	1.305		
Techexp	1.146		
Selffam	1.073		
Induexp	1.167		

Appendix 5. The cod farming industry

The institutional framework of cod farming¹

The trading of cod is regulated through the Raw Fish Act, which was established in 1951 (Fiskeridepartementet, 1951). The trade is organized through sales organizations owned and governed by fishermen. The Raw Fish Act is important for fishermen; the sales organization is a monopoly, it secures fishermen a minimum price for the fish, it has right to licence buyers, and it can regulate the supply of fish by imposing a moratorium.

The cod is traded through five different sales organizations, dependent on where the fish is delivered. "Norges Råfisklag" is the most important sales organization because of the quantity traded and because of its territorial dominance. The sales organizations negotiate minimum prices with the fish buyer organizations and certify the fish buyers.

Fishermen with a licence to farm cod may farm their own catch without specific permission from Norges Råfisklag. If the business is to be expanded to include buying cod from other fishermen, permission from the sales-department in Norges Råfisklag has to be granted. In the delivery of the catch and the sale of the fish, a special form from Norges Råfisklag has to be used. The transfer from boat to farm enclosures has also to be registered. A registration form has to be filled out when the fishermen's own catch are delivered to the net pens. This quantity is to be subtracted from their quota.

The first-hand trade of wild cod may occur in two ways: fish may be sold to a buyer approved by Norges Råfisklag (in their region), or the fisherman may buy the catch himself. The latter method requires a buyer-license, which is not granted very often by Norges Råfisklag. As mentioned above, if the cod farming activity is limited to the fisherman's own catch, he does not need a specific permission from Norges Råfisklag. A traditional fish farmer, who has neither the status as fisherman nor fish producer, must have permission from Norges Råfisklag to buy wild cod for farming.

When the fisherman has raised his own catch, the cod may be sold directly to a buyer accepted by Norges Råfisklag, or Norges Råfisklag may mediate the transaction with a buyer. When this trade is accomplished, an end-form has to be filled out with the total quantum. The fishermen do not need specific permission from Norges Råfisklag to set their own catch in enclosures. However, a licence for farming is needed, and the quantity of fish has to be registered. Wild cod bought and raised by an approved fish buyer can be sold again with no restrictions.

The license to farm cod is given by the Directorate of Fisheries. Those who apply for a licence must meet the general requirements. Apart from these rules there are no industry-related assessments. In contrast to salmon-farming, no quotas of licenses per county are given. There are, in fact, some groups which do not have to meet the important requirement of competence: registered fishermen and small-scale (conventional) fish producers. They are however, only granted a licence for 1,000 m³ (refers to net-pen size), to be used for only part of the year (Fiskeridirektoratet 1990a).

¹ Source: Foss & Aarset (1992).

Other applicants are given licenses up to 12.000 m³.

There is an obvious discrepancy between the actions of the government and of the sales organizations. Both the Directorat of Fisheries and Norges Råfisklag have the authority to grant a licence (Standal, 1990), through the Acquaculture Act (Fiskeridepartementet, 1985) and the Raw Fish Act, respectively. Both Acts are of importance for the cod farmers. A small scale structure is encouraged by the government. The fishermen and the fishing industry are, within limits, given dispensation from the requirements of the Acquaculture Act. They receive a licence that does not permit full-time occupation. For fishermen and leaders in the fishing industry, cod farming then is a complement to their ordinary activity. Those who have a regular licence, the traditional fish farmers, do often not have the necessary buyer licence from Norges Råfisklag. A second best solution for them has been to use laboratory hatched spawn instead, but as this showed itself not to be economic viable, this group has often been in lack of raw material. The reluctance from Norges Råfisklag has been due to the fact that it is owned by fishermen and one has been sceptical to support developing an industry, where traditional fishermen have to compete with cod farmers.

In the 1980's The Fish Farmers' Trade Organization (FOS) was given the exclusive right to buy all farmed species (Fiskeridirektoratet, 1985). Norges Råfisklag objected on the basis of the difficulties in deciding whic cod qualifies as farmed, and which does not. A bitter fight between FOS and Norges Råfisklag ensued (Norsk Fiskeoppdrett, 1990), which culminated in a new departmental decision: wild cod was to be traded through Norges Råfisklag, no matter how long it was held in captivity; artificially reared cod was to be traded without going through any sales organization (Fiskeridirektoratet 1990b), i.e. sold directly to the buyers. In summary, we can say that there is an institutional conflict between Directorate of Fisheries and the Aquaculture Act on one side and Norges Råfisklag and the Raw Fish Act on the other. This conflict is based on a difference of opinion on what needs should be fulfilled by the concept of cod-farming. Also, this institutional conflict separates potential cod-farmers into two major groups: those who acquire a farming licence with full rights, but are not able to obtain cod due to lack of buyer-licence, and those who acquire a limited farming licence, but are given permission to farm their own legally caught fish.