The Entrepreneurial Process in High-tech and Knowledge-based Sectors in Denmark

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Abstract

Based on a number of in-depth case studies, the aim of this paper is to elucidate some of the key internal and external mechanisms influencing the foundation and early growth of high-tech and knowledge-intensive entrepreneurial ventures. Following a detailed sampling procedure, a number of semi-structured interviews were carried out between August 2000 and June 2001. The firms were chosen among those established during the last three years both inside and outside Danish business incubators. The sampling was carried out in such a way as to include both male and female entrepreneurs.

Our preliminary findings indicate that in the early phases of the business, prior social relations between members of the entrepreneurial teams play an important role in both the recruiting of key employees and managers and in the success of the entrepreneurial venture. Moreover, the weak ties resulting from the personal and/or business experience of at least one of the members of the entrepreneurial team appear to enhance the likelihood of the firm being "born global".

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1. Introduction

New business creation and entrepreneurial "churning" (Reynolds and White 1996) are increasingly recognised as being among the most important sources of development and growth of a country's economy. In particular, the future welfare of a country seems to depend on its capacity to exploit the numerous opportunities connected to information technology, telecommunication, biotechnology and life sciences.

In recognition of this, governments all over the world are supporting the creation of new firms in the sectors mentioned above. The initiatives taken include the establishment of incubators to support the transfer of research results to the business sector and a variety of other programmes designed to improve the disposability of seed capital. The initiatives also include new specialised education and training programmes to foster positive attitudes to entrepreneurship and basic business-related skills.

The extent to which many of these initiatives actually contribute to the improvement of a country's entrepreneurial capacity is far from clear, however. For government initiatives to be effective, as well as for new companies to be able to face future challenges, a better understanding of the dynamics at work in the early stages of a new venture's establishment is vital. This paper aims at contributing to the development of scientific knowledge about the entrepreneurial process in high-tech and knowledge-based sectors. Much of the existing literature is based on US studies, i.e. based on a country, which is recognised for its unique social, cultural and institutional settings. This largely rules out the direct transferability of research results to other contexts. Notwithstanding, there have been some recent attempts at international comparisons and the monitoring of entrepreneurial activity (Reynolds, Hay et al. 1999; Reynolds, Hay et al. 2000). These studies point to the importance of country-specific characteristics in explaining the amount and type of entrepreneurial activity. Similarly,

country-specific characteristics may also affect the entrepreneurial process (cf. Lee and Peterson 2000; Steensma, Marino et al. 2000).

The results presented in this paper originate from extensive fieldwork carried out in Denmark between summer 2000 and spring 2001. This fieldwork is part of a major project aimed at investigating the entrepreneurial process in high-tech and knowledge-based sectors in this country. The study offers in-depth insight into the creation of new businesses in a context, which differs significantly from the US with regard to social, cultural and institutional dimensions. The research is based on a multidisciplinary approach, which builds on theories of human, social and financial capital as well as theories on social networks and ties. Theories of risk perception and risk-taking are also incorporated in the theoretical framework[2].

The paper summarises the results of a first round of interviews carried out in 24 selected firms, in which all the original founders of each firm are interviewed. These interviews will be followed by one more round within the next two years, thus allowing for a deeper understanding of the entrepreneurial process in a dynamic and longitudinal perspective. This paper is based exclusively on data from the first round of interviews.

The paper is organised as follows: section two outlines the research design; section three addresses the entrepreneurial establishment phase, highlighting the characteristics of the social networks surrounding different types of entrepreneurs, and discussing their importance in the first stages of the new businesses' evolution, growth, and internationalisation. Section four describes the further evolution of the businesses and underlines a number of questions connected with the entrepreneurs' roles, changes in these roles over time, and their exit strategies. Finally, conclusions are drawn and implications for government policymakers and

[2] For a more detailed description of the theoretical assumptions of the overall research project, please refer to Christensen, Ulhøi et al. 2000. The WP can be downloaded both from the SNE (Social Networks and

practitioners are discussed. Based on the results, possible avenues for future research are identified.

2. Research methodology

In the literature, various authors have proposed different lists of stages through which entrepreneurs are supposed to pass in the process of establishing a new high-tech and/or knowledge-intensive firm[3] (Wilken 1979; Roberts 1990; Roberts 1991; Gattiker and Ulhøi 2000).

In this paper, we have chosen the most concise list of stages, since the nuances between the stages are very small indeed. The stages considered include: the pre-launching stage, the launching stage and the post-launching stage. In the *pre-launching stage*, an entrepreneur might have a business idea or business plan, as well as a plan to get the resources to set up a firm. The *launching stage* represents the beginning of operations and the pre-growth phase (1-2 years), in which the investment capital needed to start the firm is obtained. The *post-launching stage* includes the possible abortion/change in ownership of the firm (e.g., closure, initial public offering, take-over or merger), as well as the early growth or post-incubator phase (years 3-5), reflecting fast growth in assets, sales and employees, as well as profits. After the post-launching stage, a slower growth phase can be identified, which starts around year six and which represents the beginning of maturity. The research presented here, which focuses on firms 0-3 years old, follows them for two consecutive years after the conclusion of the pilot study, thus only addresses stages 2 and 3.

Entrepreneurship) web site http://www.org.hha.dk/org/lok/Default_UK.html and from the LOK research centre's web page http://www.lok.cbs.dk.

[3] By "high-tech" and "knowledge-intensive" are meant firms that to a large extent are based on a combination of advanced auxiliaries and formal scientific knowledge, whether fundamental or applied.

In order to improve the understanding of the entrepreneurial process, a detailed sampling procedure has been used. This strategy focuses on obtaining information-richness (Patton 1990) rather than establishing representativity. Random sampling would be inappropriate, as it might cause the investigator to miss the best opportunities for obtaining information (Marshall 1996). A combination of maximum variation, stratified sampling and theoretical sampling has therefore been adopted. A preliminary literature review has shown that entrepreneurial research on high-tech and knowledge-intensive start-ups, and on gender differences in entrepreneurship, is generally poorly represented. Therefore, the firms were theoretically sampled using a multiple sampling strategy. Stratified sampling was used in choosing firms inside and outside existing Danish business incubators. Maximum variation was achieved by selecting firms on the basis of the age of the firms as well as gender of founders.

Respondents in the firms were chosen on the basis of one criterion only: that they are/were members of the founding team. Thus, even founders who had left the firm were interviewed, and all founders were interviewed individually, followed by a group interview. This interview strategy allows the interviewers to observe differences of opinion, particularly with regard to future expectations. However, it was not always easy to get access to all entrepreneurs, since entrepreneurs who were still involved with the firm had a tendency to discount those who had left.

The results presented here should be regarded as preliminary only, since they are based on information obtained from a first round of interviews. As previously underlined, the research project aims at fostering an understanding of the entrepreneurial process. For this reason, the research design follows a panel strategy. The entrepreneurs in the sample will therefore be interviewed once more with an interval of about one year, irrespective of the firm's survival or the entrepreneurs' own career strategy. This will allow for the collection of additional

important information about firm development and growth, internationalisation, failures, career and exit strategies.

The information presented in the coming paragraphs is drawn from the interview transcripts of 50 respondents. All interviews, lasting on average one to one and a half hours, were tape-recorded, with the exception of one instance in which the respondent preferred the tape recorder to be switched off. In this case, the tape recording was substituted by thorough note taking by both interviewers. The overall amount of transcripts and notes exceeds 300 pages.

3. Social capital and social networks during the first entrepreneurial phases

An entrepreneur's social capital consists of all social relationships and social structures used to achieve his or her goals. Social capital is therefore the result of a dynamic interaction. It becomes "capital" if it is used by actors in concrete situations (Coleman 1990; Pizzorno 1999). Social capital can be subdivided into individual and collective capital (Christensen et al. 2000). This paper focuses exclusively on the former, which is defined as a set of social relations (social ties) surrounding the actor (here, the entrepreneur), and which can be mobilised more or less consciously when needed. Gender, age, family background, education and professional experience (i.e. characteristics of human capital) are generally expected to influence the his/her number and type of social relationships (ties). This means that a person with extensive business or previous entrepreneurial experience is expected to have access to social networks that might facilitate the establishment of a new business, whereas a graduate student will typically lack such important contacts (Campbell and Heffernan 1981).

Of particular interest to this study is the use of social networks during the entrepreneurial process and the nature of social exchanges that take place through the personal ties and social

networks of the individual entrepreneur. Social ties are traditionally divided into weak and strong ties (Granovetter 1973).

In a study concerning the effect of personal ties on the performance of small firms in strategic alliances, strong personal ties were found to result in improved company performance (Hu and Korneliussen 1997).

Our interviews have highlighted the fact that most of the companies established within the sectors under investigation originate from founding teams constituted by 2-3 entrepreneurs, who tend to be connected to each other by family relations or close friendship. The successful establishment of a new company therefore seems to be fostered by the existence of strong personal ties among the members of the entrepreneurial team. The evidence collected also indicates that the entrepreneurial team tends to have access to a broader network, constituted by weak ties to various professional businesses, and/or resource-providing individuals. The access to this network tends to be due to the presence in the team of at least one "key person" acting as a "social broker" (Boissevain 1974) between the team and the external resources (information, financial capital, human capital and so forth). The key person normally has a background that differs substantially from that of the other team members. This may involve less industry-specific experience or education, but more knowledge of the business sector and a large number of weak personal ties to other entrepreneurs, possible investors (venture capitalists, business angels, bankers), consultants and public authorities. Quite often the "social broker" has some contacts abroad, allowing for early, or even immediate, internationalisation of the new firm. The interviews have shown that brokers tend to be male.

Given their emotional and non-opportunistic nature, strong ties (which generally characterise family and friendship relations and which, as seen, are most diffused in the relations among members of entrepreneurial teams) constitute a firm base of trust (Krackhardt 1992). This is an important guarantee for the survival of the newly established company

during the first critical phases during which some respondents underline the difficulty of separating personal from business life. During this stage, entrepreneurs are often still working only part time for the new venture while their main activity might be a full time job as employee for another company, a full time study or, especially in the case of biotech and life-sciences based companies, employment at a University or other research institution. Working on setting up a new company means adding hours of intense activity during the evenings and the weekends. The stress that double-job conditions entail is easily overcome when entrepreneurs know each other well, enjoy being together for long periods of time, and feel confident about each other. Choosing the wrong partner based on erroneous evaluations of people only superficially known could jeopardise the entire enterprise.

Risk perception and trust

In general, the literature on social networks and entrepreneurship ignores the importance of risk perception and trust during social interaction, despite the fact that few business people engage in any business-related relationship without having some awareness of the potential risks involved.

The phenomenon of risk perception has been investigated in relation to financial commitments and investment decision-making processes (e.g. Kahneman and Tversky 1979; McNamara and Bromiley 1999). Studies have indicated that there is a positive relationship between risk and return and a negative relationship between risk and loss when individuals evaluate a new investment opportunity in situations associated with risk (Kahneman and Tversky 1979). In the case of *positive prospects*, individuals seem to favour more risky choices over less risky ones when the gains are significantly larger. When the gains of a risky venture do not differ significantly from those of a less risky choice, people favour the latter

(Birnbaum 1999). Research has also shown that, if the situation under which products are assessed changes, individuals tend to evaluate risk differently (see, for example, Kahneman and Tversky 1979; Birnbaum and Beeghley 1997; Sjoeberg 1998; McNamara and Bromiley 1999). When decisions are associated with such *negative prospects* as loss of money, individuals tend to be more risk averse.

This study shows that risk assessment is often considered more important by entrepreneurs in the biotech and life science industries than by IT entrepreneurs. This seems to be partly connected to the significantly higher demand for capital that these kinds of ventures require, and partly to the substantially longer period of time between research, product development, and sale of the final product or service.

As with risk perception and assessment, the question of trust also seems to influence the two sectors somewhat differently. Trust is considered critical in the biotech and life sciences sectors. One of our respondents, a professor in microbiology who had worked for 15 years in an academic environment, illustrated this by observing that at scientific meetings no new or "crazy" idea is ever shared among participants - only already published results are discussed. She thought this was due to the lack of reciprocal trust and to the fear that innovative ideas may be "stolen". In the IT sector, on the other hand, trust tends to be less of a problem. This might be explained by the fact that new IT innovations rarely remain a "secret" for long. Product life cycles are extremely short and products are typically replaced by newer alternatives very quickly. Rather than plagiarisation/imitation, the problem is therefore more likely to be that someone else might be better or faster at exploiting existing market opportunities.

However, when trying to understand differences between these two sectors, more general, social variables should be taken into account. Both the existing literature and our interviews suggest that, for example, IT entrepreneurs tend to be younger than entrepreneurs in the

biotech and life sciences sectors. Whilst the former are generally aged between 18-30 and tend to be "self-made" persons, the latter frequently become entrepreneurs after having completed a higher education, often including a Ph.D. and some years of academic work. Therefore, they tend to be in the late 30s or even older - we have come across "first-timers" in this sector in their late 50s. Age has, in this respect, many implications. IT entrepreneurs are typically recruited from contemporary "youth culture" that seems to be somewhat more open towards knowledge sharing among peers. By contrast, the sharing of new ideas in the biotech sector apparently takes place solely within close tie-based relationships, often in mentor-pupil relationships or among scientists working closely for a long period of time (e.g. colleagues who have developed a joint, long-lasting research project). As one respondent explained, even at a small Danish informal scientific seminar among leading Danish researchers in the field, scientists are unlikely to share new ideas or results which have not already been published.

Other studies have found that trust influences people's behaviour, relationships and attitudes towards an investment opportunity (Doney, Cannon et al. 1998; Urban, Sultan et al. 1999). Individuals tend to develop trust through a variety of different mechanisms: for some it is sufficient to rely on word-of-mouth recommendations; others need to gather information from perceived experts (Rosen and Olshavsky 1987; Hofstede 1994). Trust developed through word-of-mouth recommendations can be based on friends or reference groups with knowledge of the industry or on key individuals in the business concerned. To be trusted, these individuals must be perceived as objective sources (Rosen and Olshavsky 1987). Developing trust by gathering information, e.g. about an investment or entrepreneurial opportunity from perceived experts, may in turn be based on the advice of trusted industry experts, members of advisory boards, or consultants (Hellofs and Jacobson 1999). Social relations connecting entrepreneurs to resource providers (e.g. other entrepreneurs and knowledgeable individuals) have been found to facilitate the acquisition of resources and the

exploitation of opportunities (Aldrich and Wiedenmayer 1993). Science parks and business incubators are established, among other things, to exploit this kind of networks. Until now, however, our results do not indicate that establishment in a science park or incubator actually constitutes a comparative advantage for new entrepreneurial ventures in high-tech and knowledge-based sectors. Hopefully, this will be remedied in the next interview rounds, allowing for a comparison of company performance in a dynamic perspective. The results so far indicate that the relationship between firms' founders and science parks or other kinds of incubators seems to be characterised by a low level of trust. In various cases, situations of open conflict have been detected. A much better relation appears to be established among the entrepreneurs themselves inside as well as outside science parks and business incubators, and between entrepreneurs and their investors (business angels and venture capitals).

The interviews show that trust creation follows specific patterns within each of the sectors examined here, though they also seem to share some characteristics. Most sectors seem to rely equally on social recognition from key individuals throughout their network. However, whereas the trustworthiness of a biotech entrepreneur is typically heavily influenced by objective scientific merits and recognition, the general trustworthiness of an IT entrepreneur is based on perceived performance, i.e. more subjective merits, such as word of mouth. These characteristics have some important implications for the availability and ease of obtaining initial seed capital in the absence of information about the firm's future performance. Preliminary analyses suggest that for a biotech entrepreneur, it is far easier to gain the general trust of a sponsor if s/he has a high scientific reputation (i.e. is among the leading researchers in the world in the field in question). An example from the cases helps illustrate this point. A biotech professor with ten years of R&D management experience from industry reported that, as soon as the rumour went around that she was "free" on the market, potential investors immediately approached her. Thanks to her reputation, she managed to raise DKK 60 million

in seed capital in less than seven weeks. Similar experiences have not been reported within the IT sector. Technical risk assessment seems much more influential, especially when the entrepreneur is starting his first business. Weak ties play a major role when an entrepreneur already has a record of successful firm establishment.

The internationalisation process

According to the traditional stage model of internationalisation, firms internationalise in a slow and incremental manner, increasing their internationalisation in pace with acquired experience and knowledge about foreign markets. Such firms generally establish a strong domestic base before venturing into foreign markets (Johanson and Wiedersheim-Paul 1975; Johanson and Vahlne 1977, 1990). Recent theory, however, suggests that new technology-based and knowledge-intensive firms tend to be "born globals", starting to act and trade in foreign markets soon after their establishment (Jolly and Alahuhta 1992; Oviatt and McDougall 1994; Madsen, Rasmussen et al. 1999). The "born global" theory states that newly established technology- or knowledge-based firms are pushed towards rapid internationalisation by three factors (Preece, Miles et al. 1998; Keeble, Lawson et al. 1998). Firstly, operating in narrow market niches means that firms cannot depend on a single country's market to support their survival and growth. International expansion becomes a necessity early in their existence. Secondly, IT, biotech and life science firms require large investments in research and development. In general, the high cost of such investments is beyond entrepreneurial firms unless they start producing revenues soon after establishment. Internationalisation is seen as a means of fostering fast growth and obtaining higher revenues. Thirdly, access to more markets provides opportunity of finding new sources of finance for investments in research and development. Finally, these kinds of firms also tend to operate in

markets where competition is fierce and based on rapid product obsolescence and where most competitors already act on a global scale.

However, the "born global" perspective on internationalisation does not take into consideration the impact of *psychic distance*, which is a central concept in the traditional stage model (Johanson and Wiedersheim-Paul 1975). This concept is related to manager/founder characteristics, describing the extent to which perceptions of cultural differences influence the speed of internationalisation. In order to explore the impact of this concept on the internationalisation of Danish technology-based and knowledge-intensive firms, we attempted to establish the extent to which weak personal and/or business ties with people and organisations in foreign countries increase the likelihood of firms being "born global". So far, our results reveal that personal and/or business ties play an important role in the biotech sector and a minor role in the IT sector.

Almost all the case companies are targeting a global niche market. Moreover, most of the key entrepreneurs are experienced travellers, possessing wide contact networks around the world. Contacts used to expand into foreign markets mainly derive from previous work experiences. However, the familiarity with other cultures also seems to reduce the perceived distance and facilitate an initial positive attitude towards early internationalisation. This familiarity might also be obtained via personal travelling, student exchanges or other similar circumstances not necessarily related to work. Strategic business contacts abroad are mainly connected to one of the members of the entrepreneurial team. It seems that biotech, life sciences and IT entrepreneurs all have a high initial tendency to be internationally oriented, albeit for different reasons. The scientific background of the biotech entrepreneurs accounts for some of the variation. Nowadays, it is impossible to carry out outstanding research in isolation from the rest of the world. University researchers and scientists become part of an international community as a natural consequence of their jobs. This might also partly explain

why some biotech entrepreneurs want to keep their chairs in research institutions even after their business has started growing and they have started hiring employees. Moreover, the main goal of scientists starting a business seems, at least initially, to be to guarantee research funds and facilities for important projects and not so much personal gain in economic or self-realisation terms. In this sense, they represent a special case among entrepreneurs. Many remain university-hired scientists and continue perceiving themselves as such, even when the entrepreneurial part of their work accounts for an increasing proportion of their personal income and the business has started growing or is acquired by larger companies. Another reason that might explain the tendency of biotech and life science firms to be born global is the universal importance of high-level scientific research and the need for massive funding. Large amounts of capital such as those required by these companies can generally only be obtained from big multinational companies. It therefore seems reasonable to suggest that for this type of entrepreneurs, the internationalisation process is an almost "natural" outcome of their business.

Early internationalisation is also inescapable for IT entrepreneurs, albeit for different reasons. In order to survive, an entrepreneur in this sector needs to have a perspective that goes beyond the national border. However, IT firms are generally unencumbered by patents and they do business in an industry characterised by fast lifecycles, unlike biotech and life science firms that often have product development and testing cycles lasting eight years or more. Earlier research has assumed that firms in highly turbulent industries, such as the IT industry, would be born global. It is therefore interesting to note that only some of the IT companies in our project diverge from the traditional stage model of internationalisation. Most companies follow the more traditional approach, expanding first and foremost to markets close to Denmark (typically Germany, Sweden and England), and using these as stepping stones to markets further away. The main difference between these two groups is

their strategic management approach: entrepreneurs who follow the stepping stone approach typically have a university education and a more planning-oriented approach or they are older.

4. From establishment to first growth

The interviews have shown that during their first years of existence, entrepreneurs from both IT and biotech companies tend to recruit personnel from their close personal network, often through former educational or work-related relationships or even through family ties. These kinds of personal networks replace the more formal selection of employees because they appear to be safer since the entrepreneurs personally know the competencies and skills of the prospective employees, and reciprocal bonds of trust are already in place. Employees chosen through personal networks tend to be very loyal and to share the "pioneering" spirit of the entrepreneurs. Often, their dedication to the work goes far beyond personal economic gain, and they frequently work late into the night. In the IT sector in particular, where employees tend to be highly motivated youngsters, a common code of work- and risk-sharing is established. This does not seem to be the case for biotech entrepreneurs, both due to their higher age and the constraints of family obligations and to heavier financial commitments.

"Burning out" is a potential occupational hazard during the establishment and first-growth phase. Some of the companies (especially in the IT sector) explain that they manage this challenge directly by sending employees on group company-sponsored holidays in exotic places, giving them psychological and physical counselling sessions in the workplace and similar benefits. Such benefits may reduce or eliminate some of the worst impacts of the "burning out" phenomenon and can also strengthen the ties of loyalty between employees and company. They may further reinforce the common values and emerging identity of the new business. However, older IT entrepreneurs do not attach the same importance to joint leisure

activities. One of the most striking characteristics of the IT sector is the speed of technological development which forces all new firms to run at a very high speed. As one of our interviewees put it: one year in the IT sector equals four conventional years. Under such conditions, newly established ventures often grow four times as fast as other kinds of businesses. Problems with the division of labour and specialisation therefore arise early, as does the need for a professional, experienced management. As previously noted, young entrepreneurs often lack longer, formal education and business-related experience, and thus might not be ready to face such a challenge. At the same time, growing firms require additional funds, which can often be obtained by trading shares. This in turn implies the need for a new, more qualified and experienced management. Seen from the point of view of the entrepreneurs, this represents both an opportunity and the end of an exciting era.

At this stage, entrepreneurs are confronted with a difficult choice. They can end the stimulating and pioneering phase of venture creation by putting it behind them and learning how to become good, high-level managers in their own firm. Or they can sell part or all of the firm and start a new project, thus becoming serial entrepreneurs (Wright, Robbie et al. 1997). The interviews have shown that entrepreneurs in biotech and life sciences firms, as opposed to IT entrepreneurs, tend to choose to remain in the business as co-managers and at the same time continue working as researchers in the firm. If possible, they also keep a foot in at the university or research institution from which they came.

5. Implications and future research avenues

This study has shown that access to social capital in particular seems to influence the mode and relative success of entrepreneurial ventures.

IT and biotech (including medico) are two clearly distinguishable "breeds" of entrepreneurs within the broader category of "high-tech and knowledge-intensive" firms in Denmark. The firms created in these two areas tend to differ significantly in a number of respects. Entrepreneurs in the IT sector are generally younger and tend to have a shorter formal education, which in turn leads to different possibilities of fund-raising, due to lower perceived trustworthiness among potential venture capitalists.

There are also some significant differences in terms of risks and payback period. Whereas IT entrepreneurs are faced by significantly lower opportunity costs – often all they need is a garage and a couple of PCs with internet access – bio-entrepreneurs must struggle with very high opportunity costs just to get started (basic lab facilities and highly skilled, i.e. costly, employees). This means that bio-entrepreneurs have to access more risk capital faster than IT entrepreneurs.

Furthermore, entrepreneurial opportunities in the IT sector are expected to produce a return on investment in a fairly short period of time. In the life science sector, on the other hand, it takes many years for a new drug and/or treatment to come to market. Due to the substantially higher initial capital requirements and the longer time horizon, investment risks may be perceived as higher in this sector than in the IT sector.

The results presented here suggest that it is far easier to gain the general trust of a biotechnology-oriented sponsor when the entrepreneur has a good scientific record (i.e. represents the highest international standard in the field in question) and previous (successful) business experience. This is not the case in the IT sector where, apart from the potential of the entrepreneurial opportunity itself, the size of informal networks constituted by weak ties is more influential.

In the biotech sector, professional background seems to account for early internationalisation, which is often seen as a natural continuation of the entrepreneurs' previous career. While IT businesses also internationalise early after establishment, some still seem to grow according to the traditional stage-evolution model.

For both kinds of entrepreneurs, personal networks are of paramount importance during the establishment phase. Fund-raising (in part), information searching, and hiring of personnel are important tasks that largely rely on personal ties. Some of these, mainly information-searching and fund-raising, where access to many different alternatives is important, are based on weak social ties, while others are based on strong ties, as is mainly the case in the initial creation of the entrepreneurial team.

The observation of increasing mistrust among biotech and life sciences entrepreneurs has some interesting implications. First of all, in a general climate of mutual mistrust, the discussion and development of new ideas are effectively hampered. This lack of reciprocal trust might translate to a lack, or weakening, of the "collective" social capital (cf. Putnam 1993). Secondly, this might lead to a lack of supportive networks, which is an indispensable resource for these entrepreneurs. Since research-based entrepreneurship is unanimously considered one of the single most strategic elements for the economic development of knowledge societies and their reliance on knowledge-sharing, such mistrust should be a cause for serious concern.

Two important questions remain. Firstly, the research carried out until now has neither found an explanation for the lack of participation by women in the entrepreneurial process in these sectors, nor for the apparent lack of female social brokers. Secondly, it has not been possible to ascertain any differences in the performance and development of firms established inside and outside Danish science parks and business incubators. The first question might be better investigated by research specifically concerned with these issues, addressing women with the

same background and different career choices (entrepreneurs and non-entrepreneurs) and investigating their motivations and decision processes. The second question, which requires a dynamic comparative perspective that is lacking at the moment, will most likely be answered after the second interview phase.

Finally, the research has highlighted an important issue that should be considered by policymakers and entrepreneurs. Young IT entrepreneurs often interrupt their studies early to start new businesses. These might succeed or fail. However, success or failure, young entrepreneurs often reach a point where further educational training is needed to equip them for a new role, be it as manager or small business owner, or where they need to opt for a completely different career option. Governments recognising the importance of fostering entrepreneurship in IT sectors may need to consider more flexible adult education opportunities capable of re-qualifying this growing category of individuals, thereby avoiding the loss of important young human resources.

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