



Factors influencing the establishment of knowledge-intensive ventures

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Abstract

Purpose – The importance of entrepreneurial activities and the establishment of new ventures for economic growth and employment have long been recognized. However, the interactions of underlying mechanisms which influence this process have not been understood all that well. In the light of this, a deeper understanding of various mechanisms on which knowledge-intensive entrepreneurship hinges is needed. This paper aims to investigate how the make-up of financial, human and social capital impacts on entrepreneurial action.

Design/methodology/approach – Based on a longitudinal study using both structured survey and in-depth interview techniques, this research addresses the role and importance of financial capital, human capital and social capital in the organizational genesis and early growth of entrepreneurial activities.

Findings – Financial capital remains the most critical asset in the entrepreneurial process. However, possessing the right mixture of human and social capital is often a prerequisite for accessing the best capital sources as well as sufficient capital. The value of human and social capital, however, depends largely on the industry environment.

Originality/value – The findings give weight and insight to the understanding that it is important, for policy-makers for example, to tailor support initiatives to specific industries.

Keywords Entrepreneurialism, Capital, Human capital, Social capital

Paper type Research paper

Introduction

The scope and scale of entrepreneurial activities are increasingly recognized as being among the most important drivers of a country's economic development and growth (Reynolds and White, 1996). There is thus an increasing recognition of the importance of the positive correlation between the creation of new ventures and their impact on the annual growth of gross national product (GNP) and employment levels (Birch, 1981; OECD, 1996). Possessing sufficient capital of all types is critical in the early stages of venture launching and development. Indeed, many studies have documented that financial, human and social capital contributes to the growth potential as well as the success of new ventures (Chandler and Hanks, 1998; Burt, 2000; Johannisson and Ramírez-Pasillas, 2001). However, most studies have typically focused on analyzing a single type of capital, e.g. either financial, or human or social.

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Studies on financial capital have primarily been concerned with identifying and measuring the different types of financial capital available to the entrepreneur such as personal *vis-à-vis* business angel finance or venture capital (Deakins, 1996). Thus focusing on the “what” rather than investigating “why” entrepreneurs choose one form of finance above the other and “how” they gain access to various sources of finance. Moreover, much entrepreneurship research on human capital has given priority to personality traits and demographic characteristics (e.g. Littunen, 2000; McCarthy and Leavy, 1998/1999; Cooper *et al.*, 1994; Cressy, 1999) rather than on how entrepreneurs transfer formal and informal entrepreneurial learning to their business activities. Further, previous studies on social capital have typically addressed the structural dimensions of social networks in terms of the strength of ties between founders and external actors, rather than the content of interaction (Neergaard *et al.*, 2005). Finally, although most authors agree that various types of capital are needed in the establishment process few have simultaneously addressed these three types of capital. This paper aims at filling that research gap through the application of an integrated framework which is tested in the Danish context of knowledge-intensive ventures newly established within information and communication technology (ICT) or biotechnology and life sciences (BIOMED).

The paper is organized as follows: first, the general theoretical framework is presented. Second, the methodological considerations are presented followed by an analysis of the results. Finally, the results are discussed together with implications and future perspectives.

Types of capital necessary in establishing a new venture

In recent years, interest shown in the various forms of capital needed to establish and grow a new venture has risen. However, understanding of the types of capital essential in the venture foundation process varies. Some research stresses the importance of extrinsic sources of capital for venture success. For lower-priced requests for seed financing or equity, investors tend to be less risk-averse than for higher-priced opportunities because of limited economic consequences (see Gottfries and Hylton, 1987; Mitchell and Vassos, 1997). The weight put on extrinsic and intrinsic attributes may be different depending on the size of the investment (see, Kahneman and Tversky, 1979). Most of these sources are typically outside the immediate control of the entrepreneur such as access to external financing. Other studies focus on the intrinsic sources of capital; those that relate to the individual characteristics of the entrepreneur and over which the entrepreneur can exercise some degree of control such as human and social capital (see, e.g. Davidsson and Honig, 2003), and some contrast intrinsic and extrinsic capital sources (Montgomery *et al.*, 2005). Whichever approach is taken, there is general agreement that each of the three forms of capital is necessary for the successful establishment of an entrepreneurial venture.

Capital is perceived as an umbrella term for critical assets (human, social and financial) the value of which can be strongly influenced either positively or negatively by the decisions and action of the entrepreneur (or lack thereof). Moreover, it requires continuous maintenance to provide a return on “rents”. This definition excludes research focusing exclusively on the personal characteristics or traits with which entrepreneurs are born (Brockhaus, 1982; Timmons, 1985; McCarthy and Leavy, 1998/1999). Indeed, Deakins (1996) argues that approaches that only look at personal

characteristics tend to underestimate the extent to which skills and learning can impact on new venture success. It is therefore reductionistic to reduce the human capital concept to specific traits (Sandberg and Hofer, 1987). However, it is still recognized that the various forms of capital may still be influenced by, e.g. demographic factors such as age and gender.

The three generic types of capital constitute critical strategic assets that are needed during the establishment and growth of new business ventures. The entrepreneur can increase the value of financial capital through deliberate investment in activities. The stock of human capital can be improved through education and experience such as previous entrepreneurial activity or participation in entrepreneurship and management courses. The value of social capital is enhanced through networking activities or investment in interpersonal or social skill development. Entrepreneurial activity and performance may thus be influenced by the overall effect of financial, human and social capital which will be addressed in the following.

Financial capital

According to Shepherd (1999), financial capital is defined as an economic asset consisting of personal and general funds. Personal funds include an entrepreneur's personal savings, financial assistance from family and friends as well as bank loans based on personal collateral. Whereas general funds consist of seed funding from a development agency, government loans and grants or funds from business angels or venture capital firms (Shepherd, 1999). Table I shows the usual distribution of personal and general capital in the first two stages of investment.

Existing research shows that entrepreneurs and small ventures in the founding stage tend to rely on personal sources of finance (Deakins, 1996). In particular, personal savings have been found to be the principal source of initial capital (Roberts, 1990). Research further indicates that bank finance such as personal loans is by far the most important source for entrepreneurs and SMEs (Deakins, 1996). Numerous factors have an impact on the initial capital requirements of an emerging venture that may give rise to different investment and development trajectories. One factor is the industry in which the venture exists and competes (Roberts, 1990). Industry affiliation may account for some variation in capital requirements; in financing research and development at the pre-product or pre-service stage. Thus, ventures with high initial capital needs typically require funding in excess of the founders' internally held resources. Given such a situation, it should be expected that ventures in different knowledge-intensive industries are subject to widely differing financing practices – a premise that seems to have been underexposed in previous research.

Human capital

There have been a number of efforts to define and investigate human capital. One stream of research defines human capital as the abilities individuals possess (Burt,

Table I.
Categorization and
distribution of financial
capital

Stage of investment	Type of capital	
	Personal	General
Founding stage	High	Low
First growth	Low	High

2000) or their demographic characteristics (Cressy, 1999). However, attributes such as personal charm, health, intelligence, age, gender, race and marital status are variables that are to a broad extent given. Therefore, although they may influence the acquisition of the various types of capital they cannot be defined as being a part of the capital. For example, although age has been shown to have an effect on entrepreneurship, it tends to only exercise an influence through the (non)possession.

Another stream of research incorporates education and experience into human capital. According to Honig (1998), these factors play a crucial role in instigating entrepreneurial activity, productivity and the relative success of entrepreneurial ventures. Becker (1975), for example, splits experience and education into two categories: specific and general. Experience is defined as general if it is not specifically related to the business sector and entrepreneurial activity concerned. General experience is typically acquired through learning the ropes in previous jobs. It may lead to skills that are useful across a wide range of occupational alternatives or be specific to a particular occupation. Although work experience can be measured in years it can also be signaled by the choice of career path; promotion to supervisory or managerial levels (Bates, 1990) resulting in experience that is of more specific use in founding a new venture. Specific experience is related directly to entrepreneurial experiences; for example, a serial entrepreneur will possess copious amounts of specific experience. General education is related to non-entrepreneurial training whereas specific education includes participation in entrepreneurship classes of various types. Table II provides the categorization of human capital adopted in this paper.

All in all, it seems reasonable to expect that a major prerequisite for entrepreneurs in knowledge-intensive industries is a high level of human capital, both general and specific. If this holds true, it is of importance because it underlines the significance of a well-developed educational system in providing a necessary basis of opportunities for entrepreneurial activities. It is possible, however, that sectoral differences exist regarding the pool and combination of competences and qualifications.

Social capital

Social capital is probably the most elusive and least consensual of the three forms of capital included in the research framework. It is by no means a new concept but it is rapidly becoming a core concept in entrepreneurship research and some have even see it as the “final arbiter of competitive success” (Burt, 2000). There are several definitions of social capital, most of which can be contained within the following four:

- (1) social capital as the network, Burt (1992) states that when social networks contribute to entrepreneurial goals they constitute social capital;
- (2) social capital is the value of network connections (Borgatti and Foster, 2003);

	General	Specific
Education	College, university or business education Language skills	Specialist, technical, e.g. a PhD in computer science, engineering or biology
Experience	Experience from previous jobs or on the job training (non-managerial positions)	Previous entrepreneurship Management positions

Table II.
Categorization of human capital

- (3) social capital is identical to the resources obtained through the social networks of actors, whether tangible or virtual (Gabbay and Leenders, 1999; Greve and Salaff, 2003); or
- (4) social capital is a compound of a number of variables including the network.

For example, Baron and Markman (2000) suggest that social capital consists of social networks (formal and informal ties), social skills (interpersonal and communicative ability), and social identity (status, identity and reputation). Considering these aspects the individual entrepreneurs obtain access to information and know-how. This study is based on the first interpretation using social networks as a proxy for social capital according to Burt's (1997, p. 355) definition of the value of social capital as "a function of a network's form and content", because is it still debatable how the value of network connections can be measured. Further, it is difficult to identify the particular resources that networks provide.

It is increasingly recognized that network relationships constitute a mechanism that plays a significant role in business development (Aldrich and Zimmer, 1986; Johannisson, 1988; Larson, 1991; Dubini and Aldrich, 1991). Over the past decade, however, entrepreneurship research has produced increasing evidence that personal and professional networks are crucial in both founding and nurturing new ventures. Hence entrepreneurs who can rely on a broad and diverse network tend to be more successful (Brüderl and Preisendörfer, 1998; Dubini and Aldrich, 1991). Therefore, this study operates with a division of related network contacts into these two categories: personal and professional. Personal networks are defined as being characterized by strong relationships that are close to individual entrepreneurs. They tend to be made up of relatives, close friends and colleagues that may provide initial capital or human resources. Professional networks, on the other hand, are more peripheral and provide access to resources and/or information that may be difficult to obtain through other channels. They are constituted by bankers, accountants and other individuals, who can provide access to both information and more tangible resources, directly or indirectly.

We aim to clarify the extent to which the various forms of network contacts are used to provide new ventures with access to the necessary resources and to investigate whether patterns of networking behavior show sectoral differences.

Research design

To study the aspects of human, social and financial capital outlined above, research was carried out in two Danish knowledge-intensive sectors. The longitudinal study was undertaken during 2000-2003 and was based on a triangulation approach collecting primary information through a questionnaire-based survey as well as a number of in-depth interviews. Since no exact information of the population was available, a list of relevant ventures was drawn up by contacting Technology-Based Incubators and investor funds as well as through a search for press releases. Consequently, the sample may be described as neither random nor representative. However, it is estimated that the thorough search procedure resulted in an identification of the majority of ventures in the target group particularly since other sources arrive at approximately the same figures (EFPIA, 2000; EFS, 2000). Thus, the sample represents reality reasonably well. Participating ventures were selected on the basis of two main criteria:

- (1) The business sector in which the ventures were predominantly active was knowledge-intensive. In this survey, all the ventures were categorized as either related to information and communication technology (ICT) or biotechnology and life sciences (BIOMED).
- (2) The age of the ventures (all ventures were established between 1996 and 2002).

The questionnaire-based survey instrument was based on the theoretical framework presented in the previous section and included more than 200 variables. The questions were generally formulated as closed questions using a five-point ordinal scale or open-ended questions to be answered by stating a value. The questionnaire was made accessible over the internet, and respondents were sent a direct link by e-mail. Information was collected in spring 2001, and again in autumn 2002. A total of 155 individuals from 130 ventures were contacted and 102 individuals (representing 92 ventures) completed the questionnaire.

Along with the quantitative survey, founders of 24 ventures were interviewed twice resulting in 85 individual and group interviews. Primary focus during the interviews was on aspects of social capital that could be difficult to collect using a questionnaire. The ventures chosen were sampled purposefully (Patton, 1990; Strauss and Corbin, 1990) according to a maximum variation strategy (MVS) in order to increase the robustness of the findings (Herriott and Firestone, 1983).

There were always two interviewers present during each interview thus ensuring investigator triangulation and facilitating the comparison of observed themes (O'Grady and Lane, 1996). All interviews were subsequently transcribed and coded. Further, public data material like annual reports and newspaper articles as well as information published on the ventures' web sites was used. This information was also used afterwards to crosscheck informant recollection.

Results

Financial capital

The need for financial capital varied considerably from nil to more than 2 million Danish kroner but seems in general to be fairly equally distributed across the intervals specified in the questionnaire (see Table III). However, a χ^2 test for homogeneity shows that the pattern differed clearly across the two sectors ($\alpha_k \approx 0$). The standardized residuals reveal that more ICT ventures than expected in case of homogeneity were established with a starting capital of less than 750,000 Danish kroner. On the other

Amount of starting capital (DKK)	Total %	BIOMED %	ICT %
0-99,999	9.7	1.9	14.6
100,000-199,999	20.9	13.5	25.6
200,000-499,999	10.4	5.8	13.4
500,000-749,999	13.4	5.8	18.3
750,000-999,999	14.2	23.1	8.5
1,000,000-1,999,999	11.2	13.5	9.8
> 2,000,000	20.1	36.5	9.8

Table III.
Distribution of starting capital

hand, more BIOMED ventures than expected were established with a starting capital of 750,000 Danish kroner or more.

In general, government loans, personal savings and venture capital were the three primary sources. 40-50 percent of respondents reported that these constituted the greater part of their starting capital. On the other hand, the role of loans from family and friends as well as finance from business angels was limited. A distinct difference between the two sectors can be observed in this respect too. Thus, new ventures in the BIOMED sector depended to a greater extent on government loans and venture capital and none obtained loans from family or friends. Companies in the ICT sector, on the other hand, relied to a greater extent on personal savings and bank loans based on personal collateral. In a few instances, ICT companies obtained loans from family and friends.

General financial capital is clearly accessed through external sources whereas personal capital originates from both external and internal sources (e.g. bank loans versus personal savings). Therefore, another dimension of the acquisition of financial capital entails an analysis of the extent of financial capital coming from external funds. The results of this analysis showed that there were generally two extreme situations: One out of four ventures reported no external funding at all whereas nearly half of the ventures reported more than 80 percent external funding. These extremes may, however, be explained by splitting the sample into two sectors. In the ICT sector, it was much more common to have no external funding at all, whereas a very high degree of external funding dominated the BIOMED sector.

Human capital

Nearly half of the respondents held university degrees and more than a quarter had doctorates. Hence, the educational level of entrepreneurs in knowledge intensive sectors is relatively high (see Table IV). Most of the entrepreneurs with a university degree were in the natural sciences (37 percent), engineering (20 percent), information and communication technology (15 percent) and business administration (13 percent). However, a χ^2 test for homogeneity shows that the pattern differed clearly across the two sectors ($\alpha_k \approx 0$). The standardized residuals reveal that more entrepreneurs in the BIOMED sector had a PhD degree than expected in case of homogeneity. On the other hand, more entrepreneurs than expected held a final degree below PhD level. The interviews indicated that the higher the technology component of the product, the higher the educational level of the founders.

About two-thirds of the entrepreneurs possessed considerable general experience in technology and innovation management while almost 60 percent had previous specific experience in entrepreneurship and starting new ventures. Furthermore, between a

Highest education	Total %	BIOMED %	ICT %
Basic school	0.7	0.0	1.2
High school	6.6	1.9	9.5
Bachelor	17.6	0.0	28.6
Master	44.1	32.7	51.2
PhD	30.9	65.4	9.5

Table IV.
Educational level

third and half of the respondents had experience in areas such as human resource management, accounting and financial control, as well as sales and marketing. However, the entrepreneurs generally seemed to lack experience in functional areas like business administration, logistics and production management, as well as finance and capital management. Eight out of ten indicated that they had very little experience in these categories.

Approximately 40 percent of the respondents reported that previous experience as entrepreneurs was decisive for their continued efforts. One-quarter of the entrepreneurs who actually had previous experience perceived it as positive whilst a fifth perceived it as negative. About half perceived both positive and negative elements in their previous experience. However, previous experience did not seem to influence the desire to start a new venture and almost 70 percent reported that their previous experience had been crucial in developing their present business ideas. This observation was also supported by the interviews; for many of the entrepreneurs, the venture founded during the study period was generally not their first entrepreneurial attempt.

Social capital

About a quarter of the respondents were solo entrepreneurs (26.7 percent). The remaining entrepreneurs started the venture with one or more partners. The size of the founding team was normally two or three (26.7 percent and 23.8 percent respectively). Considerably more solo ventures were established in the BIOMED sector compared to the ICT sector (24 percent and 12.2 percent). In founding teams, partners were primarily previous work associates (39.2 percent). A total of 14.9 percent reported founding ventures with friends or fellow students and 10.8 percent with other acquaintances. However, only 2.7 percent reported that they had founded ventures with a relative. In these cases partners were never close family such as spouse or siblings.

These patterns of founder relationships were also confirmed during the interviews, as most entrepreneurs were work colleagues, relatives or good friends from early school days or university. Frequently, informants replied that it was very important to have personal knowledge of other team members and it was insufficient that one member knew only one of the other members. In founding teams respondents generally considered the relationship with one of the other members as quite strong whereas it was considered less strong with the remaining team members. Likewise, they had generally known one of the other team members for a reasonably long time – eight years on average – compared to approximately four years for the remaining team members (see Table V).

Even if there is a clear difference between how long the entrepreneurs have known their co-founders in the two sectors, a univariate analysis of variance of each of the five situations does not reveal any statistically significant differences. The reason is that great variations can be observed in all situations. Thus, the numbers of years which respondents have known their co-founders ranges in general between nil and 15. With respect to the first co-founder, the maximum is as high as 30 years.

The networking activities of the entrepreneurs were primarily directed at market-related aspects such as identification of customers and new partners or at technical issues such as solving actual problems, obtaining advice on specific issues and improving technical knowledge. These purposes were reported by 70-80 percent of the respondents to be the most important. According to the interviews, most types of advice and knowledge were found via indirect ties, through the CEO's network or

Table V.
Length of relationship
with co-founders

	Total		BIOMED		ICT	
	Average years	Standard deviation	Average years	Standard deviation	Average years	Standard deviation
1st co-founder	7.6	7.4	9.1	7.7	6.7	7.2
2nd co-founder	4.6	4.0	4.5	3.5	4.6	4.5
3rd co-founder	3.3	4.4	4.3	4.6	2.4	4.3
4th co-founder	5.1	8.9	3.7	4.2	6.8	13.0
Other co-founders	5.0	7.3	5.2	8.4	4.5	6.4

networks of board members. Someone in the network would tell the CEO or board member where to obtain assistance thus reducing the uncertainty associated with contacting individuals not known personally. In many cases, however, the actual advice or knowledge was purchased. Only technical knowledge was accessed through the network of the chief technical officer or by hiring individuals with the needed skills, if suitable network contacts were lacking.

The interviews revealed that the attitude to and perception of networking activities exercised an important influence on networking behavior. Some entrepreneurs attached little importance to networking and three even rejected its relevance altogether. Moreover, they explained that they did not network either because they did not see the need for it or because they did not like or want to network. These all had the title of chief technical officer or were in charge of research and development, which are internally oriented positions. One individual even replied that he leaned on the network of the CEO.

However, 60 percent of the founders reported that networking for capital as an important activity. The interviews highlighted that if entrepreneurs themselves did not have the networks to access seed-stage investors they relied on either the “weak ties” of board members and their reputation or the strong ties of the CEO. In other words, they relied on their professional networks in such situations. More often, however, raising capital seemed to be a bit like a fishing expedition not using networks at all. The entrepreneurs would send out letters and e-mails describing the venture together with their business plan and hope that venture capitalists would bite. Another aspect of interest was that entrepreneurs in the BIOMED sector generally spent more time on networking for capital than their colleagues in the ICT sector (77 percent and 49 percent), possibly because more capital was needed as the section on financial capital showed.

The interviews also showed that the primary recruitment strategy of team-based ventures was to look to the founders’ personal networks. The first employees were generally previous colleagues, friends or fellow students from university. This choice was based on two factors:

- (1) general trust in competencies derived from personal knowledge of skills and experience; and
- (2) emphasis on “cultural fit” in the sense that new employees would also possess “entrepreneurial values”.

In half the interviewed ventures, most founding team members used their networks for recruitment until these were exhausted as a source of new employees. Then they would start to draw on the network of the early employees.

Discussion

Financial capital remains the key strategic asset needed for the realization, survival and growth of any new venture. However, it is clear that without sufficient human and social capital, it may be difficult to gain access to the financial capital needed to establish a successful venture, particularly with regard to external types of capital. Despite variation in financial sources, the entrepreneurs generally find searching for financial capital – and especially external capital – very time-consuming and with numerous pitfalls. This means that whilst financial capital is an important resource in the entrepreneurial process, the support of resources related to human and social capital is often vital in obtaining financial capital.

There are, however, sectoral differences in the amounts of capital needed. The establishment of a new venture in the ICT sector typically requires much less equipment and research investment compared to establishing a new venture in the BIOMED sector. Furthermore, most ventures in the BIOMED sector are characterized by a long time lag between research, product development and sale of the final product or service. This leads to a need for heavier investment, which in turn requires a different type of investment. It is therefore not surprising that BIOMED ventures seek out venture capital rather than relying on personal savings or bank loans that are a characteristic of ICT ventures. A drawback of relying on venture capital and business angels is that it takes time to identify and persuade them that they should invest; particularly as the complexity of products in these cases is often high. The more complex the technology, the more difficult the risk assessment procedure is for the potential investors and the less likely it is for the entrepreneurs to obtain external funding (Philpott, 1994), or put differently, the more effort entrepreneurs will have to put into this activity. Indeed, the results show that entrepreneurs in the ICT sector generally spent less time on seeking capital than their colleagues in the BIOMED sector. On the other hand, the results indicate that banks are not always the most important source of financing for entrepreneurs and SMEs as mentioned by Deakins (1996). Moreover, the results support the claim by Roberts (1990) that the need for financial capital varies across sectors.

In general, the educational background of the entrepreneurs in the two sectors included in the survey indicates that the general level of formal education in Denmark is sufficiently high to provide an adequate basis for entrepreneurial activities in knowledge-intensive sectors. The difference in educational level found between the two sectors can be perceived as an indication that invention and innovation in the BIOMED sector are generally more complex (see Christensen *et al.*, 2000). This is also highlighted by the results showing that entrepreneurs in the BIOMED sector often tend to pursue higher education and obtain PhD degree before engaging in entrepreneurial activities. However, the findings indicate that a lack of human capital is generally present with regard to the day-to-day running of a business. That is, even if the formal educational background of the entrepreneurs in the two sectors seems to be sufficient from a technical point of view this may only create a platform for the initial entrepreneurial activities. The lack of broader experiences in running a company may be a drawback when the activities have to be organized in a more formal way. This may turn out to be

critical when the founding ideas develop into products that need to be distributed through market channels. Therefore, it may be necessary to offer specialized managerial training to individuals who due to their educational background are more research and development-oriented than management-focused. Alternatively, it is necessary to hire professional managers to take care of the day-to-day running of the business.

Most ventures were founded typically by teams of two entrepreneurs. Team formation often occurred within a pre-existing network consisting of relatives, friends or work associates, in other words “trusted alters” (Ruef *et al.*, 2003). Forming a venture with one or more partners seems to rest on the criteria of trust and long-standing relationships, whether these be friendships or colleagues, which often involve an accumulation of knowledge-based trust (Gulati, 1995) or strong ties (Dubini and Aldrich, 1991). However, although strong ties may promote effective teamwork the drawbacks of establishing a venture with relatives, friends or colleagues should not be overlooked. For example, the extent of the network is negatively affected by a lack of diversity as the individuals have a common background whether this is in terms of family relation, education or experience. When analyzing the purposes for which entrepreneurs used their networks, the results showed that these consisted mainly of market-related or technical issues. However, acquisition of new capital was a primary activity as well, and most of the ventures, apart from BIOMED ventures founded by women, had a hard time obtaining the funds needed for building production, equipment and working capital which are high in technology-based new ventures (Hambrick and Crozier, 1985).

Another important purpose of networking was recruitment. Very little has been published on recruitment strategies in knowledge-intensive ventures, but selection criteria used by Danish founding teams were similar to those found by Baron *et al.* (2001). The networks of new employees consisted of indirect strong ties that increased the diversity of networks available to the venture (Dubini and Aldrich, 1991), particularly since the networks of the entrepreneurial founding teams themselves were limited due to team homogeneity. In other words, diversity was achieved through weak ties, whereas strong ties resulted in homophily. Thus, based on the findings, it seems reasonable to accept that personal as well as professional networks of the entrepreneurs play an important role in establishing and developing their new venture.

Conclusion and implications

Generally, obtaining financial capital does not appear to be an insurmountable problem although it may be time-consuming. However, the limited number of sources used to obtain financial capital and the way information on financial sources is identified indicate that the flow of information is not fully transparent and/or easily accessible. There may be several reasons for this situation. First, the entrepreneurs’ lack of knowledge and experience may limit the search for financial sources and force the entrepreneurs to rely on other persons (the network). Second, the information provided by investors – private as well as public – may not be visible or easy to access. Having high-tech knowledge-intensive entrepreneurs spending a disproportionate amount of time looking for financial capital means that the time available for growing and developing the venture is seriously reduced. The implication of this situation could point to the need for developing a single portal with information about different

sources of financial capital and which one(s) may be the most relevant one(s) to contact. Furthermore, it could provide information about brokers that can arrange contact between ventures with realizable ideas and venture capitalists or business angels.

The results showed that the general educational background of entrepreneurs in the knowledge-intensive sectors was high particularly with regard to their technical skills. However, there was a general lack of experience and education within the area of sales and marketing, which may have severe repercussions unless qualified individuals are hired, who possess such competences. This suggests that there seems to be a need both for post-education of entrepreneurs in business administration matters as well as a need to include courses in business administration and entrepreneurship in technical and science-related master-level programs.

Social capital has been found to play an important role in the entrepreneurial process in the knowledge-intensive sector. First, when it comes to the establishment of a new venture, as three-quarters were founded by entrepreneurial teams. But searching for starting capital and later on new capital and employees relies very much on personal relationships as well. This study shows that social networks – both personal and professional – play an important role in establishing and developing a new venture in knowledge-intensive sectors. This in turn calls for more attention to be given to the question of how to stimulate and further develop such skills during the education and preliminary vocational training of youngsters. Moreover, existing institutionalized “infrastructure” needs to be reinforced in at least two ways. First, facilities for establishing contact and dialogue between students and researchers at universities on the one hand and the business community on the other hand, will be mutually beneficial. Second, regular “match-making events” where entrepreneurs with ideas can meet persons with experience and capital as well as those who provide services can definitely contribute to improving the entrepreneurial climate.

An aspect that should not be overlooked concerns differences between the ICT and BIOMED sectors. This further points to an important policy implication as the support needed in different segments can hardly be provided via a “one size fits all” strategy. Thus, the results of this research indicate that future initiatives concerning initiation of and support for entrepreneurial activities should be tailored to specific needs. Therefore, future political initiatives to stimulate entrepreneurial activities should not transcend sectors. Covering many sectors simultaneously is comparable to a shotgun approach, which is very imprecise.

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