

BEYOND HUMAN CAPITAL:

The application of human capital in new venture development

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Abstract:

Earlier research has identified a variety of human capital dimensions related to the entrepreneur as positively influencing new venture performance. However, in high technology exploitation the entrepreneur is commonly only one person among other highly skilled individuals involved in the development. This longitudinal case study approach focuses on key recruitments contracted due to their earlier experiences needed in the ventures. Two perspectives are taken to approach how earlier experience is applied in new contexts; the drives behind the recruitments, and how new recruitments apply their earlier experiences. Timing, persistence, and transformation appear to be vital in the process of transferring earlier experiences to new contexts. Timing is related to the early development of the venture, when all individuals are engaged in several different roles. An extension of timing is the challenge of persistence in matching earlier experiences with the entrepreneurial development. Finally, apart from transformation of the knowledge carried by individuals, they do also create their own platforms to work from.

INTRODUCTION

This paper is an investigation of the application of human capital related to exploitation of innovative venture ideas. The extent and nature of innovative ideas emerging as a result of academic research, or advanced technology development are to a large extent unknown and unpredictable during their exploitation (Toole 2003). High-technology and research-based ventures may need to create a new market, or convert potential users of an existing product or service to use a new one (Samuelsson 2001). Thus, to exploit this type of new venture ideas includes a process without a common knowledge base to work from.

Human capital related to exploration and exploitation of new ideas has lately aroused much interest among researchers. Taken together different kinds of human capital of the entrepreneur have been investigated as advantageous related to successful outcome of early organizing activities (Davidsson and Honig 2003; Delmar and Shane 2003; Watson and Stewart 2003). Apart from actual performance, also studies about expected performance highlight the role of human capital (Kaplan and Strömberg 2000; Shepherd, Ettenson et al. 2000). This implies that the mere existence of human capital is important to new venture creation; and is of particular interest to stakeholders.

Human capital includes a wide range of capabilities acquired in different ways (Davidsson and Honig 2003). It may be the result of upbringing or education, professional or informal learning. From an entrepreneurial perspective human capital has primarily been approached as a structural asset related to the entrepreneur(s). But, encompassing both explicit and tacit knowledge indicates that human capital may be embedded among several individuals involved in venture exploitation. As touched upon, human capital as a structural asset might be beneficial for legitimacy reasons towards different stakeholders (Kaplan and Strömberg 2000; Shepherd, Ettenson et al. 2000). However, knowledge about the driving forces behind acquisition of human capital in new ventures, and how it is applied remain to explore. Earlier research points at a need of contextualized studies to create a better understanding of both the variation and the conditions where human capital is more or less successfully applied. Particularly, in the case of innovative venture idea exploitation alternative micro-levels to understand entrepreneurial development seem to be scarce (Davidsson and Wiklund 2001), and the prevailing knowledge about human capital application is relying studies investigating the human capital of the entrepreneur. Consequently, this paper is based on the involvement of several internal key individuals, and external actors, in an individual firm context. Thus, the purpose of this paper is twofold. *First*, it explores why individual human capital is attracted to the venture. *Second*, it discusses how human capital may be made use of during new venture exploitation. The first issue is a context and actor related aspect closely integrated with how individual human capital can be made use of.

THEORETICAL BACKGROUND

Different modes of exploitation

Equilibrium ideas

A late discussion is about distinguishing between different types of venture ideas and the need of different modes of exploitation (Samuelsson 2001; Shane 2003). The distinction relates to residing knowledge about how to exploit equilibrium venture ideas versus breaking new territory with innovative venture ideas. In the first case, earlier experience of practicing some specific knowledge may apply for individual business ownership. Prior competence and skill in a specific area has been found as a favorable base for founders of new firms, enhancing both survival and growth (Shane 2003). Capitalizing on earlier experiences does however not apply for all challenges possibly met in exploiting equilibrium ideas, but seem to be a both indirectly and directly favorable knowledge base for exploiting new ideas in well

known contexts (Chandler and Hanks 1994). Besides having experience from the practice of a certain skill or knowledge, personally related clients may also add to the decision of creating a new business based on a reproducible idea (Shane 2003). Still, the entrepreneur starting a new firm may not have the knowledge needed that apply as a business owner, since the value of embedded resources, such as earlier experience, may be reduced when applied in new contexts (Madhok 1997).

Innovative venture ideas

Exploiting innovative venture ideas on the other hand is an uncertain road taken, exactly due to its innovativeness (Toole 2003). Innovation based venture ideas are here referred to as emanating from academic research or technology advances. It is used in line with the definition of high-technology as: venture exploitation whose products and services include new, innovative and advanced technologies emanating from work of scientific and technological expertise (Keeble and Wilkinson 2000). Due to its newness it implies that there are few, maybe even no forerunners to imitate, or that the market for application may need to be created. If there are identifiable potential customers, it may be a major challenge in convincing them to leave one way of working and take advantage of a new practice made possible through the innovation (Shepherd, Ettenson et al. 2000). What high-technology ventures often start from is its aggregated human capital embracing an innovative venture idea for exploitation. It has been suggested that organizing efforts are taken by path breaking entrepreneurs without widespread knowledge and understanding of their activities (Aldrich and Baker 2001). Consequently, the development is not only of explorative character, but may also suffer from knowledge and experience shortcomings not mastered by the founder(s) launching a venture.

An extended definition of new technology based start-ups has been suggested as: businesses whose products or services are to some extent dependent on the application of scientific or technological skills, and/or knowledge (Allen 1992). This definition does not necessarily assume that the opportunity as such is emanating directly from academic research or technical development, but it may be an embracement of an existing opportunity in an innovative way (Madsen, Neergaard et al. 2003). The extended definition reflects an assumption that human capital, in a wide sense, is an important aspect of early venturing in the transformation of academic or technical advances to market application, due to the complexity of transforming inventions to possible commercial value. When no or few blueprints are available, the human capital of exploiting actors become important as the main assets for engaging in improvisation and respond to upcoming events (Teece, Pisano et al. 1997; Aldrich 1999). A common way to overcome an early reliance on the founder's human capital seems to be a group of founders setting up a new venture together (Watson and Stewart 2003). That is a step beyond an earlier dominant research focus on the human capital of an individual entrepreneur.

Yet, another approach to integrate different dimensions to understand organizational processes is an individual/opportunity nexus argued to be a way to further our knowledge about the entrepreneurship phenomenon (Shane 2003). The nexus idea integrates different aspects of entrepreneurial development into actions, actions taken for pursuing entrepreneurship both related to the opportunity and the capability of different individuals involved. In focusing the integration of human capital and venture idea exploitation several theoretical perspectives appear. Assuming that human capital is attractive for exploitation of innovative venture ideas, what is the different human capital dimensions involved? Furthermore, acknowledging that the human capital of different individuals can be supportive in the exploitation process, how can they support the development in different roles, i.e. both organizational roles and in relation to a new organizational context? That includes questions like, what are the driving forces for contracting experienced individuals, what organizational roles do they fill, how can their experiences be transformed to the actual context they are attracted to? These are the main dimensions that guided this investigation,

and have in line with the approaches referred to above brought about an integrated process approach. It includes both the contextual conditions for employing experienced key individuals and how their knowledge is made use of. For reasons of limitation human capital in terms of earlier professional experience is the primary focus in this paper. In the following a theoretical base for the assumptions made in this paper will be introduced.

Human capital and entrepreneurship

The creation of new organizations is closely related to entrepreneurship and the activities involved in the realization of different intentions (Scott 2003). Human capital is, as suggested by introduction, widely recognized as an important asset in exploiting new venture ideas. An underlying assumption is based on the idea of the role of human capital as increasing the individual's prospect of achieving things, compared to others with less human capital assets (Delmar, Sjöberg et al. 2003). Besides a classification of different kinds of opportunities necessitating different modes of exploitation, also human capital classified as work experience, education, skills and demographics of human capital (Watson and Stewart 2003) indicate that many different kinds and dimensions of human capital may be involved. More fine-grained aspects of how specific kinds of human capital are applied during venture exploitation inform us in many cases to be beneficial to venture performance, without explicitly investigating the contextual conditions for application.

Research has so far concentrated on tracing the antecedents of outcomes, while process approaches to understand the dynamics of entrepreneurship has been less used (Van de Ven and Engleman 2004). Also assessing entrepreneurial processes are commonly related to performance can be accessed in different ways. Two measures of particular interest is performance in terms of sales or increase of employees, as indicators for continued growth and survival. These indicators do however not inform us much the temporal value of human capital and how it is applied in the development. Other dimensions, such as setting quality standards, continual improvement, and venture goals, have been suggested for accessing the effects of human capital, and particularly the relational aspect of it (Watson and Stewart 2003). Yet, another study recognized certain earlier experiences as vital for identify and envision possible ways to exploit opportunities (Chandler and Hanks 1994).

Integrated needs of human capital in entrepreneurship studies

Exploitation is as shortly touched upon not a self-contained process. From a strategic perspective creating a new organization as a mean for exploiting a new venture idea may be regarded as the ultimate goal of the creation. But as suggested above, it is commonly an uncertain road taken and a process of explorative and exploitative character. In high-technology ventures an integrated development of exploitation and exploration is accentuated due to the creation stage a new venture is in. This complicates both the prioritization of human capital acquisition and the understanding of individual human capital application. Consequently, apart from the human capital dimensions introduced below a process approach may open for new ones, as well as new insight into the application of it in an entrepreneurial context.

Human capital and the creation of new firms

Creation of a legal unit

Human capital acquisition may be integrated in the entrepreneurial process long before the explicit outcomes of it can be assessed. Apart from encompassing studies of nascent entrepreneurs' human capital related to realization of firm establishment (Davidsson and Honig 2003; Delmar and Shane 2003) a process of human capital accumulation seems to start among nascent entrepreneurs, i.e. during emergence of new firms (Chrisman 1999). The assistance investigated by Chrisman was discussed as a mediator in terms of creating tacit knowledge useful during the start-up period among nascent entrepreneurs, and as a result a majority did actually create boundaries. One explicit outcome of human capital

related to entrepreneurship is thus a decision to create a new firm. The conclusion to draw from this is that a longitudinal process approach allows for investigating how human capital is made use of through different individuals overcoming upcoming challenges during venture idea development. The very distinction between exploration and exploitation has, as suggested above not always a defined boundary-line. The creation of a legal firm may be regarded as a explicit starting point for exploitation, but research has shown that the exploration of the initial venture idea may take years to refine (Vesper 1989). Consequently, the exploitation may start before there is a legal establishment, and vice versa the exploration may be a continued process.

Human capital related to venture capitalists

Investigating how venture capitalists work three main issues appeared in their screening of potential investments; the opportunity, the management, and the deal terms (Kaplan & Stromberg, 2000). In venture capital intensive firms the human capital of the entrepreneur/manager is commonly considered as an important aspect to include in investment risk evaluation process. Human capital of the entrepreneur has e.g. been discussed in terms of industry related competence (Shepherd, Ettenson et al. 2000), or upper echelon affiliations (Higgins and Gulati 2000) in relation to investors perspectives. Additionally, even if there is a trust in the individual entrepreneur/manager; many investors get actively involved in the recruitment of the management team before the investment (Kaplan and Strömberg 2000). Also after the investment 50 percent of the investors were actively involved in employment issues. Thus, human resource acquisition seems to engage investors to get operationally involved. An important drive for early external actor involvement is related to solving initial financing. One that is finalized the venture opportunity gain legitimacy which allow the entrepreneurs to engage in new venture activities (Samuelsson 2001). That would involve additional activities that are in focus in this paper, such as acquisitions of new competencies and resources to realize a commercialization (Teece, Pisano et al. 1997).

Previous entrepreneurial experience seem to be of particular interest to venture capitalists, and according to some researchers they have been proven right in this emphasis as the most valuable kind of experience (Stuart and Abetti 1990). The study indicated entrepreneurial experience to be more important than management experience or technical experience among other measures related to performance. However, other studies have showed mixed results depending on what kind of experience or industry were selected for the studies (Dyke, Fischer et al. 1992).

One particular capability related to human capital application was highlighted through a study of venture capitalists' screening of potential investments (Shepherd, Ettenson et al. 2000). As suggested in the paragraph above about innovative idea exploitation, it commonly takes time to convince potential customers to exchange their present way of working and apply a new product or service (Toole 2003). Therefore an educational capability was identified as decisive for this challenge. It was considered valuable in shortening the time for gaining customers, and was based on the need of having relevant industry experience (Shepherd, Ettenson et al. 2000). Apart from human capital commonly being highly valued among venture capitalists in their screening of potential investments, it also seems to bring about active involvement of the investors.

External actor involvement

The development of innovative venture ideas commonly involves external actors, particularly in the beginning when the new venture does not encompass all expertise needed due to inexperience (Aldrich 1999). This need of exchange shows itself not only through network activities taken by the founders, but also in specific supportive activities taken by dedicated actors to bridge knowledge gaps in the formation of new ventures (Kenney and von Burg 2000).

From studies of high-technology ventures in Silicon Valley a wide range of actors have been shown to facilitate different challenges a new venture encounters through the delivery of specialized goods and services (Kenney 2000). Apart from venture capitalists they may be represented by established lawyers acting as consultants facilitating the development (Suchman 2000), or other unheralded sources (Auerswald and Branscomb 2003). Through their involvement they add legitimacy, network contacts and specialized skills. This kind of interacting is particularly interesting since it seems to be interacting experts that, as a consequence of their interaction and as an extension of their professional experience, have in turn created dedicated establishments to pursue this facilitating role (Kenney and von Burg 2000). The example shows that the application of professional experience does not perfectly match the knowledge gaps in new ventures, but may need to be reproduced through new roles emanating from this interaction. As touched upon earlier, it highlights the need to focus on how earlier experience may be taken advantage of in individual venture idea exploitation differing from the context where it was created (Madhok 1997).

Deriving from this three dimensions related to human capital appear. First, the mere existence of different kinds of human capital is a commonly prioritized factor in considering new investments by venture capitalists. The mere existence of human capital adds value to a new venture with intentions to raise external capital. Second, human capital issues may involve investors operationally. Third, different specialized external actors may initially pave the way for venture development and the attraction of complementing human capital. This study is investigating how human capital is acquired and made use of in ventures already established. Consequently, how external actors are possibly involved is one perspective included in the investigation.

Enhancing aspects of human capital related to the entrepreneur

Earlier experience and opportunity exploitation

A classification made by Dyke et al. (1992) about earlier experience related to the entrepreneur displayed several experiences investigated in earlier research. The variation was between management, industry, entrepreneurial, start-up, family, educational experience, and having experience from starting a firm in contrast to having bought one. The results of the studies included in the overview indicated that human capital related to earlier experience seems to be more or less influential in the opportunity exploitation process. Through this overview we can gather that there are many inherent expectations about how earlier experience is beneficial to opportunity exploitation. The best known successful outcome of individual experience is mainly related to performance in cross-industrial investigations, and do not inform us about how it is made use of in particular industries or firms. There have been some indications that founders with earlier management experience own more successful firms (Dyke, Fischer et al. 1992). Another study, not included in the overview made by Dyke, clarified the combination of entrepreneurial and managerial competences as vital to recognize and envision possibilities in the opportunity selected for exploitation (Chandler and Hanks 1994). This implicit behavioral approach to the relationship between competence and performance of the firm, gives a general indication of how entrepreneurial competence may moderate the opportunity development in terms of resource acquisition and leadership ability. Also other studies, of earlier industrial experience in an industry related to the present venture, have showed an indirect positive relationship with early performance in cross-sectional studies (Cooper, Woo et al. 1989).

Through a selected group of high-technology ventures, management was compared to strategy making and the industry structure as possibly influencing performance. Management turned out as the single most important factor without being able to relate it to the backgrounds of the entrepreneurs (Keeley and Rourey, 1990). However, the results are

an indication of that it was the actions taken by the managers that made it useful. A suggested (Reuber et al. 1990) and supported (Covin et al. 1990) explanation is that individual experience varies as well as the application of it in different contexts. Furthermore, individual experience includes both tacit and explicit knowledge, seldom considered in investigating venture development over time. However, one encompassing longitudinal approach to understand the effects of human capital showed that nascent entrepreneurs could benefit from both tacit and explicit knowledge engaged in organizing activities towards launching a new business (Davidsson & Honig, 2003). But the effect of human capital was much weaker and less consistent after a firm was created.

The studies presented represent selective attempts to further our understanding of the relationship between human capital and entrepreneurial development. The somewhat limited and contrasting perspectives constitute a useful background for an explorative investigation of how human capital may be implemented in venture development. The heavy bias towards investigations of founders' earlier experiences may be explained by its relevance for the first attempts, when nascent entrepreneurs are actively engaged to realize their intentions by creating a new venture. It is less clear how earlier experience enable continued exploitation of the venture idea. Particularly, in the case of innovative venture idea exploitation it seems to exclude other key individuals involved in the exploitation process. To start a high-technology venture involves, in contrast to self-employment in general, different competencies from the start due to the complexity of the venture idea (Watson and Stewart 2003). Furthermore, as suggested by introduction, the time to success may be long and involve both internal and external key individuals.

Thus the main assumption in this study is that earlier experience of key employees attracted to new ventures has been neglected in earlier research and thereby assign different enabling aspects solely to the entrepreneur, and are possibly missing important human capital characteristics. Besides a firm perspective including key employees, our knowledge of human capital assets and how it is made use of during exploitation of new venture ideas is extended through the possible inclusion of external actors.

METHOD

This paper emanates from my ongoing work on a doctoral thesis focusing on early formalization processes in young high-technology ventures. An explorative qualitative approach has been suggested to get insight into organizational phenomena in single settings (Eisenhardt 1989; Perren and Ram 2004). A longitudinal case study approach was initiated during the fall of 2003. Unstructured initial interviews with the CEOs at the end of 2003 and the beginning 2004 were conducted for getting an orientation of the company history, and the current organizational status of the company. An agreement on a one year study, including interviews, participant observation and archival documentation was made with five ventures. For the purpose of this paper only four of the ventures were relevant to include here, due to the dominance of founders on key positions in the fifth one.

An event-driven understanding of how human capital can be made use of, builds a forward understanding of this process, and extends existing knowledge about human capital related to new venture development (Van de Ven and Engleman, 2004). The knowledge intensity is part of the competitive edge embedded in innovative venture opportunities, and the human capital is the main substance in early venture idea exploration. A process approach opens for an understanding of how firms takes advantages of their resources, and not the resources as such (Teece, Pisano et al. 1997). The main issue to explore is how earlier experience applies to high-technology exploitation? This question takes our knowledge beyond the commonly known benefits of human capital, mainly relying on empirical studies focusing on the entrepreneur. It does also open for further investigations of human capital application related to entrepreneurial development through its contextualized process

approach. Consequently, it does not exclude that the results may apply to new firms exploring other types of venture ideas, here distinguished as equilibrium ideas, or to the development of established firms.

In the agreement with the CEOs the longitudinal approach was outlined as recurrent interviews with the CEO every quarter of a year, additional interviews with key individuals involved in the organizational development pointed out by the CEO, when suitable participation in recurrent meetings such as management meetings, information gatherings etc, and access to written documents judged by the CEO as relevant information for the research purpose. With this approach retrospective biases could be reduced (Pettigrew, 1992). As has been suggested for case study approaches; employment issues and the creation of organizational roles were among the main dimensions of interest identified in this project, apart from boundary creation and other indications of a transformation from informal towards formal organizational structures, (Eisenhardt 1989). But the partly explorative approach kept open for identification of upcoming dimensions in entrepreneurial studies (Perren and Ram 2004). I was introduced by the CEO to all employees as a researcher that may call on everyone for shorter talks from time to time during the present year, after a non-disclosure agreement was signed with the companies.

Sample

Young high-technology ventures were chosen due to the unique challenges of high-technology exploitation as referred to above (Auerswald and Branscomb 2003; Toole 2003). Access to this kind of firms during their start-up periods is limited for confidential reasons, and for difficulties in accessing them at early stages. My access was facilitated by a renowned Swedish technical magazine¹. Two journalists have worked on identifying and making a yearly follow up of new high-technology ventures across industries in Sweden since 1999. With their technically competent judgment they have through different sources identified a total of 83 ventures until the end of 2003. Besides their ambition of early identification of innovative venture idea exploitation, they have got a confirmation from the ventures that they have an aspiration for growth. A total of 20 ventures still in operation were sorted out from two criteria; they were younger than five years, and had a minimum number of 10 employees. With a fewer numbers of employees the formalization process was judged to be hard to identify (Burton 2001). They were contacted for initial interviews. Out of the 20 selected 10 CEOs agreed on an interview without a commitment of further investigation. Eight confirmed their willingness to be included in my study, but only five were ready to agree on the research design at the beginning of 2004. The other three have not been open for making agreements at renewed contacts taken during spring 2004. As mentioned, only four are included in the analysis of this paper.

The cases are derived from a unique sample, but may include a bias in that the ventures included are selected from their highly innovative venture ideas, which may involve more exceptions than relevant cases for studying high-technology venture exploitation. This may be compensated for in accessing ventures longitudinally at a very early stage, rarely accessible through other samples.

Operationalized case studies and validity aspects

All interviews with the CEOs and key individuals were recorded and transcribed. The initial interviews were unstructured, but a check-list for my own use was brought to the interview ensuring that issues of interest were covered. Recurrent follow up interviews have allowed for probing on assembled empirical evidence, and have been taken as occasions for accessing secondary data. Management meetings have been attended in three of the ventures, and have been recorded if allowed, and then transcribed. Key employees have been pointed out in all the firms, and separate recorded interviews with them amount

¹ Ny Teknik

presently to 12. The key employees focused, apart from CEOs, are selective and rely on indications from the present CEOs. Likewise, the involvement and priorities made by venture capitalists relies entirely on the accounts of CEOs and founders. However, in recurrent interviews with the CEOs and talks to key employees, different recruitments and their roles have been able to probe on. For the same purpose founders no longer active in the ventures have been contacted through the help of the CEOs, and recorded interviews with founders in all but one venture have been completed. Weekly information gatherings have been planned to attend at least twice in all the firms so far. In three of them this was not realized more than ones due to late cancellations by the firms. Protocols produced after internal meetings during 2004 have been sent to me, adding to other documents produced by the firms. Full day observations have been achieved in all the firms at least twice, when all employees present at the time have been approached for shorter informal questioning. Apart from the CEO position, key employee recruitments encompass both full time positions and contracting on temporary or short-term agreements. They were primarily identified related to formalized positions, and the results were verified through different respondents. Taken together the case study design has created a rich opportunity to approach the organizational process in real time through multiple methods and respondents.

EMPIRICAL RESULTS

The empirical work is still in progress, and this is only a first attempt to analyze comprehensive case studies on early organizational development. It reveals some preliminary results related to contracting of different key employees. Due to the non-disclosure agreements the ventures have fictitious names; AAAX, BINYL, SEPPRO, and DELLO. Presently, three of them have venture capitalists as majority owners. All four have exchanged their founders as CEOs for external recruitments.

	AAAX	BINYL	SEPPRO	DELLO
Founded	1999	2001	1999	2001
Founders	2	3	3	2
1st external CEO	2000	2001	2000	2001
2 nd external CEO	2000	-	2004	2004
Headquarters	Sweden	Sweden	Sweden	Sweden
Additional sites	US and Finland	-	China and Japan	-
Present total number of employees	25	17	16	30
Turnover, 2003 ²	No information	<1,000 000	5,000 000	1,234 000
Venture capitals as majority owners	Yes	No ³	Yes	Yes

In the following presentation the four cases are introduced together with the key recruitments that constitute the empirical base of this paper. It is followed by a contextual analysis, and conclusions, including implications for future research.

Human capital contracting

² The information is noted in SEK, and is taken from the Magazine Ny Teknik published on March 26, 2003.

³ One investor was classified by the CEO as a venture capitalist that have invested together with several angel investors

External recruitment of CEOs - their backgrounds and their priorities

The initially managing founder of AAAX stepped back as CEO after one year in operation, and having received that industry's largest investment. During his responsibility there was a constant hunt for individuals that could add some experience to the development of the venture idea. Individuals with academic experience were rare and relevant experience was scanned for all over the world at the time of venture creation. Newly graduated doctoral students dominated the first recruitments. The second founder is still chief technical officer integrated with his academic position abroad.

AAAX first externally recruited CEO with related industrial experience came in when venture capitalists took over the majority ownership. For different reasons, he was replaced only after a few months by another external recruitment with industry and manager experience, which had been recruited simultaneously as the CEO for another position. He still remains in operation. This third CEO has taken a primarily administrative and commercial approach. During his responsibility several key individuals with some years of related industry experience have been recruited. One board member with valuable commercial contact was also involved operationally at the beginning of 2004, through the initiative of the present CEO.

BINYL's three founders recruited a business consultant as CEO, who also had entrepreneurial experience, when the venture was legally started in 2001. One of the founders is continuously interacting with the firm as a natural part of his academic research; the other two are contracted in the venture. The business idea encompasses involvement of three different professional skills. A commercial concept around these three skills has been created with a minimum of financing from angel investors. The venture is backed by a group of angels, who are not operationally involved but are members of the board. The founder has added to legitimacy through his world wide renowned academic publications, adding to a commercial value.

Due to the demand from venture capitalists SEPPRO replaced one its founders acting as CEO for recruitment with start-up experience. This person was substituted after four years, by an entrepreneurially experienced CEO. She had been involved for a while as consultant, and had a professional relationship with one of the investors. The first CEO kept an informal organization, and concentrated on recruiting and stimulating individuals to proceed with the commercialization. Several financial rounds were closed by him. The recently employed second CEO is also presently acting as sales manager due to the loss of a former sales manager. Until recently, the former founder/CEO has been operative in the venture since it started in 1999. He has now returned to his academic institutional work, and started another venture. A second academic founder is the only one of the three that is somehow involved in the venture, as a member of the board.

In DELLO, one of the co-founders came from a consultant firm to take the role as CEO from the start. He has a doctoral degree within the discipline that is related to the potential market of the venture. He left recently, as planned for some time, without having a successor. The chairman of the board is currently operating as CEO. The first CEO concluded several financial rounds since the venture was initiated in 2001. The board has constantly interacted in his decision making. He kept an informal substance driven organizational fundament as a driving force for the entrepreneurial development. Besides the present chairman of the board temporarily acting as CEO, another board member with industry relevant and entrepreneurial experience was contracted operatively during spring, as sales manager on a temporary basis.

Additional external recruitment

Key employee recruitment was accounted for by the present CEOs as a constant challenge. The most wanted would have both industry relevant and entrepreneurial experience. Depending on the innovativeness of the venture idea or the present employment situation these requirements seemed hard to fulfill. In AAAX, SEPPRO, and DELLO the initial recruitment prioritized individuals that could add to the transformation of the academic invention to a commercial product. There were practically no experienced employees to attract in any of the cases, so the founders concentrated on raising an interest among doctoral students at their different academic institutions. In BINYL there was an initial prioritization of finding entrepreneurial and commercial experience, as well as skilled specialists that could interact with clients.

ANALYSIS

Human capital in new settings

CEO recruitments

Different roles are filled through external recruitment. As presented above the ventures have recruited experienced CEOs through the responsibility of the chairmen of the boards. The primary selection criteria have been their industry relevant and/or entrepreneurial experiences. In venture AAAX the first CEO had long experience in managing positions in a multinational corporation. He came in when there was substantial financing available, with the expectation to realize sales. However, the technical development had to be abruptly redirected towards a new technical solution. The founders and present employees were able to redirect the technical development, but the new CEO was built in to continue development from the old track that had failed to raise commercial interest. The second CEO, on the other hand, had technical development experience apart from managing and marketing experience of 18 years, and could enable the technical redirection of the engineer work. It included a loss of certain technical specialists, but that did in turn open for new recruitments with a variety of skills. He has pushed a focused technical development on customer requests, and created an administratively supporting organizational structure.

In BINYL, the externally recruited CEO has from the start fulfilled roles that neither the founders, nor the investors have been able to cover. A legitimizing activity has been to set up an operational group of employees that can actually deliver the product to commercialize. On a constrained financial market since the launch in 2001, no venture capitalists have been attracted. Due to an unstable financial situation employment has been restrictive. The CEO referred to his earlier entrepreneurial experience in accounting this, many times when headcounts came long before sales, they resulted in too many disappointed individuals losing their employments. The CEO has made all recruitments, but it is not until after three years that some of the 17 involved individuals are employed. Increased commercial demand has during the summer of 2004 given rise to contracting of additional specialized and experienced individuals locally based in other Scandinavian countries.

In SEPPRO the first external CEO could, at the early stage when he was recruited, apply his earlier start-up experience of being a serial entrepreneur during more than 20 years. Recognizing his earlier behavior and the deep involvement of the founders at the time, made him approach this in serious discussions with them before he started, in order to gain their confidence. Employees with different skills were attracted, and different competencies were integrated ad hoc to explore the invention from different perspectives. Lacking commercial experience from this industry, he supported a continued exploration of the venture idea, while commercially experienced key employees were relied on for commercial contacts and agreements. A substantial financial round was prolonged for different reasons, which eroded his internal trust among some employees. This in turn, paralyzed the technical development. When the present CEO started, after having first been engaged as a

consultant both technical and commercial development needed to be integrated. Individually based compensation agreements with the former CEO were negotiated, dissolving sub-groups that had emerged in the informal atmosphere. With an earlier experience of both fast commercial breakthrough and expansion of personnel, the immediate actions of the present CEO were to create a mutual trust in the management group for decisions taken. With higher degree of transparency also allocation of scarce human resources could be more easily handled.

DELLOs founder/CEO has an academic background and some years of consultant experience. This legitimacy ensured financial trust among investors, and the initial group of employees related to the academic inventor. With the financial rounds taking most of his attention, he could use his consultant experience in presenting trustworthy information to investors. Besides, with a certain personal understanding of the research platform of the venture, he in turn trusted the predominant academics employed. Some selective individuals with industrial or entrepreneurial experience were lately recruited, stressed by the investors, to complement the overweight of academic and technical competence. The attracted contrasting competencies appeared hard to integrate, as will be discussed below.

Additional key individual contracting

In AAAX some key recruitment were made at an early stage among academics with leading knowledge about the technique that was to be commercialized. They turned out to be crucial much later when the technique development had to be redirected after the first external CEO left the company, due to their roles as leading academics. Having been through several rounds of financing, redirection of the technique focus including a reduction of employees, and other challenges the venture have had long lasting benefits from legal constructions that were set up by a contracted lawyer before the venture capital was secured. He was recommended through the angel investors and could make a professional work against equity. This was presumed to have spared the venture from many legal disputes. On the commercial side, two experienced sales persons were recruited who had been dealing before with multinational corporations around the world, and had experience of developing products in partnership with the customers. Additionally, a commercially experienced board member was contracted at the beginning of 2004 to make an extra commercial effort. This was however put to an end through the reaction of other board members, also largest investors.

As already touched upon, BINYL's externally recruited CEO could early, through his own network, attract both an entrepreneurially experienced employee and specialists for client interaction. They started to work on clinical testing basis, and the venture idea soon turned out to be commercially attractive. The venture is not totally relying on the initially involved individuals, but has been shown to be able to upscale. However, the initial group of four has worked hard on enabling this up scaling through intensive internal experience sharing and agreements on commercial procedures, despite their part time engagement. Besides service production with clients, they also contribute in the marketing process, both as employees of the venture and as professionals in other positions within the industry.

In SEPPRO a key employee in sales was recruited early in the development. He had some years of entrepreneurial experience, and was engineer by training. He was early off with a prototype visiting customers all over the world. He did later on recruit two expatriates to work on their home markets. These two did not only add to the commercial approach, but became important referees for testing of products due to their knowledge of cultural differences. After a year in operation an advantageous recruitment was made, through a person that still is crucial in translating customer needs into product development. His particular language skills opened the eyes for the venture to employ complementing skills that, in a combination of three different educational backgrounds, could develop attractive customer made products. The organizational informality, kept by the first externally CEO for several years

caused an active involvement of one of the board members/investors. Being a consultant by profession he identified the main processes of product development and wrote an encompassing handbook including a working model. The product engineers tried to apply it, but failed due to the immature stage the venture was in and the general lack of work experience among the young recruits.

Keeping the organization very informal and flat in DELLO, and with a rather homogeneous group of employees, two recent key recruitments demanded explicit formalized responsibilities, and started to outline new structures for the venture development. One with years of experience from research and development (R & D) in a multinational corporation, used her earlier experience to create written formalized documents that would facilitate the commercialization process in her role as responsible for R & D. She was confronted by very informal ways of solving problems, and did not get much attention in her attempts. The argument was that the suggested formalized way of working was much too early to implement, due to the lack of routines. The other key employee had experience from sales in a start-up in a different industry. He took an encompassing approach to sales in this venture, and was inspired by the formal documents of the R & D responsible. His sales attempts apparently needed support after some time, and one board member with long entrepreneurial and management experience was contracted for a shorter period to structure sales. He focused sales activities and integrated it with marketing and product development. The logic of sales communication was exposed to and discussed by everyone at a full day meeting, emphasizing the benefit to the customer. At the very beginning an experienced manager became involved as a consultant facilitating the set up of financial routines and human resource practices. Both attempts resulted in handbooks that became a framework for subsequent implementation.

CONCLUSIONS

CEO recruitment

Venture capitalist preferences and engagement regarding recruitment of CEOs (Kaplan and Strömberg 2000) with primarily entrepreneurial experience, or a mix of managing positions was recognized in this study (Stuart and Abetti 1990; Chandler and Hanks 1994; Kaplan and Strömberg 2000). Exceptionally, venture capitalists pushed other recruitments as well that turned out to be more difficult to integrate at the time. Industry related experience seemed the less relevant experience to prioritize in recruitment, due to the uncertainty about market identification and what would actually be relevant in a longer perspective. Selective industry experience do not apply for long due to redirections during market identification.

Operational involvement

In these ventures there were individual engagements by board members and investors (Kaplan and Strömberg 2000). However, the timing aspect for applying board members experiences at different stages of the venture development was delicate. Besides, their authority and their identification as investors and board members made the employees uneasy, unless their temporary and defined involvement was very clearly understood by everyone.

CEO experience application

Consultant experience created both a confidence among investors and founders, and added to the product conceptualization of the venture idea. Mixed professional experiences seemed necessary in the venture development over time to enable an integration of continued exploration and exploitation, in that they gained confidence among employees representing a variety of human capital. But with the many roles the CEOs were theoretically capable of fulfilling, it seemed difficult in reality due to the proportionally time consuming effort of acquiring venture capital.

Key employee recruitment

The implementation of earlier experience among other key employees turned out in two ways; as specialist competence related to the exploration of the venture idea, and as commercial experience related to the market awareness of the new product or service. The specialist competence often needed to employ in the beginning was related to the transformation of an invention to a commercial product, and has been referred to as technical knowledge (Auerswald and Branscomb 2003). Not to isolate the technical development, technical knowledge was early integrated with commercially experienced recruitment. This complex mix of different skills and logics is an early challenge in exploiting innovative venture ideas, but is also required to succeed commercially (Auerswald and Branscomb 2003). As illustrated, the ventures all made an attempt to create such a mix. What added to complexity when selective experiences were recruited was that specialist competencies could seldom be applied downright in formalized roles, something that seemed to be commonly expected and lacked concern with opportunism (Madhok 1996). With scarce resources the ventures typically involved every individual in many different roles. Besides, the very venture idea was in all cases based on three different individual professional competencies. Individuals with long experience needed to create their own platforms for applying their skills. In a longer perspective solid experience may be favourable to solve upcoming challenges (Chandler and Hanks 1994), but it seems favourable to the venture development to apply it in portions, to time it, combined with different roles during early venture development. Furthermore, the ventures seemed to lack the capability to create idiosyncratic roles (Miner 1990) for much wanted employees. In these ventures still struggling for commercial breakthrough, the employees needed to lay the grounds for their roles themselves.

Timing, persistence and transformation

The variety of earlier experience recruited by young high-technology ventures has been exposed in this paper. Putting it into context and illustrating how earlier experience was contracted and applied in different ways, several important indications evolved.

One is the sensitivity of timing in recruiting employees with experience attractive to the venture. The key recruitments did not turn out well in all cases, while others could in retrospect be regarded as successful. Neither outcome can solely be related to bad timing, but also other aspects such as personality and misleading expectations from both the venture and the employee may have contributed to the outcome. It highlights the challenge of context related to human capital assets (Madhok 1996). Another indication related to time was the prevailing uncertainty about the future when relying on venture capital. Persistence seemed restricted both among investors and employees when things did not turn out the way it was expected to. A third indication is the sensitivity regarding timing of specific challenges to be solved through external contracting. In the cases investigated it was apparent that existing clearly formulated challenges could be solved through external recruitments with matching experience, but the timing was essential to see short term results. Contrarily, experience application with immediate benefits, did not always hold in the long-run when challenges changed. This indicates that some particular experience may not hold for long during exploitation, unless the individual grows with the development. Besides, the individuals recruited needed to enable for their implementation of experiences, and not simply transfer former ways of working to the new ventures, as elaborated on above (Kenney and von Burg 2000). This was apparent for the CEOs that regardless of their capabilities had to spend most of their time on venture financing, often a new role to them. But also other employees with specific knowledge had to take several roles that were not all familiar, integrating their earlier experience.

Taken together, this paper highlights timing aspects and transformation of earlier experiences as crucial in understanding how human capital can be made use of in venture

idea exploitation. The results add to our understanding of why a variety of human capital can affect firm performance. A methodological implication is that the contextual setting of human capital implementation is essential to include in future investigations. A practical implication is that the application of human capital through key recruitments highlights the challenge of being persistent and leaving room for transformation of human capital into new contexts.

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