Alistair Anderson and John Park
Aberdeen Business School, The Robert Gordon University

Entrepreneurial Social Capital; Conceptualising the social capital in new high tech firms

Alistair Anderson and John Park
Aberdeen Business School, The Robert Gordon University
Sarah Jack
IEED, Lancaster University Management School

Abstract

Although the literature on social capital has increased dramatically in recent years, concerns have been raised about the expanse of applications of the term, diversity of constructs, definitions and variety of analyses. The purpose of this paper is to clarify the conceptualisation of social capital in entrepreneurship. To achieve this, the paper begins with a review of the extensive literature on social capital. This provides a preliminary theoretical framework about the nature and categories of social capital. Thereafter, an account is provided of an empirical study in which in-depth and extensive data was gathered about the social interactions of entrepreneurs from ten technology firms. Findings demonstrate that social capital is a social relational artefact produced in social interactions. It is not owned but represents a pool of goodwill residing in a social network and it can be envisaged as a revolving mutual fund of traded and un-traded interdependencies.

Introduction

The idea of social capital has found a firm foothold in the social sciences. A keyword search in one of the literature databases produced over a thousand hits, strong evidence of the popularity and possibly the utility, if not facility, of the concept in academe. Delving deeper into this literature it quickly becomes clear that the expanse of the applications of social capital masks the diversity of the constructs, the definitions of social capital and the variety of the units of analysis. Commenting on this proliferation of the social capital literature, Dasgupta, (2002) claims that there is a temptation to use "social capital" as a peg on which to hang all those informal engagements we like, care for and approve of. Quibria (2003) proposes that it is fraught with serious conceptual and empirical problems. Indeed the very designation of the phenomenon as a “capital” is problematic, especially when it is used to describe a wide range of social phenomena. Moreover, as Fukuyama (1999) notes while social capital has been given a number of different definitions, many of them refer to manifestations of social capital rather than to social capital itself.

The purpose of this paper is to try to clarify the conceptualisation of social capital in entrepreneurship. We will argue that attempting to define social capital is problematic because the conceptualisation is fuzzy. Previous attempts to define the concept have led to a confusing assortment of different definitions. This is in part, we believe, explained by the extensiveness and scope of the applications of the phenomena leading to conceptual ambiguity. In Putman’s early definition (1993:167) social capital was identified with those "... features of social organization, such as trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions". Dusgupta (2002:5) finds this characterization beguiling but suffering a weakness in that it encourages us to amalgamate incommensurable objects, namely beliefs, behavioural rules and such forms of capital assets as interpersonal links, without offering a hint as to how they are to be amalgamated.

Cook and Willis (1999) argue that insights into social capital can be generated by examining smaller firms. By concentrating upon the presence and applications of social capital in entrepreneurship we hope to use this lens to narrow our focus. This will allow us to refine the meanings of social capital as applied in entrepreneurship theory and, by examining the social capital practices of new firm formation in high technology, develop a fuller appreciation of the nature and qualities of the phenomenon in its application. There is of course a potential for tautology in this approach. If we redefine and employ social capital in a particular way it is all too likely that this is exactly what we will see in our data. We hope to overcome this circularity by convincing the reader of the value of our theoretical discussion and by demonstrating that social capital is a misused metaphor for a relational artefact. It is not a capital asset in any conventional sense but is best thought of as a condition which adheres to and within social interaction. If we must reify it, it is a quality, of which the currency is what we use to build social relationships. The coin of such social exchange is trust and interdependency which is valued in terms of the prevailing norms and expectations of social interaction. So rather than a metaphoric "capital", social capital is a revolving mutual fund of traded and untraded interdependencies.

The Puzzle of Social Capital

Throughout their lifecourse people are embedded in social situations so that social relations are fundamental to everyone's life (Kim and Aldrich, 2005). It is within this context that social capital is traditionally conceptualised as a set of social resources embedded in relationships and the resources available to people through their social connections (Liao and Welsch, 2003; Baker, 1990; Burt, 1992; Coleman, 1990; Lin, 2001; Kim and Aldrich, 2005). It has been defined as "the sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by individual or social units" (Nahapiet and Ghoshal, 1998: 243); "the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu and Wacquant, 1992: 119). So, seen this way, social capital is the resources which inhere in a network.

In a similar vein, Woolcock (2001) sees social capital as the cumulative capacity of social groups to cooperate and work together for the common good. But Fukuyama (1999:1) views and defines it as an instantiated informal norm that promotes cooperation between two or more individuals. Social capital must be instantiated in an actual human relationship: the norm of reciprocity may exist *in potentia* in dealings with all people but is actualized only in dealings with friends. "By this definition, trust, networks, civil society, and the like which have been associated with social capital are all epiphenomenal, arising as a result of social capital but not constituting social capital itself." So for Fukuyama, social capital is not the resources but the norm which influences social interaction. But for Woolcock, social capital is the capacity.

Coleman (1988) sees social capital as a number of entities and defines social capital by its function. This approach may be a more helpful way of defining the intangible. Dakhli and De Clecq (2004:110) recently proposed that the central proposition in the social capital literature is "that networks of relationships constitute, or lead to, resources that can be used for the good of the individual or the collective." Setting aside the potential problem about "for the good of the individual or collective", since social capital is also recognised to have negative effects (Uzzi 1997; Woolcock, 1998), we can detect two distinctive and very different forms or applications of social capital. Dakhli and De Clercq (2004) described networked social capital as 1) constituted of resources or 2) leading to resources. In this we see a contradiction, albeit a very common one in the social capital literature. How is it possible for social capital to be both the resources and the method of unlocking the resources? Coleman's (1998) account of social capital also recognises social capital as both the cause and consequence of social capital (Portes, 1998). Lin (2001:19) gets round the problem rather neatly by drawing on the premise behind the notion of social capital, "investment in social relations with expected returns in the marketplace". This she describes as a general definition consistent with all scholars who have contributed to the discussion. However, rather than defining its nature this tells us more about its manifestations (Fukuyama, 1999).

A further problem arises when we consider whether social capital is a group or an individual asset? Lin (2002) notes the conceptual confusion caused by the divergence of conceptions. However, she argues this is because social capital may have become divorced from its roots in individual interaction. As an example of the individualistic perspective, Glaeser et al (2002) define social capital as a person's social characteristics. Loury (1977), one of the originators of the term social capital, also sees it in terms of the individual. He argues that one's social location substantially affects access to resources (Loury, 2000). In contrast to this individualistic view, Putnam (2000) sees social capital as the features of social organisation, the networks, norms and social trust that facilitate coordination and cooperation. This aggregated perspective (Quibra, 2003) shows social capital as a group property. Social capital is thus construed as both collective and individual goods (Lin, 2002).

Our final problem is whether social capital is actually a true "capital" or if the metaphor of capital is misplaced. Bourdieu (1986) conceives social capital as one of a group of capitals which intervene to shape or amplify the effects of class origins. However, Bourdieu has been criticised for not developing the idea much further and for concentrating on the parallel concept of "cultural capital" (Barbieri, 2002). Narayan and Pritchett (1999) argue that social capital is a robust metaphor. The metaphor captures the idea of something which augments a stock of incomes without being consumed directly in the process of use (Anderson and Jack, 2002). Ostrom (2000) favours the concept as a "natural" complement to natural, physical and human capital but identifies key differences; it does not wear out with use and it is difficult to see and measure. Lin (2002) argues that a capital is an investment of resources with expected returns in the market place. However, this account does not really tell us much about the nature of our investment, nor provide much explanation for our returns. Physical capital is conventionally seen as a stock, an accumulation of assets, which we then invest. But social capital stocks are difficult to envisage, other than as a pool of goodwill residing in a social network. We can own or borrow physical capital but again it is difficult to imagine how this might work with social capital. Indeed, Bowles and Gintis (2002) feel we should replace the term with community because it better captures what people do, rather than what they own. Anderson and Jack (2002) suggest that it should be termed "networking capital" since this captures the essence of a relational phenomenon. Kim and Aldrich (2005) make the point that social capital refers to the social connections people use to obtain resources they would otherwise acquire through expending their human or financial capital. Solow (2000) sees it as a bad analogy and Arrow (2000) even calls for the abandonment of the term.

So what then is this thing we call social capital? Our review has shown that there remain a number of quite fundamental questions about the nature of the phenomena. These are, is social capital-

- The resources embedded in a network?
- The means of accessing these same resources?
- The norms that shape or influence social interaction?
- The cumulative capacity of groups or individuals to work together?
- What is the habitus of social capital, the individual or the network?
- Is the metaphor "social capital" a helpful one in describing this phenomenon?

Trying to synthesise these different issues into a form which may be answerable, the overriding question appears to be what is the meaning of social capital? It is apparent that there are different categories of questions: 1) about the nature and qualities of social capital; 2) where does social capital reside and 3) how do we name the phenomenon.

Social capital is obviously a social thing. Descriptions of the content and associations invariably talk of trust, relationships, associability, interdependencies and networks. Barbieri (2003) concludes that all of the many meanings proposed consider social capital to be connected with the system of relations and social belongings in which individuals are embedded. It is not based on market transactions, though it may support such transactions and is often described as a means of reducing the cost and moral hazard of interaction. Anderson and Jack (2002) employed a structured observation of social interaction process. They argued that the developing social connections, "the manifestations of connecting" (2002:205), could only be explained as the formation of social capital. So, social capital exists in a social domain and manifests in social interaction. This may be helpful because it delineates that social capital is relational. Since social capital must belong within an interaction, and hence is a social production, we want to argue that it is necessarily a group or network phenomenon. Individuals may have a high or low propensity to use or develop social capital but social capital resides in the nexus of connections.

Is it then simply a group resource? At one level it is a resource. The evidence in the literature is strong that the presence of social capital can ease, enhance and solidify social interactions. Except it is not a resource like any other commodity. As an enabler of something else, it is perhaps misleading to consider it as a simple resource like information or cash. Its primary function is to facilitate the interaction. Thus we would argue that it is best understood as a quality of the interaction. That is to say, a quality which creates a condition where interactions are better because of the presence of social capital. Therefore, networks of connected individuals can employ the social capital present in the network to unlock or gain access to other resources. Seen this way social capital is more akin to a key, rather than the resource itself.

Many authors have argued that social capital is the expression of particular social norms or values, but we would argue that these cultural norms are merely an element of social capital. Norms are only a part of social capital's characteristics and probably best understood in terms of their cultural relationship to the social capital process. Returning to our analogy of social capital as a mechanism to unlock resources, the commensurability of shared values enhances this relationship. We can conceive of shared norms as having different roles in the process. First, shared cultural values provides the introductory threshold to interaction, they are an appropriate milieu to provide the mutual language for the interaction; shared values equip each actor with expectations about the other's attitudes and likely behaviour. Secondly, values may act like a grammar to shape the rules of exchange and interaction, so that the mutuality of norms becomes a governance mechanism. Consequently, norms are not social capital but are a characteristic of social capital.

To summarise our discussion, we have argued that social capital is a social relational artefact, produced in interactions but that it resides within a network. Individuals may have a high or low propensity to develop social capital, but they can only do so within social interaction. Whilst it is generally a useful thing, in the sense that it may create a richly interactive environment, it is not a resource as such. The presence of social capital enables interactions which in turn may tap into resources. Norms and values do not constitute social capital, but are characteristics of the mechanisms of the processes of social capital. Cultural values provide an introductory platform and a guide to the expectations of behaviour within social capital. It seems then that the metaphor of "social capital" is inappropriate. Social capital may be an asset but it cannot be owned or borrowed. It can only be produced and shared within the conjunction of social interactions. Hence it is probably more useful to consider it as a "social condition".

Social Capital and Entrepreneurship

No matter how broadly conceptualised, for entrepreneurship social capital has a particular salience, especially if entrepreneurship is conceived as a socio-economic process (Granovetter, 1985). Anderson and Miller (2002) argue that entrepreneurship draws upon the social in two distinct ways. First, because entrepreneurs are a product of their social environment they will be conditioned by that environment and may even perceive opportunities in a manner that is influenced by their social background. Second, each business forms part of a social web of interaction within which the economic elements are conducted. They conclude that the presence or absence of social capital is likely to influence the nature of the business. Young (1998) makes a similar argument to show how economic actions are conditioned by social relations. Aldrich and Zimmer (1986) make the same point and show how entrepreneurship is channelled and facilitated or constrained by the entrepreneur's position in a social network. As Nahapiet and Ghoshal (1998) put it, the central proposition of social capital theory is that networks of relationships constitute a valuable resource for the conduct of affairs.

Although the entrepreneurial benefits of social capital are becoming well established (see Kim and Aldrich, 2005), our understanding of the specific social processes that may enhance the ability of the entrepreneur to recognise or exploit opportunities is fairly limited (Davidsson and Honig, 2003). Liao and Welsch (2003) argue that in entrepreneurship research there is a general consensus that a high level of social capital often assists entrepreneurs to gain access to venture capitalists, key competitive information and potential customers. From an entrepreneurship process perspective, Aldrich and Martinez (2001) suggest that the resources required for creating a successful new firm consist of human capital, financial capital and social capital; social capital allows them access to other inputs that they do not possess. Davidsson and Honig (2003) remark that social capital may also assist by providing and diffusing critical information and essential resources. In their quantitative study of 380 new companies they found that belonging to a business network had a positive link to advancing the start-up process and that the value of social capital to nascent entrepreneurs was strongly evident, helping the nascent process, the probability of sales and indeed profitability.

The high-tech venture is in many respects an ideal place to study the nature and importance of social capital. New high-tech ventures are rarely started by individuals acting in isolation. They generally involve teams of highly skilled individuals with a complementary mix of technical and commercial management skills that have to be effectively combined (Aldrich; 1999, Granstrand; 2003, Oakey; 2003). Thus, the embryonic high-tech firm provides a reaction crucible in which the high-tech firm is created. It is in this crucible that a complex set of individuals and resources both synthesise and transform opportunity into innovation and ultimately on to business success (Alvarez and Busenitz, 2001). Within this crucible we have an ideal opportunity to study the unique combinations that are the genesis of the high-tech firm and allow us to understand the nature of networking capital in the reaction pathway.

The young high-tech firm has become the focus of recent studies to define the nature of social capital and in particular how it differs in high-tech ventures from non-technology based sectors (Liao and Welsch, 2003). Liao and Welsch (2003) suggest that the nascent technology entrepreneur is more focussed in the forms of information and the mechanisms of information they exchange when compared to non-technology entrepreneurs. Technology based entrepreneurs benefit more from relational embededdness because of a need for freer and greater exchange of non-redundant information. However, non-technology entrepreneurs engage in a less focussed but more expansive social network. Fukuyama (1994) notes that a number of empirical studies of high-tech firms have shown that information exchange does not always occur by formal means and has highlighted the importance of informal information exchanges in high-tech ventures.

The innovation process within a new firm is itself a highly interactive phenomenon. Hayek (1945) observes that the creation of business opportunities relies on the effective combination of dispersed pieces of incomplete and often contradictory knowledge that exists within individuals and institutions. The innovation process thus seen is very interactive, with innovation occurring as a complex interaction between the external environment, the internal environment within the firm and interactive flow of information between the two (Utterback; 1971).

The theme of informal information exchange is also explored by Murray (2004) and Harrison et al (2004) who have both proposed that the social and intellectual capital which technologists have generated in their previous employment is utilised in future entrepreneurial ventures. Here the technologist's former career path plays a role in establishing social networks both locally and in the broader scientific community. The individual's network can be directly translated into network relationships that benefit the firm (Murray; 2004). The individual's social capital has a significant impact on the degree to which the firm is embedded in the wider community. This is because it becomes yet another asset of the firm that helps link it to, and embeds it in, external networks. Harrison et al (2004) demonstrated that a technical entrepreneurs' previous career plays a critical role in developing the knowledge, experience and network connections for future ventures. Johannisson (1988) demonstrated an even stronger link to previous employers in a Swedish study that showed that over half the surveyed firms in a population of recently founded ventures were serving their former employers or their former employer's customers.

Individuals often play a pivotal role in the information transfer exchange by facilitating communication within or between firms (Tushman and Katz, 1980; Tushman and Scanlan, 1981). Such individuals develop the specialist social and translation skills necessary to communicate with external organisations, decoding internal technical and organisational jargon into language that can be understood by the outside world and vice versa (Tushman, 1977; Boland and Tenkasi, 1995; Blackler et al, 2000). Boland et al (1995) describes how these individuals have the ability to make strong perspectives within a community as well, as being able to take the perspective of others (e.g. outsiders) into account. This suggests they are not only adept communicators but also have highly developed social skills. Tushman and Katz (1980) propose that such individuals take an active training, development and socialisation role within their organisation. Understanding the nature of these social interactions would begin to help develop a clearer understanding of what networking capital these individuals develop and employ as they work across organisations. Networking capital may have many manifestations and its actual form may differ depending on the type of organisational environment in which it is created. In high-tech firms, one manifestation or quality of such networking capital may be "technical competence". Tushman and Scanlan (1981) suggest that successful boundary spanning individuals are often regarded as technically competent. Tie technical competence is achieved by their superior ability to seek out and utilise external information. Once endowed with this technical competence label, other individuals are more likely to seek them out for use as internal consultants. This can result in access to new ideas, information, evolving knowledge and an accompanying increase in their technical competency status. Organisational core competencies are often seen as key components of successful innovation strategy (Prahalad and Hamel, 1990). So, it is reasonable to suggest that individuals highly skilled in such competencies can achieve a higher social status within the organisation.

Effective knowledge exchange has also been identified as a key component in the development of successful economic clusters. The proposition that a certain critical mass is required to make a region self sustaining has its origins in the Marshallian concept of industrial districts (Marshall 1947). Marshall proposed that learning between firms is enhanced when similar firms exist in close proximity as knowledge can easily be exchanged between firms. However, the type of knowledge has an impact on its ability to be transferred (Polyani 1966).

i) Explicit or codified knowledge involves theories, procedures or processes that is easily transmittable and does not require direct experience. Explicit or codified knowledge refers to knowledge that is transmittable in formal, systematic language. Accordingly this form can be easily communicated.

ii) Tacit knowledge is personal and context specific. Its acquisition is highly personalised, because it originates in an individual's ability to recreate and organise their own experiences. It is also correspondingly difficult to formalise and communicate.

The transfer of tacit knowledge is facilitated by close proximity because tacit knowledge often has to be exchanged in a face-to-face manner (Lawson and Lorenz, 1999; Malmberg and Maskell, 2002). Thus, being in close proximity benefits firms engaged in new activities which rely on recent knowledge shared through face to face interaction (Nelson and Winter, 1982; Garnsey, 1998). This is particularly relevant in rapidly evolving technology fields. Much of this knowledge has not yet reached the public domain, or is so tacit in nature that it is not yet possible to codify (Howells 2002). Moreover, it is also difficult to articulate and transfer, unless those who possess it can and are willing to demonstrate it to others (Nonaka and Takeuchi 1995). Individuals within organisations often act as stores of tacit knowledge and their departure can mean knowledge is lost but gained elsewhere (Nelson and Winter, 1982).

Although the early literature suggested simple economies of scale, efficiencies of input-output transformations and facilitating the linear input-output model of innovation (Marshall 1947, Porter 1988) as being key to cluster success, the literature is now beginning to emphasis the importance of the less tangible and more social nature of inter-firm knowledge exchange within successful technology clusters (Camagni, 1991; Storper, 1997). The role of learning, innovation and the role of institutions in regional development originally evolved as the GREMI (Group de Recherche Européen sur les Milieux Innovateurs) concept of the "innovative milieu", an innovative regional environment defining regional innovation as a series of territorial relationships (Camagni 1991); "Economic space becomes a relational space, the field of social interactions, interpersonal synergies and social collective actions that determine the innovative capability and innovative success of specific local areas." (Camagni, 1997: 1)

The concept of the innovative milieu as a relational space of social interaction has gained much support (Morgan, 1997; Lawson and Lorenz, 1997; Storper, 1997; Keeble and Wilkinson, 1999; Malmberg and Maskell, 2002). Both innovation theory and economic development are converging on an interactive model of learning and innovation involving multi level social and institutional relationships and the importance of a shared set of local cultures, values and institutions enhancing the transfer knowledge from one organisation or individual to another (Malmberg and Maskell, 2002). It thus seems that the crucible of interactions that we discussed earlier is well founded as an appropriate area to explore the nature of entrepreneurial social capital in action.

Methodology

Context

The specific "milieu" chosen to carry out the research and clarify our conceptualisation of social capital was Aberdeen in the North East UK. Aberdeen has a well developed technology cluster that has formed around the oil sector with many businesses feeding off of this dominant sector. The rationale for choosing this location was:

i) Aberdeen has already been the focus of broad ranging academic research exploring their historical, geographic and economic development of the city and its institutions;
ii) The small geographic size of the city, often referred to as the Aberdeen "village" creates a natural crucible for social interactions inside the firm, between firms and in a broader social context.

Aberdeen is Scotland's third largest city with a 2001 census population of 212,125. Prior to the discovery of oil in the North Sea, Aberdeen was depressed, with low wage levels and substantial outward immigration (Harris et al 1986). Aberdeen is now dominated by the oil industry and is widely known as the "Oil Capital of Europe". The arrival of oil had a dramatic impact on the economy with around 60% of employment in the city now oil-related (Cumbers and Martin, 1997).

The impact of the oil industry continues to have a positive effect on the local economy. The increasing challenge of developing suitable engineering and technical methods to extract oil for the aging North Sea fields has resulted in pioneering solutions developed in the North Sea finding application in wider, non-oil markets. Innovation is continuing with 40% of firms involved in new product development and testing (Cumbers 2000). Evidence suggests that oil related activities are increasing in sophistication and the oil complex displays a healthy rate of firm foundation with over 70% of new firms established being Scottish-based. Many of these are spin-offs from larger companies managed by former managers and employees who have settled in Aberdeen, indicating a considerable incubator effect in the industry. Furthermore, over two-thirds of firms are engaged in export activity with almost half considered as active exporters (Cumbers, 2000). The main change in the last 18 months has been asset transfers and rationalisations as the oil majors gradually withdraw or rationalise operations in the North Sea.

There are also likely to be proximity effects with firms developing strong links with the two local universities. Aberdeen has one of the largest concentrations of life scientists in Europe as a result of the attractant effect of the universities and numerous internationally renowned research institutions, e.g. the Marine Research Institute, the Rowett Research Institute and the Macaulay Land Use Research Institute.

Sample and Research Techniques

Our study explores the role of social interactions in the formation and growth of indigenous, entrepreneurial firms. We collected data by extended interviews with entrepreneurs from ten technology firms. Our sampling method was purposeful whereby respondents were deliberately selected with a specific purpose in mind (Punch, 2005: 187). Our purposeful sample was selected on the basis that we thought that they would be interesting examples and that we could learn about and from their interactions. The sample (see Table 1) was drawn from three industrial sectors: biotechnology (three), software/IT (three), and oil & gas (four). Our sample firms were identified from a number of sources;

i) Biotechnology firms which had spun out from the University of Aberdeen or other public sector organisations in the city, that were still in the process of developing or refining their product portfolio;
ii) Computer software/IT Telecommunications firms identified through the Aberdeen branch of the networking organisation Business Network Scotland;
iii) Oil-related firms were oil sector new-start recipients of SMART technology government grant awards or university spin-outs planning to enter the oil-related industry.

Following Gartner (1985) and Bygrave (1987) our approach was to collect data that allowed us to build a complete picture of the development of the firms. This included the entrepreneur, the organisation, the process of firm creation and his/her interactions with the external environment. As the intent was to try to understand the nature and role of interactions within the process of firm foundation, qualitative techniques were determined to be most appropriate (Curran and Blackburn 2001). Many soft issues impinge upon the complex and interactive nature of the development of the firm, and these are not amenable to quantification (Hammersley 1992). Moreover, the objectives of the research were related to understanding process rather than measuring the contribution of key process elements (Oininas, 1999). This approach allowed the researchers to focus on the key areas of investigation: the nature and categories of social capital but also to build a picture of the ties and networks of the entrepreneur and the use and outcomes of these for entrepreneurship. Analysing the data involved examining, exploring and looking for detail relating to these themes in the responses of the entrepreneurs using the constant comparative method (Alvesson and Sköldberg, 2000; Silverman, 2000) and analytic induction (Glaser and Strauss, 1967). Each “case” was, therefore, analysed and compared to determine categories and general patterns of activities. To achieve data analysis themes were identified from the literature: ties, networks and connections to others. The constant comparative method was used to analyse the data gathered according to emergent categories and themes. These were inductively developed from out data and identified as connectivity, credibility, market opportunities and contacts. Triangulation of our data, in the form of company press releases, websites and other relevant documentation were used to complement the interview material (Yin 2003). We employed a set of semi-structured interview questions to ensure that the critical research areas were covered, but the interviewers also encouraged respondents to include additional factors or issues that they identified as important to their firms.

Table 1 Respondents

Respondent	Business Type
Alan	Oil and Gas Services
Bob	Oilfield Technology
Conor	Software and Computer Services
David	Chemical Services
Jack	Cleaning Chemical Systems
Janet & Harry	Oil and Gas Services
Mark	IT Installation, Telecommunications and Software
Mary	Redeveloping Contaminated Land
Norris	Environmental Services
Paul	Computing Software & Services

Methodological Issues

Our research ambition was to clarify our conceptualisation of entrepreneurial social capital. Accordingly the first part of our methodology was to review the concept. This formed the earlier part of this paper and provided us with a preliminary theoretical framework about the nature and categories of social capital. In the empirical part of our study we gathered data about what actually takes place in social interaction. However, aware of the risk of circularity in our thinking and presentation, we also looked for any contradictory indicators. Our analysis was similarly “informed” by our theory, so that the emergent themes that we “recognised” were those associated with the qualities of social capital that we had described earlier. Again, we carefully sought out any contradiction or possible alternatives to our, schema, categories and explanatory analyses, but in fact found none. This gives us a fair degree of confidence that what we had examined was social capital and that our accounts of practices reflected a reasonable description of what goes on in the formation of new high tech firms. Of course all such analyses are necessarily subjective interpretations, but that said we hope that our explanatory accounts are convincing.

Findings

This section of the paper presents a discussion of the data and findings from the study. This is organised around the emergent themes identified for analysis. These show the use and creation of social developments and illustrate the mechanisms employed by our respondents. A range of interesting areas were identified in the data which seemed linked to this notion of social capital. These not only helped us to attempt to understand the nature of the phenomena but also to address the issue of clarifying the activities. The key emergent themes were aspects of connectivity, credibility, market opportunities and contacts. Each of these seems to reflect different but related elements of social capital.

Connectivity

A particularly interesting theme within the data was the notion of connectivity. This feature, present and apparent for the majority of respondents, was demonstrated in the manner of the links which seemed to bring people together. We were intrigued to find Intriguing that although mechanisms were reflected in a number of ways, what was clear was that it was not at the level of the firm. Instead it was produced at the individual level within the associations and relationships that individuals had with others. As the following quotes show, connectivity seemed to be developed through building on former dealings with another individual and/or previously working together: "*that was through a friend I knew from previous employment. I basically sent him an email saying hello, how are you doing etc., and by the way do you ever need any production assistance, and he got in touch to say yes, we do, we've got this job here, could you help us out on some of this?"* (Norris); "*I've never been a very good programmer so I phoned up a chap, Ian, from school. Anyway, we built this piece of software."* (Paul); *"I started it with two other scientists who became equity holders, Sam and Kate. Kate's become the absolute hub of the business. She was one of my post docs"* (Alan). So, in some ways connectivity is a condition of social capital, perhaps even a manifestation, which creates new connections and perpetuates old relationships, albeit in new ways. Returning to our discussion of the literature this seems to reflect the views of Lin (2002) and Loury (2000) that social capital is about collective social interaction between individuals. However, it is also about how connectivity and ties to others within the network can actually lead to resources and, perhaps more importantly, the type, significance and appropriateness of resources for the entrepreneurial activity.

In functional terms, the outcomes of connectivity were about the utility of connections. Conor provided a number of examples: "*It just happens. Do you believe in fate? I don't know whether it is fate but take Kim, our first employee, I was giving somebody I used to work with a copy of some software and he had a friend, a web developer, looking for a job. I met her for a coffee and we got chatting……We were subletting an office from Ideas* (Mark's Company). *One of the girls boyfriends had just been made redundant so I told her to get him to give me a call*". Although Conor did not describe his connectivity as such, this connectedness had not only led to him finding employees, it had also led to him appointing a non-executive Director: "*I was involved in a mentoring programme…..he came along and we got on really well together*." This appointee's background was in a very large structured organisation, so he brought with him a different set of experiences and ways of approaching things. But, more importantly, he also brought a different set of contacts. These contacts have also helped Conor to resource his firm.

Alternatively, connectivity was also described in terms of friendships which were transferred from one context to the entrepreneurial one. Conor explained, "*Mark and I have been friends* *since the day we met working at Campbell's….that's how we met Steven, how he met me, how we had ideas together, did different things*." However, what was interesting was the need for Conor to ensure that it was known that he had never been financially involved in his "friends" business. It was as though, if he had been, it would have changed the relationship in some way. This seems to highlight the aspect of untraded dependencies discussed earlier. For Conor, the direct involvement of a "market" element would have redrawn or reshaped the interaction.

In other instances connectivity was already present through family ties. When describing how they found the right partners in the property world Mary commented: "*I'm married to one. That's how it happened. I had been talking for years about science and he wasn't interested as he wasn't a scientist. I thought he wasn't listening but for five years he was subliminally picking up information. His quiet acknowledgement was there but no enthusiasm for what I was talking about….I'd been at a seminar where it had sunk in that something was needed in the property market. It was spooky as he had also been discussing the potential with one of his colleagues. It was just luck that I was married to a property developer, serendipity? It might have been different if I hadn't been married and we might have had the academic arrogance to think we could do it on our own. But we did need them, they gave us introductions into the property world, particularly with the preferred providers, hosted seminars for us all over the place. They paid for marketing, brochures, etc.….A powerful combination of expertise*." What seems relevant here is that the existing connection was used in a very different context. However, Mary's comments also illustrate how connectivity is related to identifying and employing a common link, i.e. commonality. For instance, Mark and Conor had both worked for the same Company prior to starting up their individual businesses and had identified the commonality which brought them together "*I had become involved in the development of this database working with Mark and Alistair, we all worked together previously….we get on really well together,"* (Conor). Clearly, when a need was recognised the link could be reactivated from some time back.

So, thus far it would seem that the notion of connectivity, with links and associations to others was a significant element of the interactions which formed an important element of the entrepreneurial process. What is particularly interesting is that even in instances where there had been no contact for periods of time - in some cases years - individuals were able to reactivate these links because the commonality and association were still present and could be made manifest when and where necessary.

Credibility

Thus far it is evident that connections to others were important for our respondents. However, to try and generate a deeper understanding of why this was the case and how this relates to social capital, we sought to identify what respondents actually did and how they related these connections in their own terms. Here there seemed to be several informative aspects. These themes and patterns seemed to represent credibility and the production of market opportunities.

The idea of credibility was a particularly intriguing feature of interactions. It seemed to us that the respondents both endeavoured to build up their own credibility and also sought out credibility in others. Credibility appeared to be a symbolic token of the right to social capital. The respondents' comments were peppered with statements about earning, building, generating and recognising credibility. In some cases the entrepreneurs seemed to work hard at finding or identifying a mechanism which could allow them to achieve this credibility: "*Build credibility…that's what we're doing just now by getting Victor in, again it's a credibility type thing*" (Conor); "*Interaction with the University, who owns a percentage of the Company was good for us as it helped establish technical credibility with clients*" (Mary). Others did not appear to purposefully seek out this mechanism for credibility. In some instances it just seemed to happen and they only realised afterwards how beneficial it had been: "*I started going to meetings with this guy. Suddenly I had a commercial person sitting next to me. He was the safe pair of hands, the business head, he had the pedigree in business and had found this mad academic with a good idea he was going to commercialise and develop. Once I got him on board he knew people so I got more people on board and ended up with a really good business team"* (Alan). Again this seemed to be apparent across the three different industries. For instance, in terms of finding employees Mark commented: "*We were at the stage that made it slightly easier because people had heard about us so we started to get approached or people working for us maybe knew somebody else and so on"*. However, Mark doesn't feel that for his business this recognition and credibility has been gained informally. Instead, he feels that they have worked professionally and more formally at helping raise the profile. So, for Mark it has really been a two-sided process – informally extending reputations and formally increasing recognition and awareness. The following helps to explain this: "*People like to tell other people, you know if you find a good plumber, you say "you should use this guy. He's really good"…….We've spent a lot of money on PR. We will spend £1000 a month. We've been doing that for two years. Now it's paying back* (Mark)".

What was also interesting was that this idea of credibility could work against you. For example, Conor provided an alternative perspective. When it came to employees he felt it was important to find some mechanism of "trying" people out before actually employing them. His approach seems to have arisen from his own experience "*…this techy guy was a real nerd, technically brilliant but commercially inept……I was starting to get a bit of a bad reputation from a couple of customers for not delivering, because he wasn't backing me up."* (Conor). But, in Conor's case he was able to identify through his contacts that this was happening. So, in his own terms, Conor seemed to have earned enough of a "stock" of credibility for people to realise and recognise that it was not actually him that was at fault, i.e knowledge of the other led to understanding and reputation.

Market Opportunities

In some instances, market opportunities could be identified as an outcome of interaction. Remarkably, we noted how interaction as a condition of social capital, actually created the opportunity. Without the presence of social capital the opportunity would not have existed, in other cases it was also clear that market opportunities were recognised through contacts the individuals had. The creation of market opportunity happened in various ways. For instance, Norris commented: "*through a contact I realised there was an opportunity to make an insulation material…...he said you want to talk to another contact in Aberdeen? Turned out it was the MD of a pipeline consultancy Company"*. So, Norris' contact was sufficiently secure and comfortable enough in his relationship with Norris to incorporate him into his network. Thus we can see how this opportunity could not have existed for Norris without the original link.

David described how important contacts were for spotting opportunities: "*Most of it is through contacts – all of it is through contacts*." While Conor believed it was because of his networking that they were able to get business: "*I am very active network-wise, we have no issue getting business in, no problem at all*." Paul, on the other hand, illustrated how it was a chance conversation with someone who was virtually a stranger that gave him the initial idea to go into business: "*I got chatting to him…..he said "I've got an opportunity for you. It's with an oil company, give me a call about it*"." A key point here seems to be the informal nature of how these market opportunities were identified. This informal aspect is also evident in the following: "*….consultants who advise you on how to run your business. I went through it. There was a list of 23-24 consultants and I knew three of them and the three that I knew had been involved in businesses themselves and had gone bankrupt. One had gone bankrupt three times. It fascinated me and I started checking up on it and I got people who knew maybe* *nine of them and in every case it was the old story – if you can't succeed in business, be a teacher!*" (David); "*We did this on an informal basis. We already knew people in the property business and just chatted to them. At the same time it was clear that they were interested in more effective ways to value contaminated land*" (Mary).

What was particularly interesting from the data of those companies involved in the oil industry was that respondents kept referring to "politics". It seemed that unless you were party to these "politics" you had less chance of being successful within this industry. The following quotes help to demonstrate this: "*It's more a political game than a technical one*." (Bob); "*We started approaching the market with this one product and it was the market itself the service companies and the operators who said if you could use if for this application could you use it for another application? And this is how we found out how the industry works, what the opportunities were…..As it turns out it is not just a matter of market need and product performing, there is a lot more politics at play. If we are negotiating a supply agreement with a particular company and a particular individual within that company whether they are based in Aberdeen or Houston puts the brick wall up then we have to find a way round that brick wall to get that product into the marketplace……Politics!*" (Jack). Being aware of how the politics operated and being party to these politics meant finding some way of breaking into the network. It seems that becoming part of the network was what really enabled respondents to get into the industry. But, to break in to this network individuals had to "informally" build credibility through this network. Doing so, involved having contacts who themselves were linked to players in the industry.

Network Links and Contacts

The data resonates with comments about the critical role of contacts for enabling entrepreneurship. Significant features of the roles these contacts had, what they actually provided and the characteristics which gave the respondents "faith" to use these contacts for entrepreneurship were also evident. Respondents commented on how having their contacts allowed them to avoid isolation. Isolation was seen as part of being an entrepreneur but that through social contact they could draw on others, as the following illustrate: "*I don't know if I have ever been in a situation where I really felt I didn't know what to do because I've always already sought that information ahead of time. Because I know these networks I know if I need business advice there are about 3-4 people I trust. I'm constantly listening out for opportunities. Either we've got our ear to the ground or we've got good friends or business friends who are doing that for us….It's knowing where to find the information.*" (Paul); "*I talked to a lot of people prior to start-up, you do get to meet a lot of people who've been there and done it before. It's only through networking that we discovered the potential applications we could have had. I guess a lot of it is contacts – finding the right people who will make a difference to the business. Part of that was naivety because we just don't know the industry but also the fact that we didn't see through the politics that were at play within these industries*" (Jack). In terms of the very practical support needed to operate, respondents relied on others to provide information, for business advice and to inform them or what was happening within the business environment. This is evident in a comment from Mary: "*Although we had a very good skills base we did have to go outside. We set up an academic network with people we knew in the UK. So, if a client wanted to discuss a site in London we had a good mate at Queen's House who could help out as a paid consultant. This academic network gave us on site skills when required. We also set up an office in Manchester which helped establish a market down south where a lot of the brown field land was situated…..a local presence suggests you can appear in 2-3 hours which you can anyway with modern air travel. Again it overcomes client prejudice. We also have a virtual University network of 150 people in various universities, £2million of grant funded R&D resources. Which means we can tackle pretty much any problem we are presented with!*" So, in many ways these contacts were used to resource the business.

For our respondents, the reliance on contacts and the ability to "talk" certainly, in their minds, has played a crucial role in helping them establish and develop their venture. In terms of building the "team": "*I knew how to talk. Ian knew the programming then we found Geoff* (who was on Paul's University course) *was able to handle the design better. We've relied on family networks, friends of friends, these kind of things to find people who I can get into the company."* (Paul). However, for others it was also about being recognised within his/her particular industry and being able to "talk the talk": *"having worked in the industry for fifteen/twenty years individuals have an opportunity to build up those networks to start their own business. If you start your own business in those circumstances you can start it running on the ground rather than from scratch like we did. It is very difficult to start from scratch in an industry which relies on those networks as much as the oil and gas industry does. It is very incestuous as you know and if you are not part of that family already getting into it from a young age with a new technology and new products is very hard. If you know the people already then I am sure it is an awful lot easier to set up your business that is producing results in a quick fashion. That has been very difficult for us, yes*." (Jack); "*Having left….I was approached by two or three other people to do their IT as well on the side. This is the most competitive place in Scotland for IT….purely it's been luck and word of mouth that has led us to grow a lot quicker than we would have normally done….a referral from one person to the next person.*" (Mark). Although similar themes were clearly evident with Alan, he also provided an alternative perspective when he discussed someone that had purposefully brought into the network: "*He brought contacts….deals were done….he knew all the guys in the business, a lot of senior people. He was pulling through his network and these guys were coming on board*." Through this network Alan ended up with his accountant, who he described as "*a safe pair of hands*". If this individual had not been involved Alan is certain he would have "*gone bust because we'd have been going too fast……We got the contract because another company couldn't do it and they said to talk to us. Getting referrals*" (Alan). The data here again supports the view that contacts were important and that they were used to draw and pull resources into the business. This enabled respondents to deal with the industry which they were trying to break into, so in effect allowed them to break down the barriers. Conor illustrated how although inter-connectedness can be an asset, it could also work against you: "*two of the clients came from that first client. They all work together anyway….but the converse if you cock-up as well everybody knows it*." Bob provided a different view: "*I don't actively network to promote the business.*" Yet, Bob was aware of the politics at play within his industry and the need to break through these to survive!

Respondents also referred to trust as being an important feature. It seems that in trusting the individual, the information and knowledge provided could also in effect be trusted. This feature is well illustrated by Paul's comments: "*all sorts of other unscrupulous things that we were hearing about the chap so we said no. Were not prepared to do this, we want to work with the original agreement…..he phoned Ian and said "look I'll give you half the money if you cut Paul out of the deal and just finish the programming". And Ian said "No". So, I'd found a person I could trust."* David talks about the trust and expectations implicit in previous interactions "*contacts made over the years have a habit of calling back*".

Interpretation and Analysis

In our review of the literature we noted the relevance of social interaction to be an important aspect of social capital. For instance, Fukuyama (1999) talks of informal co-operation and reciprocity between individuals. Shared face-to-face interaction was also noted as being an important aspect for firms engaged in new activities (Nelson and Winter, 1992; Garnsey, 1998). We identified four themes in what our respondents told us about their interactions. We see these as different elements of social capital and categorise them as characteristics, process elements, outcomes and the operating medium. Interestingly, connectivity appears to be a fundamental characteristic of the nature of social capital. It describes the individual's disposition and actions but also refers to a quality present in the interactions, thus representing a condition of the interactive group. When respondents talked about their actions, they described a sort of openness, an awareness of others and a disposition to engage with others. To us this seemed to be akin to an “attractive” force, working in the way that a magnet is both attracted to, and by, metal. Moreover, staying with this magnetic analogy, a magnet can be strongly attracted to another magnet, thus explaining how high individual dispositions of social capital are attracted to similar high dispositions. Seen this way, we can begin to understand how the pooling of social capital within a network, presents an agglomeration of attractive power; much greater and more powerful than individual magnetism, but nonetheless composed of individual contributions. Connectivity is a sticky quality and so describes the sticky condition prevailing within a network.

Our data suggests that credibility is a process element of social capital. It has two facets, first, as a symbolic entrance requirement for entry to the pool. Secondly, it operates as a mechanism for maintaining goodwill within the pool. Our respondents told us about how they sought out credibility for themselves and how they used their credibility as a way of establishing the right to connect with others. In the oil industry the highly technical language of the interviewees directly illustrated the need to demonstrate credibility, as does the use of external academic networks for additional technical credibility in the academic spin outs. Respondents also commented on how they gauged the credibility of others before embarking on a relationship. Tushman and Katz’s (1980) notion of technical credibility as a critical component of an individual’s ability to engage in knowledge exchange seems to hold true. This entry credentialism seemed to be about their worthiness to be members of the pool. It took different forms, some spoke of technical competencies, others simply described their existing connections and reputation. One respondent described his investment in PR as a way of building credibility. Despite the variety of forms, it seemed to us that credibility was seen as a prerequisite joining credential.

But if credibility was a necessary entry credential it was not, in itself, sufficient to maintain the goodwill that characterised the network. The maintenance of credibility was operated by the demonstration of a willingness to oblige and the capacity to do so usefully. We noted earlier the scenario of Conor’s “techy chap”, where this employee failed to meet customers’ requirements. In this case, the credibility in peril was Conors, but that his establishment in the pool provided the signalling mechanism which allowed him to note and correct the situation. Other respondents described the to and fro of giving and receiving from the network pool. There was an expectation of “obliging”, but not a formal obligation. Thus, credibility became a medium of network value delivery. Failure to oblige, albeit in a long term time frame, represented a failure of credibility. Similarly, taking unwarranted advantage of network connections appeared to be a breach of trust. On the other hand willingness to volunteer contributions, without any obvious or immediate reciprocosity, appeared to demonstrate high levels of maintenance credibility. Malmberg and Maskell (2002) describe how a shared set of local cultures, values and institutions can enhance knowledge transfer and this is evident in firms operating in the oil sector. Such firms all mention a common language but define it as “politics” that you need to understand to operate in this business sector. Credibility presented an association of values and behavioural norms; the values required as a signification of worthiness for entry and norms and the governance of behaviours from within. Taken together, we believe that these are process elements which show how social capital works. Interestingly, our review of the literature showed that there was a relationship between social capital and trust (Putnam, 1993; 2000; Fukuyama, 1999). The process elements identified from discussions with our respondents also explain why trust and interdependency, the coins of social exchange, are so important for building, generating and developing social capital.

Market opportunities were discussed by all our respondents and the data seems to explain ‘opportunity’ as social enactment. Both Hayek (1945) and Utterback (1971) observe that problem solving and business creation require connecting knowledge that was dispersed among institutions and individuals. Davidsson and Honig (2003) had, for example, found that bridging social capital and linking to weak ties for specific knowledge was more important than bonding social capital and operating with a close network of strong ties. However our data demonstrates a much richer version of this bridging. It reveals many examples of actual opportunities emerging from the network connections respondents had developed. Indeed, several of these individuals clearly function as organisational gatekeepers and have developed the necessary social capital for others to trust them sufficiently to pass business opportunities on to them, even within their interacts to actually create the opportunity. We thus saw two similar formations of this theme of opportunity production by social capital. The first and the strongest version, demonstrated that the opportunity was actually created by and in the interaction and that it would not have existed without social capital . The second, weaker in the sense that the opportunity was recognised because of social capital, also represents an outcome of social interaction. Nonetheless both formations emphasise opportunity as an outcome of social interaction. Thus, the pool of social capital reflects the resources which are contained within the pool. These may be latent and only become real when activated.

Network links and contacts are also enacting mechanisms, but represent the nodes that link into the pool. Taken together they represent the network, but become the entity that we think of as the network. Similarly social capital, in this sense, is contained and contextualised by the network. These different nodes of social capital do represent resources, again activated by the application or employment of social capital. But the "resources" can be either tangible, information, advice, often about what to do, or intangible emotional support or introduction to the brokers or gatekeepers of other organisations. Nonetheless, it does not appear to be helpful to think of the network as resources, but it is useful to consider it as an operating medium through which resources are articulated, obtained and exchanged.

Conclusions

Our research ambition was to clarify our conceptualisation of entrepreneurial social capital. To achieve this we began with a review of the literature. This highlighted the difficulties and complexities associated with the term "social capital" but it also provided us with details about the features and aspects of the nature and categories of social capital. Our empirical study looked at what actually takes place in social interactions. Our findings show that social capital is represented by an investment of social resources with expected returns, directly or indirectly anticipated, now or at some possible future time. As a social relational artefact it is produced in social interactions but resides within the network. Individuals can only draw on the social capital which resides within a particular network by being part of that network, either directly or indirectly. After all, people are embedded in social situations and consequently can take advantage of the wider social relations in which their ties are embedded (Kim and Aldrich, 2005).

Unlike a normal "stock" social capital is not owned but merely represents a pool of goodwill residing in a social network. Clearly social capital is a social thing and it operates through norms which appear to be articulated as values and as worthiness. In agreement with previous studies our findings show that it relies on trust, social interaction, associability, sociability, interdependency between individuals and the utility of social networks. The network facilitates the interaction. Thus, networks of connected individuals can apply the social capital present in the network to unlock or gain access to other resources. Seen this way social capital is more akin to a key, rather than the resource itself. Consequently social capital is a network phenomenon. Furthermore, it resides in the network as connections and interactions which take place between individuals. Indeed, this would seem to fit with some aspects of the traditional conceptualisation of social capital as a set of social resources embedded in relationships (Liaou and Welsch, 2003; Baker, 1990; Burt, 1992; Coleman, 1990). The coin of such social exchange is trust and interdependency which is valued in terms of the prevailing norms and expectations of social interaction. Accordingly, we want to argue that social capital can be envisaged as a revolving mutual fund of traded and untraded interdependencies.

Dasgupta (2002) claimed that it is tempting to refer to just about any informal engagement as "social capital". Our findings and analysis illustrate that social capital is indeed a misused metaphor for a relational artefact. Furthermore, social capital can only be developed through social interaction. Examining the social capital practices of new firm formation in high technology industries has allowed us to identify the nature of social capital. We have shown that it is not a capital asset in any conventional sense but instead should be thought of as a condition that adheres to and within social interaction. Social capital is difficult to see and measure. Only through qualitative techniques can we really attempt to appreciate its nature and effects on entrepreneurship. Our study also illustrates that it is difficult, if not impossible, to study social capital without looking at social networks. The two are so entwined, could or would one survive without the other.

So, to conclude, if we perceive entrepreneurship as a socio-economic process (Granovetter, 1985) then the notion and influence of aspects of the social context are particularly important. Davidsson and Honig (2003) found that actively maintaining, pursuing and developing social relations was important for both nascent and actual entrepreneurs. Indeed, it could even be argued that it is through social relations, social interaction and social networks that entrepreneurship is actually carried out. We realise that our findings may be indicative of the types of industries we have looked at. It would, therefore, be interesting if the patterns we have identified were looked at in other industries.

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Maskell and Malberg Delete this reference it is actually Malmberg and Maskell see above
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