The Role of Networking Groups in the Creation of New High Technology Ventures

The case of the Cambridge high tech cluster

An MBA Dissertation

Iain Edmondson

Judge Institute of Management Studies
University of Cambridge

September 2000

Acknowledgements

I would like to thank the people that have contributed to this work, either directly or indirectly. Firstly, Pilgrim Beart, Tony Hooley and Stephen Bartlett from activeRF Ltd, 1… Ltd and Fontal Ltd respectively for allowing me the time to search into their pasts - I wish them continued success in their ventures. Also, all the administrators and members of the networking groups who provided information and opinions.

Thanks also go to my fellow MBA students at the Judge Institute, past and present, for their technical and moral support.

Finally, I would like to express thanks to my supervisor, Dr Tim Minshall, for his support, patience, enthusiasm and timely 'polite encouragements' during my time completing this dissertation. I wouldn't have done it without you, Tim!

The role of networking groups in the creation of new high technology ventures

The case of the Cambridge high tech cluster

Table of Contents

Table of Exhibits

1. Introduction & Background

1.1. Introduction to this research

Establishing personal relationships is a feature of all business, whether to establish reliable suppliers, gain new customers or recruit skilled labour. Large organisations have the benefit of using vast resources to attract these relationships however potential entrepreneurs may have nothing but their own guile and existing personal relationships. Many successful entrepreneurs take full advantage of their experience and existing contacts in order to mobilise the necessary resources to create a business, but very few start with sufficient experience to immediately make a new venture a reality. How do entrepreneurs fill this gap and what support can be provided for them from the environment of 'entrepreneurial clusters'?

Relationships are also important in providing other functions for the 'lonely' profession of the entrepreneur. Managers within large organisations have support staff and a hierarchy of senior management to turn to in need. Where do entrepreneurs turn for guidance, advice, inspiration, empathetic consolation or just to let off steam? Is there a role for networks outside personal and family circles to provide such support?

Existing research has focused on entrepreneurs' individual networks, rather than specifically the groups that exist to facilitate the growth of these individual networks. However, how does membership of groups that provide face to face networking opportunities support entrepreneurs in the creation of their new ventures and enhance their business networks? How does entrepreneurs' use of such networking groups vary at different stages of growth? Therefore this work focuses on the primary question;

What specific roles do networking groups play in the creation of new high tech ventures?

1.2. Summary of chapters

In completing the work for this dissertation I have undertaken the following stages;

Explain importance of this research (Chapter 1)

The resurgence of entrepreneurship as a focus of teaching and research, and the rise in government support for the 'enterprise economy' provide the background to this research. As does the recognition of the importance of high technology ventures and knowledge based industries in providing national competitive advantage.

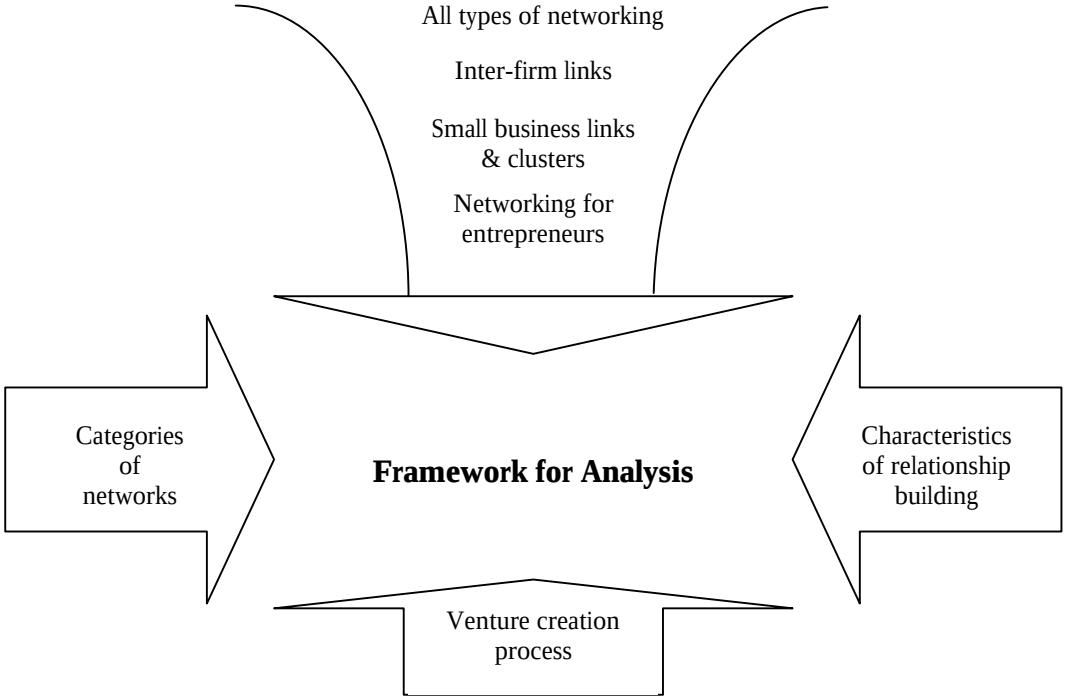
Chapter 1 introduces the research subject of how networking groups support the venture creation process for new high tech ventures and provides some evidence of recent trends in the phenomenon of 'networking'.

Review existing research (Chapter 2)

I have reviewed existing research into aspects of networking, clustering of high technology firms and the creation of new ventures in order to establish the progress of research into these areas and establish a relevant framework that can be applied to this research.

Chapter 2 explains the general areas of existing research into networks and before reviewing more specific research into small business networking and phenomenon of clustering. It also reviews relationship building through face to face contact and the critical aspects necessary for developing such relationships. It then reviews how researchers have categorised networks used by businessmen and entrepreneurs, and finally the process of creating new businesses that entrepreneurs go through. These elements of existing research can then be applied to this research as explained in the following chapter, as indicated in the figure below.

Exhibit 1.1: **Developing a framework for analysis**



Define scope of this research (Chapter 3)

Having reviewed the existing research, I then discuss the relevance of the research to this work and draw out how the existing research is used to shape the research for this dissertation.

Therefore chapter 3 begins by reviewing how existing research has categorised types of network in order to construct a definition of 'networking groups' for the purposes of this research. It then summarises the roles that networking groups can fulfil to entrepreneurs and their members in general and identifies the venture creation process through which entrepreneurs go in the creation of their new businesses. Finally the chapter summarises some characteristics of relationship building that will be used to discuss the relative effectiveness of the networking groups covered in this research.

Create framework for analysis (Chapter 4)

Having clearly identified aspects relevant to this research, I have then articulated the question that this research aims to answer, a framework within which the research will be analysed and the methodology for gathering data to populate the framework.

Select the research population (Chapter 5)

I have provided background details of the Cambridge high tech cluster, with specific reference to the clustering characteristics identified by previous research, in order to demonstrate the relevance of Cambridge as an appropriate population for the research. I have then reviewed the networks that exist within Cambridge and specifically the sub set of networking groups that aim to provide support to new high tech ventures.

Populate the framework (Chapter 6)

Having selected the Cambridge high tech cluster as the focus for the research, I have then chosen to use the experiences of three recent high tech ventures to provide rich contextual evidence to populate the framework.

Chapter 6 therefore contains case studies of the three chosen high tech ventures, activeRF Ltd, 1… Ltd and Fontal Ltd. These cases chronologically explain the background to the entrepreneurs and the growth of the companies through the venture creation phases of conceptualisation, start-up and growth, identifying strategies for growth and the key milestones over these periods.

Present key findings and discussions resulting from the research (Chapter 7)

Having identified the main benefits that networks, and therefore networking groups, can provide entrepreneurs and gained primary research evidence of the use of these networks, I have then summarised the key findings and highlighted discussion areas for further research.

The discussions in chapter 7 have been generated by reviewing the findings across the two dimensions of the venture creation process and the role of networking groups. I have then discussed the relative strengths and weaknesses of particular groups by drawing on the existing research into the characteristics of relationship building to establish any causal effect.

Analyse results and draw conclusions (Chapter 8)

Having populated the framework and drawn discussions from the research I have concluded the research by suggesting the relationship between the roles of networking group and the venture creation process. In doing so I have reviewed other potential factors influencing an entrepreneur's likelihood of using networking groups, such as external or member driven group administration and the background of entrepreneur

The final chapter summarises key lessons for networking groups that have been drawn from this research, as well as lessons for individual entrepreneurs. I have also highlighted areas for further research beyond the scope of this research.

1.3. Background - Recent trends in networking for entrepreneurs

Networking has become big business

The term 'networking' in today's enterprise economy has become synonymous with gatherings of entrepreneurs and venture capitalists. *First Tuesday* started as an informal meeting in a small London pub at the beginning of 1999. With the boom in new Internet ventures, over the following 18 months it became one of the most well known forums for potential entrepreneurs in the world. By mid 2000, *First Tuesday* meetings were being held in more than 80 cities across five continents, bringing together entrepreneurs, venture capitalists and service providers. Besides generating revenue through sponsorship and additional services such as conferences and seminars, *First Tuesday* has leveraged its matchmaking reputation by charging financiers 2% of the capital for any company that gets funding through its meetings. As a result, the founders have recently sold the company for $50million.

Venture capital networking has become more sophisticated

Venture capitalists and angel funders have long since recognised the importance of networking to find suitable potential investments, and venture forums are nothing new. With the rapid improvements in information and communication technology, however, organisations are becoming more sophisticated in casting their nets as far as possible.

One example is the creation of the National Association of Venture Forums in the US at the end of 1999. Through a combination of Internet and video technology, the association allows entrepreneur presentations made at local venture forums to be spread across all of the other member organisations.

Entrepreneur communities are being created

With the increased focus on entrepreneurial activity brought about by the boom in Internet ventures, communities of entrepreneurs are being created 'on line' as well as in person.

Web sites, such as www.startups.co.uk and www.garage.com, offer support and advice to potential entrepreneurs as well as giving them an opportunity to share their experiences 'on line'. Other organisations, such as London based *The Glasshouse*, combine the creation of an 'on line' resource for entrepreneurs with regular speaker forums. Such networking focuses on peer group networking rather than the high intensity matchmaking events offered by the venture forums.

Business schools have developed new methods of networking

Business schools in the US and UK have become more of a focus for entrepreneurial activity over recent years. MBA courses provide an opportunity for potential entrepreneurs to meet prospective partners or advisers. Also, in addition to offering courses in entrepreneurship many, such as the Kellogg School of Management in the US and London Business School in the UK, have launched business incubators to encourage students to take their ideas further with the assistance of established business contacts.

Sponsored business plan competitions are also a means of bringing together potential entrepreneurs within the student community with potentially interested parties. The MIT $50k Entrepreneurship Competition has, since 1990, encouraged students from different schools within the university to develop their ideas, therefore allowing inter-discipline networking within the university as well as networking with potential funders and service providers from outside the university.

The importance of 'networking skills' is being recognised

With the gathering of potential investors and entrepreneurs becoming more commonplace, the skill of being able to articulate the business opportunity in a short space of time has become essential in a competitive market place. Many potential investors expect entrepreneurs to be able to deliver their 'elevator pitches' in a suitably brief and focused fashion, irrespective of the setting.

Therefore some institutions, such as the MIT Entrepreneurship Centre, have begun teaching 'networking skills'. These skills extend beyond delivering the 'elevator pitch' to business etiquette and non-verbal communication skills.

Networking is a recognised method of job hunting

In addition to matching potential investors with entrepreneurs, networking has become a recognised means of job hunting. University careers advisories advise students on how to make the most of formal and informal introductions in order to find appropriate job opportunities and to get past initial filtering stages.

Finding appropriate labour for a growing start-up is essential therefore the recommendations from trusting relationships can be a less risky means of establishing a potential recruitment pool.

'Virtual' networking

In addition to the on-line communities being developed in association with entrepreneurial networks such as *The Glasshouse*, the Internet is having its own effect on the phenomenon of networking.

Email has increased opportunities for people to refer and recommend contacts that increase individuals' networks. However, the ability to have 'live' discussions on-line are perhaps more of a threat to face to face networking. By having common interest areas, people are able to pass on technical information and leads, and develop relationships, without the time commitment of attending networking events.

2. Review of Existing Research

The following chapter reviews the existing research in the relevant areas for this research. It initially funnels the general research into networks down to the relevant literature on networking for new and small businesses within 'clusters', and how such networks have been categorised. As this research is focused on the growth of new businesses, this chapter also reviews research that has identified stages of venture growth. Finally, it also then reviews research into the dynamics of relationship building with particular reference to the critical issue of trust, including some important factors for building trusting relationships.

2.1. Fields of research into business networks

Literature on business networks falls into two major areas, social networking and its effects on individuals' work performance, and networking between computers, particularly with reference to information and communications technology.

Research into social networking recognises that business activity is embedded in complex networks of social relations which include family, state, educational and professional background, religion, gender and ethnicity (Granovetter 1985). Jones & Beckinsale (1999) go as far as to say that it is impossible to consider decision making without examining networks of personal relationships.

As a result, research includes studies into the effects of social networks on such areas as relationship marketing and intra-firm politics, particularly with the shift away from formal hierarchies to flatter, organic structures (Krackhardt & Hanson 1993). Social capital, the networks of personal relationships individuals accumulate over time, has also been shown to enhance one's job-related perceptions, compensation, mobility in the workplace, promotion speed and individual power (Galunic & Moran 2000).

However a particularly relevant area of existing research to this work is the study of networking in the process of innovation. Literature is increasingly recognising the central role of networks in effective innovation management and many entrepreneurs are also innovators. Research in this area relating to the effects of networks and 'clustering' is particularly prevalent, and I shall review this further in a later section.

Beyond the study of individual network relationships, there is extensive research into the area of inter-firm relationships, either at the large or small firm levels. I shall review this in more detail in the following section.

2.2. Inter-firm links and networks

As Ebers (1997) states, there is a rich literature having developed that examines "when, where, why and how organisations engage in inter-organisational networking". This literature includes such diverse areas as industrial economics, organisational sociology, game theory and resource dependence theory. The Japanese system of inter and intra-corporation co-operation, in the form of *keiretsu*, which has been studied as a factor in the country's economic success, is an often-studied example of inter-firm co-operation.

The following areas are some of the major elements of research into inter-firm networking.

The increase in co-operation

Organisations have increasing become engaged in co-operative strategy in an attempt to realise their objectives through co-operation with other organisations, rather than in competition with them. In this way they can overcome areas where they are lacking in particular competencies or resources and gain easier access to new markets, and opportunities for mutual synergy and learning (Child & Faulkner 1998).

Child & Faulkner also site the globalisation of markets, rapidly changing technology, ever-shortening product life cycles and high uncertainty and turbulence in the economic environment as catalysts for the increase in co-operation.

Diversity of networks

Inter-firm networks have been classified as the loosest form of alliance between companies (Child & Faulkner 1998). In themselves networks vary in their form from communication networks, such as trade associations, to collections of co-operating companies willing to tackle commercial opportunities together without setting up formal links that may compromise the individuality of networking firms.

Snow et al (1992) refer to networks as any relationship, from an executive's 'black book' of useful contacts, to an integrated company organised on internal market lines.

Hard v soft exchanges

In addition to different styles of networks, Sobrero & Schrader (1998) recognised that networks can have different dimensions. They identified two fundamental dimensions characterising inter-firm relations; contractual co-ordination, which refers to the mutual exchange of rights among the parties involved, and procedural co-ordination, which refers to the mutual exchange of information among the parties.

Focus on relationships

As has been mentioned earlier, research recognises the importance of relationships in establishing inter-organisational networks. Such networks existing as exchange relationships that jointly direct otherwise independent resources.

Roles that networks between firms fulfil

Child & Faulkner quote six reasons why networks arise; to reduce uncertainty, to provide flexibility, to provide capacity, to provide speed, to provide access to resources and skills not owned by companies themselves, and to provide information. In the following chapter I shall draw on some of these (and others), which are particularly relevant to new venture creation.

2.3. Small firm networks and 'clusters'

Over recent years, there has been an increase in research into the effect of clustering and networking within regional localities, including research into industrial districts, innovative milieux and nexuses of untraded interdependencies. Michael Porter's 1990

book, *The Competitive Advantage of Nations*, has contributed to this increase, however the first analysis into sets of small and medium-sized firms within defined geographical areas was the Cambridge economist Alfred Marshall (1920). He identified industrial districts as localised communities, characterised by numerous small, technologically advanced firms, involved in specific, but complementary activities. By specialising in distinct activities along the production chain, the firms in the district were able to overcome disadvantage of scale and to challenge larger competitors.

Research has therefore argued that small business service firms are able to compete successfully with large firms through the use of a variety of personal contacts, associates and business contacts, which Bryson et al (1992) term 'networking'.

Italy's industrial districts of small firms are amongst the most studied examples of industrial districts, as is the highly publicised case of Silicon Valley in Northern California, USA. Saxenian (1994) explained that Silicon Valley has a regional network-based industrial system that promotes collective learning amongst specialist producers of different but related technologies. She found that the regions dense social networks and open labour markets encourage experimentation and entrepreneurship.

Characteristics of clusters

In their research Lawson et al (1997) sought evidence of a knowledge-based milieu through questions related to the sources of ideas for innovative activities, the frequency of informal meetings and social contact between professionals and managers, the degree of new local firm corporate spin-offs, and the nature of intra-regional labour mobility.

Gibbons of Stanford University[1] identified the following conditions as being necessary for the success of Silicon Valley start-ups

- Universities with centres of academic excellence
- Entrepreneurs with marketable ideas and products
- Business angels and established seed funds
- Sources of early stage venture capital
- Core of successful large companies

[1] JF Gibbons, Frederick Emmons Terman Professor of Engineering and Dean of the School of Engineering at Stonford University, in a presentation made via video link-up to Cambridge Network members in March 1998,

- Quality management teams and talent
- Supportive infrastructure
- Affordable space for growing businesses
- Access to capital markets
- Attractive living environment and accommodation

Co-operation v competitiveness

Within clusters researchers have found that co-operation between small companies actually encourages overall competitiveness (Saxenian 1994, Casson 1997). Casson concludes that a highly competitive and impersonal culture is not appropriate, because it presumes too much self-interest and breeds distrust in matters that inevitably remain inadequately covered by the law. He states that in the long run the most successful central places are those whose culture engineers high levels of trust amongst entrepreneurs.

The innovativeness of small firms

As stated earlier, the impact on innovation is a major area for research in networking and clusters. Small firms within clusters are regarded as being in a better position to foster economic growth than larger firms constrained by structural inertia (Lipparini & Sobrero 1997).

Researchers are divided over the effectiveness of 'non-firm' institutions or organisations, such as governments, training organisations, development agencies and universities, in shaping regional innovative capacity, however most accept that they are a factor.

Knowledge transfer & Collective learning

One of the major positive effects of networking within clusters that is sited by researchers is the sharing of knowledge and collective learning by local firms (Holmen & Jacobsson 1998, Camagni 1991, Keeble et al 1998). Referring back to the importance of relationships, Keeble et al state that collective learning processes are "based on relationships of trust and reciprocity".

The sharing of knowledge is particularly relevant for technology intensive sectors and researchers have found that geographical proximity is an important factor, despite the

recent developments in new information and communication technologies (Lawson et al 1997). Other research has concluded that, where traditional districts studied by Marshall benefited from traded 'input-output' relations, high technology regions rely more heavily on untraded links and informal interdependencies (Storper 1995)

2.4. Networking and entrepreneurship

Having reviewed key elements of research relating to the dynamics of small firm networking, this does not consider the more specific area of networking and the creation of new ventures. There is little specific research in this area however there are some relevant findings.

Entrepreneurship is embedded in the social context

Having already noted that all business activity is embedded in a complex network of social relations, entrepreneurship in particular is also viewed as embedded in a social context, channelled and facilitated or constrained and inhibited by people's positions in social networks (Aldrich & Zimmer 1986). Also individual entrepreneurs are explicitly integrated within the external business, social and political environments (Johannisson 1991).

The importance of personal networks

Birley et al (1988) focus on the dynamic process of starting and running a firm – the gathering and the managing of the necessary resources. Stating that it is during this process that the entrepreneur's ability to use his social networks becomes prime. The underlying assumption being that, in the absence of a track record for his firm, the entrepreneur must rely on his personal credibility in asking people to take a risk by investing in his business. They also imply that "the nature and richness of the social networks within a local setting becomes a key factor in economic regeneration".

Other researchers have also state the importance of social, rather than commercial, networks during the creation of new ventures (Dubini & Aldrich 1991, Drakopoulou Dodd 1997). However despite this research, there remains little evidence to suggest that the success of a new venture is related to the capacity of the entrepreneur's personal network (Johanisson & Monsted 1997).

Propensity of entrepreneurs to network

Given the apparent importance of networks as described above, it is not surprising that Birley et al found that entrepreneurs in their study showed a high propensity to socialise and to be actively involved in networks of all types. Entrepreneurs also appeared to consider the time spent developing and maintaining contacts to be of importance, particularly in the early days of the firm. However there was very little use of the 'artificial networks' that were available to the entrepreneurs.

Role of networks in the entrepreneurial process

Birley (1985) found that, in his interaction with the networks in his local environment, the entrepreneur is not only seeking resources but also advice, information and reassurance. Birley's study was concerned with the extent to which the entrepreneurs sought and received help from various potential sources.

Building on research by Greico (1980), Birley et al (1988) summarised that social networks provided entrepreneurs with information, sponsorship and support, credibility and control over the local business environment. Social ties also to the entrepreneur's self-confidence and to the legitimacy of the firm on the market according to Johannisson & Monsted (1997).

The venture creation process

In her research Birley et al (1988) use the following stages to identify patterns during the growth of, relatively traditional, new ventures;

- Start-up
- Early stage
- Established
- Growing

Greve (1995) referencing Wilken (1979) referred to three phases of the establishment process,

- Idea development
- Foundation
- Operation

Changes in personal and professional networks during venture growth

Birley et al (1988) attempted to map changes in an entrepreneur's social and professional networks as their venture grows. They assumed that people within the entrepreneur's social network could also have a role in a formal or professional network and that the balance between the entrepreneur's social and professional network changed over time. However the results provided little support for the hypothesis that the pattern of an entrepreneur's personal networks changes significantly as the firm grows.

2.5. Categorising networks

The following researchers have categorised networks into types in an attempt to identify meaningful patterns of use. Although they all relate to small businesses, they do not all relate to new ventures and none specifically to new high tech ventures.

Owner/managers

Curran et al (1993) divided networks and networking into two aspects, compulsory and voluntary networks. They describe networking activities as being on a continuum, at one end being activities essential for the firm's survival such as winning new customers, and activities such as joining the local Chamber of Commerce at the other end.

In their study Curran et al selected four themes as being important to small businesseses and their owners;

- The family and kinship
- Co-directors and partners
- Customers and the market
- Investment and finance

Their study found that the small business owners did not demonstrate high levels of networking, although some did express regret at this fact.

In another paper, Curran & Blackburn (1992) argue that networking amongst small businesses was stronger amongst industry-specific contacts such as trade associations, trade exhibitions and magazines.

Service businesses

Bryson et al (1992) divide networks into three types relevant particularly to small service firms where new business is characterised by word of mouth recommendations. Their research focused on small management consultancy and market research companies. These types are; demand-related networks, associated with maintenance or establishment of contacts with clients; supply-related networks, associated with the co-operative supply of a service or product; and support functions, for example banks, business advisers, family and friends.

New ventures

Birley (1985) divides networks into formal and informal groups. Formal networks including banks, accountants, lawyers, Chambers of Commerce, and informal networks including family, friends, previous colleagues and previous employers. According to Birley membership of informal networks is often an entry point into the formal networks, and the types of network used during the start-up process have an important influence on the subsequent development of the firm.

Birley et al (1988) defined two types of network available to an entrepreneur; the social network and the professional network. The social network includes family, friends and school, sports club and previous employer contacts with whom relationships are primarily social. The professional network includes banks, accountants and lawyers with whom the entrepreneur has relationships primarily concerned with his business.

Birley et al also refer to artificial networks as the agencies and organisations specifically designed to advise and assist the small firm, including enterprise agencies, business incubators and business development centres.

From their study of the wineries of the north western US, Brown and Butler (1995) found four types of network building activities;

- Publicity
- Distribution }
- Suppliers } stakeholder networks
- Competitors

Their research attempted to assess the influence of entrepreneurial networks on the growth and business performance of the wineries. The results showed that profitability did not appear to be related to any of the network building activities by entrepreneurs. However, sales growth was significantly related to time spent and investment in competitor network building. Perhaps unusually, efforts devoted to publicity and promotional activities were strongly associated with lower growth in sales.

2.6. Developing networking relationships

Research into how networking relationships are developed is another relevant aspect to this research because networking groups wish to encourage the development of new relationships, whether formal or informal. Some of the key findings of existing research are review below.

Trust is essential in building effective relationships

Co-operation between individual and firms creates mutual dependence between them and requires trust to succeed (Child & Faulkner 1998). They define trust as "the willingness of one party to relate with another in the belief that the other's actions will be beneficial rather than detrimental to the first party".

Sako (1992) states that trust between individual employees and a firm's customers and suppliers is an essential feature of business relationships and Nadvi (1998) adds that social ties between local agents provide the basis for trust in economic relations.

Larson (1992) found that personal reputations, prior relations, and firm reputations were important preconditions that had to be fulfilled before partners began to contemplate establishing a networking relationship.

Building relationships through social networks

Thus we see the importance of trust and social ties in the creation of business networks. In his paper on entrepreneurial networks Casson (1997) summarises the association by using the definition of a network as "a set of high-trust relationships which either directly or indirectly link together everyone in a social group."

In considering information as the main link between parties in a network, he builds a theoretical stance based on the fact that parties look to reduce false information, which may arise due to incompetence, failure of communication or dishonesty. He hypothesises that in a high-trust network people face emotional incentives not to cheat each other as well as material ones. Emotional incentives such as respect from others and self-respect.

Casson describes how relaxation strengthens network relationships; "by alleviating the pressure of everyday decision-making, it makes it possible for people to obtain rewards from self-respect." He also argues that it is difficult for a person to be dishonest when they are relaxed.

Social events that provide face-to-face contact also make it more difficult for people to be dishonest, and therefore provide a stronger basis for developing trusting relationships. Casson adds that communal relaxation, shared experience and intense experiences all help build loyalty and trust, which explains why the family, school, university, the church and sports teams all play a role in building personal networks.

3. Implications of Existing Research for the Creation of an Analytical Framework

Having reviewed the relevant existing research into areas related to networking groups and the creation of new ventures, this chapter analyses the appropriate areas with a view to their developing a framework on which to base this research. These areas are in the definition of a networking group, the roles of such networking groups, the stages of the venture creation process and the characteristics of relationship building, as shown on Exhibit 1.1.

3.1. Defining a networking group

As I have reviewed in the previous chapter, researchers have categorised networks in different ways. Some researchers have chosen to separate networks along functional lines. Bryson et al (1992) describes demand-related and supply-related networks, and Brown and Butler (1995) also separate competitor networks from stakeholder networks in a similar way. Brown and Butler also categorise publicity activities which would fall into Bryson's definition of a demand-related network. In addition, Bryson recognises support functions as network contacts that support the entrepreneur without leading to a formal business relationship, including business advisers, family and friends.

Other researchers have categorised networks by the primary function of the relationship, such as social and professional (Birley et al 1988). Birley et al also recognise what they call 'artificial networks' that have been formed with a primary function of providing support to entrepreneurs and small businesses, even though an entrepreneur may go elsewhere within his social or professional networks for this support.

Considering all types of network – irrespective of function

In order to assess how entrepreneurs use any particular type of network to support the creation of their high tech businesses, one must initially consider all potential sources of support. As researchers have found (Birley et al 1988, Keeble et al 1998), an entrepreneur may gain benefit from a group or an individual without that group or individual having the benefit as a stated aim or primary function. A group or organisation may also serve to provide an entrepreneur with different types of benefit, such as establishing a contact for a future financial relationship as well as providing the entrepreneur with support, inspiration and confidence for his idea.

Also, an entrepreneur's network includes individuals and organisations established from all his activities, social or professional, formal or informal, irrespective of whether or not the entrepreneur maintains any other ongoing link to these activities. I shall therefore consider all possible networks and attempt to establish the source of an entrepreneur's individual network contacts, whether it be membership of a business-related group or a friendship built up in a social context.

I shall, however, particularly draw out the role of what Birley et al's described as 'artificial networks', whose primary function of providing support to entrepreneurs and small businesses, as by definition these groups should be identified by entrepreneurs as being useful. By considering other networks that entrepreneurs found beneficial, this research may discover lessons that 'artificial' networking groups can learn from these other less formal groups.

Focus on organised groups

Birley (1985) separated networks from organisations and individuals with a formally stated role, including banks, accountants and Chambers of Commerce, and informal contacts, such as family, friends and previous employers. Curran et al (1993) appeared to expand on the formal networks by distinguishing between compulsory networks essential for business survival, such as investor forums, and more voluntary networks, such as Chambers of Commerce.

As argued in the previous section, it would be inappropriate to prejudge the benefits gained by entrepreneurs from different types of networks based on their stated aims. Therefore I shall not separate networks using Curran et al's categorisation of compulsory and voluntary networks. However, as this research is focused on networking groups then it is important to distinguish networks along lines of structure and organisation.

Birley's distinction between formal and informal networks is perhaps closer to being appropriate for use in this research, however it focuses on networks of individuals and organisations, rather than specifically collections of individuals within groups. Also, an entrepreneur may gain benefits, such as reassurance and support, from being a member

of an organised group in a social context, that Birley would categorise as an informal network.

Definition of networking groups

As I have shown, existing research has focus on entrepreneurs' individual networks, rather than specifically the groups that exist to facilitate the growth of these individual networks.

For the purposes of this research I shall therefore define a 'networking group' as any organised gathering where there is an opportunity to build relationships through face to face contact, irrespective of the primary function of the group.

It is then possible to sub-divide these groups into categories based on who provides the organisation and administration;

Exhibit 3.1. **Categories of networking groups**

Administered by external organisations	**Administered by members**
Commercial Investor groups Professional services events Business incubators	*Industry based* Small business owners' associations Trade associations
Academic Open lectures Alumni gatherings Business competitions	*Community based* Chambers of Commerce Parents/school groups Neighbourhood Watch schemes Charity groups (Round Table/Lions)
Government supported Small firm advisories Training enterprise councils (TECs) Regional development associations	*Special interest* Environmental Political groups
	Social Sports clubs Working men's clubs

Identifying the parties responsible for organisation and administration of the groups may help in identifying patterns in the actual type of benefits gained by entrepreneurs, and therefore the actual roles of these groups in the venture creation process.

Other networks that exist that do not fall into my definition of a 'networking group' are those not related to organised groups, including;

- Previous employers
- University/college/school
- Church
- Family
- Friends
- Recommendation/contact from a friend or colleague

3.2. Roles of networking groups

As this research is considering benefits that entrepreneurs may receive from all types of networks, I have aggregated what existing research has identified as being the role of networks to entrepreneurs. It has shown that networking can provide entrepreneurs with the following;

Leads to formal business relationships

Many researchers into inter-firm links and networks have focused solely on formal relationships which have developed purely to serve a business function. When building new businesses it is essential for entrepreneurs to establish these relationships, such as;

- Customers
- Investors
- Partners
- Suppliers
- Employees

Technical and market knowledge/information

Research into knowledge-based milieux in particular has emphasised the benefits of information sharing between individuals and firms within a cluster. Timing the introduction of a new product is critical, therefore entrepreneurs need a good understanding of the market environment within which they operate.

Professional credibility

Membership of some formal networks, particularly trade associations, can give individuals and firms credibility within a market place or local environment. In an absence of a 'track record' this can be an important issue for entrepreneurs.

Advice and problem solving

Individuals, whether entrepreneurs or employees in established organisations, use a variety of personal and organisational networks to help find solutions to professional problems. The credibility and trustworthiness of the information provider are particular issues in influencing who individuals turn to in times of need.

Confidence and reassurance

Different individuals require different levels of confidence and reassurance and, as with advice and problem solving, the choice of who they turn to can be a very personal decision and a very private issue. Self-confidence is a particularly relevant issue for entrepreneurs in order to overcome inevitable problems that occur in establishing new businesses.

Motivation/inspiration

As a very intangible benefit, there can be many different sources of inspiration to individuals however, as many entrepreneurs are by nature innovators, it is an important issue for the creation of new businesses. Talks and presentations by successful entrepreneurs are often described as 'inspirational' and as such can be a source of motivation.

Relaxation

This is not an area which futures regularly in existing research however it remains important in increasingly pressurised work lives. The ability to recharge during busy working minds is particularly important in knowledge-based industries that thrive on innovative thinking.

3.3. The venture creation process

In his research into the use of networks in the establishment process for new ventures, Greve (1995) references Wilken's three phases of idea development, company foundation and company operation. This process is useful in identifying the period of idea gestation within the entrepreneurs mind prior to the foundation of the new venture, as there may be networks and networking groups that were particularly influential in this period.

Birley (1988) used four stages of venture growth to model changes in social and professional networks, though her research did not support the theory of changes in the networks through these stages. These stages were start-up, early stage, established and growing, demonstrating a focus on ventures that have established a position in their market place, rather than simply the creation of operating ventures from 'scratch'.

Given the increasing trend of high tech start-ups in Cambridge (see chapter 5), the focus of this research is companies in early stages of growth. Cambridge has a strong tradition of research and innovation, therefore the focus of this research is the creation of the new ventures from initial ideas and research, rather than the development of these ventures in the commercial market place.

Therefore the Wilken model is more appropriate for this research, the stages of which I shall term the conceptualisation stage, the start-up stage and the growth stage. The latter recognising the fact that the ventures may go through different stages of growth from additional funding to growing their positions within an established market place. A brief description of how I have applied these stages follows;

Conceptualisation stage

It is difficult to strictly define the period over which an entrepreneur develops an idea, given that the idea may have changed over time or that much of the thinking may have been done during previous employment. However this stage basically refers to the formulation of the idea and business model that is then taken forward and started as the initial business. During this period there may be particularly influential parties that

become involved in the initial business start-up as partners, or key customers or suppliers.

Start-up stage

This stage refers to the actions necessary to begin operating as a business, including seed funding, equipment purchase and creation of initial operations. Given that this research is focusing on high tech ventures, this stage does not necessarily include the establishment of all operations necessary to begin trading and making a profit. It does, however, refer to the establishment of a competitive position from which the business can begin bringing a basic product to market. This may be the establishment of key patents, initial prototypes or a core development team which, for high tech start-ups, may take a considerable length of time.

Growth stage

At this stage the business grows from an established base rather than simply an idea and business model. With the establishment of a base, this stage can include key milestones such as further rounds of fund raising to support further development, more aggressive recruitment or the establishment of initial customers. At further stages of growth, this stage may also include the establishment of a market position, the achievement of profitability or even transfer of ownership.

3.4. Characteristics of relationship building

Research has suggested that the key factor in the development of effective relationships is trust. If networking groups are to be effective in delivering benefits such as support and reassurance to entrepreneurs then they must encourage the development of trusting relationships amongst their members.

In his work on entrepreneurial networks, Casson (1997) highlighted some key aspects for the development of trust, suggesting that trust could be developed in environments where participants have

- Face to face contact,
- Communal relaxation,

- Shared experiences & common interests,
- Intense experiences.

For this reason, Casson describes why relationships and bonds of trust between people are developed particularly within the family, at school, university & church and amongst sports teams.

Given that trusting relationships are built up over time, it is likely that individuals within entrepreneurs' individual networks will have been established via some gathering of common interest or activity. In analysing the role of networking groups in the entrepreneurial process, this research will assess how the groups operate in comparison to the characteristics identified above and whether any lessons can be learnt from less formal groups.

4. Research Methodology & Analytical Framework

The following chapter identifies the specific research question on which this research focuses and identifies the method of analysis, building on the key aspects identified in the previous chapter. It also describes the methodology which was used to create the primary research, on which the discussions and conclusions are based.

4.1. Research Question

Having identified the benefits that networking groups can provide entrepreneurs, and the process through which entrepreneurs create new ventures, this research is focused on the relationship between the two. The research question therefore being,

What specific roles do networking groups play in the creation of new high tech ventures?

Birley (1988) and Greve (1995) have studied the use of networks through the venture creation process but not specifically the use of networking groups. This research focuses on how groups that bring people together for face to face contact can fulfil certain roles, and help build individual entrepreneurs' networks of contacts. Despite the increase in 'virtual' networking, the focus of this research is face to face networking and networking groups as I have defined in chapter 3.

4.2. Analytical framework

In answering the question I shall use the roles of networking groups and the venture creation process as axes on a matrix, and attempt to map where specific networking groups have fulfilled these roles at each stage of the venture creation process.

Exhibit 4.1. **Framework for analysis**

Stages of venture creation

	Conceptualisation	**Start-up**	**Growth**
Leads to customers			
Leads to investors			
Leads to partners			
Leads to suppliers			
Leads to employees			
Technical and market knowledge / information			
Credibility / legitimacy			
Advice and problem solving			
Confidence and reassurance			
Motivation / inspiration			
Relaxation / interest			

'Harder' benefits ↑ ↓ *'Softer' benefits*

In addition to mapping the networking groups onto the matrix, I shall use the summarised characteristics of relationship building to discuss the relative strengths and weaknesses of particular groups, particularly with a view to explaining why certain networking groups have failed to fulfil certain roles.

4.3. Methodology for data gathering

As this research focuses on networking groups that provide face to face contact, I have chosen to concentrate the data gathering in one locality that facilitates relatively easy face to face networking. Cambridge is a relatively mature cluster high technology cluster, whose profile was particularly highlighted following the *Cambridge Phenomenon* report by Segal Quince & Partners in 1985.

In reviewing the Cambridge high tech cluster I have researched the networks, formal and informal, that exist by interviewing entrepreneurs and prominent members of the Cambridge business community and reviewing material in the public domain. Of all the types of networks that exist, I have particularly drawn out details of a sub set of networking groups that are primarily or partly focused on supporting and nurturing the creation and growth of new ventures in the area.

For the main area of primary research I have chosen to undertake a qualitative approach and discuss the development of a theory to suggest the roles that networking groups can fulfil, rather than performing a detailed quantitative analysis in order to test a theory.

The qualitative approach used is to gather rich contextual evidence from individual case studies of high tech companies that have gone through the early stages of the venture creation process as identified in chapter 3. I have chosen three such companies whose entrepreneurs have differing backgrounds in order to gain a degree of diversity and draw appropriate conclusions through a process of triangulation.

Material for the case studies was gained firstly through secondary research into existing reports and research into the companies, including official company publicity in the public domain, and secondly from one to one interviews with the founding entrepreneurs. Having established the background to the company technologies and key milestones, the interviews explored the use of networking groups throughout the growth entrepreneurs' experiences developing the companies. Time spend developing a relationship with the entrepreneurs was important in establishing open and candid dialogue in order to provide detailed evidence for the research.

In addition to gaining contextual evidence from entrepreneurs, I also used further interviews with administrators of the relevant networking groups and other group members in order to gain further perceptions of the groups' style, culture and effectiveness.

5. The Cambridge High Tech Cluster & its Networks

The following chapter provides the background to the cases to be used for research. It describes the high technology industry in the Cambridge area, the activities that characterise it as a cluster and, more specifically, the networks that exist, which are such important aspects of the clustering activity.

5.1. The Cambridge high tech industry

Companies

Since the 1970s there has been a dramatic growth in small and medium sized technology based firms, to over 1,200 (*Electron*[2]).

Exhibit 5.1. **Growth of high tech companies in Cambridge**

Year	No. of high tech companies
1980	30
1985	360
1995	1,000
1999	1,200

By 1996, 28,000 of the 227,000 active population of the Greater Cambridge area were employed in the high tech industry (*Cambridge 2020*[3]) and, with consistent growth in the sector, estimates now exceed 30,000.

Within the industry of 'high technology' there is a diversity of sectors, rather than any specialisation on one particular sector, including IT, telecoms and biotechnology. Computer software and services being the largest sector in 1996, accounting for 29% of all firms (*Cambridgeshire County Council*). Some of the most successful companies to emerge from Cambridge over recent years are ARM Holdings and Autonomy in the IT sector and Peptide Therapeutics, Celsis and Celltech/Chiroscience in the biotechnology sector.

[2] '*ELECTRON, European Label of Excellence for the Cambridge area to enable the Region to Operate in a thematic Network'*, Report by THW Minshall 1999

[3] '*Cambridge 2020: Meeting the Challenge of Growth*', Report by Susan Ablett, Sir Alec Broers, Dr David Cleevely, Sam Cover, Professor Marcial Echenique, Dr Hermann Hauser, Dr Peter Radley 1998

University

Cambridge is characterised by its major university with a global reputation for research and scientific activity, yet it also has two other universities with facilities in the region, Anglia Polytechnic University and the Open University.

Cambridge University has a generally liberal and positive academic attitude towards research collaboration, where intellectual property rights are available to individuals. The sharing and development of new knowledge has appears to have spilled over, and helped shape, the wider culture of the local research based business community via university spin-offs, researcher recruitment and direct research collaboration (Keeble et al 1998).

In 1999 the Cambridge Entrepreneurship Centre was established with the award of £3million government investment. Also in 1999 the government announced a $125million investment to establish a Cambridge/MIT Institute, as a recognition of Cambridge as the UK's primary location for technology research and enterprise.

Support

With the growth in the number of new companies in Cambridge a number of science parks have developed, including the Cambridge Science Park (founded by Trinity College in 1970), the Granta Park, the Melbourn Science Park and the Peterhouse Business Park. Business incubators have also developed, including the St. John's Innovation Centre, founded in 1987, and the Babraham Bioincubator for life science based companies, based at Babraham Institute (*Electron*).

The sources of finance that exist within Cambridge range from angel investment from members of the Great Eastern Investment Forum to seed funding from Cambridge Research and Innovation Ltd (CRIL) and larger investment funds managed by NW Brown Corporate Finance Ltd, Prelude Technology Investments Ltd, Amadeus Capital Partners and 3i, the international venture capital firm who has long had an office in Cambridge.

A number of professional services companies have also established themselves within Cambridge, including technology specialising legal firm, Taylor Vintners and Arthur Andersen and all the other of the 'big 5' accounting firms.

5.2. Cambridge clustering activities

As referred to in chapter 2, Lawson et al (1997) looked for evidence of clustering activity in four areas, ideas, spin-offs, labour mobility and informal networking. I shall address each of these areas with reference to Cambridge.

Ideas

The Eastern Region spends the largest proportion of its GDP, 3.8%, on research and development compared to elsewhere in the UK, with an average of less than 2%. Also, in 1996, research and development accounted for 25% of all high technology employment (*Cambridgeshire County Council*). Many national and international companies have R&D facilities located in the area, such as AT&T, Glaxo Wellcome and Microsoft. A small group of large R&D consultancies, Cambridge Consultants, PA Technology, Scientific Generics and The Technology Partnership, also account for a significant proportion of the R&D employment.

Research from the universities is also a source of ideas. Cambridge University produces 1500 graduates a year in computer science, electrical and information sciences and engineering (inc. manufacturing and electrical engineering) and more than 450 PhDs in the same disciplines (*Cambridge 2020*).

Spin-offs

The Cambridge Phenomenon, written in 1985 by Segal Quince & Partners, suggested that a high proportion of the Cambridge high tech firms owed their existence to Cambridge University, either directly or indirectly by spin-off from firms themselves originally spinning-off from the University. The large R&D consultancies (Cambridge Consultants, PA Technology, Scientific Generics and The Technology Partnership) have played a very significant role in generating and fostering local research-intensive spin-offs, and the establishment of Cambridge Consultants out of Cambridge University in 1960 was a key factor in this.

Companies that have 'spun-out' of the large R&D consultancies include Domino Printing Sciences plc, which led a change in printing industry, and Cambridge Silicon

Radio. Companies that have emerged more directly from Cambridge University include Cantab Pharmaceuticals plc and Zeus Technologies Ltd.

Labour mobility

Labour mobility in Cambridge is relatively free, particularly due to the presence of the four large R&D consultancies with their enterprising cultures. The majority of founders of new high tech companies come from previous employment in local companies or local universities (Keeble et al 1998). Perhaps unsurprisingly, with the bias towards R&D employment in the area, the majority of such founders also have a research background.

Informal networking

Informal links between firms in Cambridge include the sharing of technological and customer information, the sharing of equipment, joint problem solving and inter-firm collaborative development of new technologies and products (Keeble et al 1998). There are also high levels of international networking both formal and informal, including exporting and research partnerships.

Due to the dominance of Cambridge University in the town, there is a mixture of facilities available for networking. The college facilities are often popular but only as formal venues for networking. As a popular tourist location, however, there are many pubs and cafés that can, and are, used as meeting venues. Despite the growth of business and science parks there are relatively few specifically designed focal points at these locations, such as restaurants and meeting rooms, that allow for informal networking.

5.3. Cambridge networks

Of the categories listed in chapter 3, the following are examples of networking opportunities, whether formal or informal, that exist within Cambridge. I have provided further details on the organisations that fall into my definition of 'networking groups' and that specifically state that their role includes supporting the creation and growth of new businesses within the area.

Groups administered by external organisations

Commercial

Perhaps the most well known formal network within Cambridge is the **Cambridge Network**. Since its foundation by some of the major influencing business people within the area in early 1998 Cambridge Network has become a focus for the high tech business community. With regular news, events and job vacancy updates, and over 1,200 companies and 800 individuals registered listed, its web site now achieves 6,000 hits per day. Further information is provided below.

The professional services community regularly holds events and seminars for the business community, such as the **Deloitte and Touche Fast 50 event** held at Hinxton Hall south of Cambridge to launch its analysis of the 50 fastest growing companies in the region.

The business incubators, such as **St. John's Innovation Centre**, and science parks already listed above act as networking opportunities although many lack a focal point for meeting. Efforts to rectify this are being made at the Cambridge Science Park where **Qton** is building purpose built conference, restaurant and support facilities for local companies.

Finally, as part of the venture capital community the **Great Eastern Investment Forum** existing to provide early stage ventures with, usually pre-venture capital, investment.

Exhibit 5.2. **Cambridge Network** (www.cambridgenetwork.co.uk)

Background	Founded in March 1998 by 3i, Amadeus, Analysys Ltd, Arthur Andersen, NW Brown & Co. and the University of Cambridge. Chaired by Sir Alec Broers, Vice Chancellor of the University of Cambridge.
Purpose	To create and support a community of like-minded people from business and academia in the Cambridge region, and link this community to the global high tech network. To promote the region, share ideas and resources, present a powerful, collective voice to influence others and bring about change enable 'Silicon Fen' to challenge Silicon Valley.
Format	Regular (monthly or bi-monthly) open meetings attended by over 100 people, discussing major topics for the high tech community. Hosting of visits from external organisations. Open entrepreneurship lectures. Recently launched 'Café Networking' meetings for start-ups, service providers and other interested parties to meet and discuss their ideas, to be held monthly.
Membership	Over 500 members from entrepreneurs, businessmen and women and organisations to academics.
Stated benefits	• Attendance at network meetings • Ability to post details on the web site, including job vacancies, press releases, seminar advertisements and other news • Participation in all Network events • Purchasing discounts
Annual cost	Ranging from £50 for individual membership to £1,000 for companies with over 100 personnel.

Exhibit 5.3. **Great Eastern Investment Forum** (www.geif.co.uk)

Background	Business angel network established in 1995.
Purpose	To link early stage, pre-venture capital, companies and business angels seeking quality investment opportunities.
Format	Presentation days every 3 months for 7 or 8 entrepreneurs to present their business plans, including 'break out sessions' for further discussion. Breakfast meetings, attended by over 100 people, with guest speaker every 6 weeks to keep members in regular contact.
Membership	260 business angels and corporate investors.
Stated benefits	• Presentation days to encourage investment funding, usually up to £500,000 • Web site posting investment opportunities • Regular newsletter • Business angel expertise
Annual cost	£120 +VAT for individual, £360 + VAT for corporate membership, plus £20/£25 fee for events. Entrepreneurs seeking investment pay £200 + VAT for publication in newsletter, £300 + VAT for bi-monthly publication on the web site and £650 + VAT for presentation at a presentation day.

Academic

Cambridge University actively attempts to encourage entrepreneurship within the university and the community as whole in a number of different ways. In 1999 the **Cambridge Entrepreneurship Centre** was founded to support entrepreneurs by delivering training such as regular lectures held at university departments, providing advice and guidance, and providing access to best practice experience.

Other events held in association with university academics include the **Cambridge Enterprise Conference**, held in 1998 and 2000, and **eJudge** events hosted by MBA students at the Judge Institute of Management Studies to discuss emerging e-commerce opportunities.

The Cambridge Programme for Industry also runs an organisation known as **CULIL** (**Cambridge University Local Industry Links**), where bi-monthly dinner seminars are held and attended by 40 to 100 senior professionals from local companies, academic institutions and public agencies.

Within the university organisations that encourage business networking activity include the **Cambridge University Business Association** and the recently founded **Cambridge University Entrepreneurs** (**CUE**). CUE was founded to run two annual (£1k and £30k) business plan competitions for teams of students.

Government supported

Services of information, advice and other assistance are provided by the regional **Business Link**, as are similar services and access to an owner manager network from the Business Link supported **Cambridge Enterprise Agency**. The **Cambridge Training and Enterprise Council** also plays a role in co-ordinating services and training.

Groups administered by members

Industry based

As Cambridge has matured as an enterprising environment for new start-ups, numerous business interest groups have emerged.

CHASE (**Cambridge Hi-tech Association of Small Enterprises**) and **Enterprise Link** specifically encourage the growth of high tech businesses. The **Cambridge Europe & Technology Club**, which holds informal monthly meetings for businesses looking to grow into Europe and take advantage of latest technology, and the **Eastern Region Biotechnology Initiative** also focus on the technological strengths of the region. There is also a monthly **Cambridge Web Developers Meeting**, held at the

CB2 café in Cambridge, consisting of presentations and discussions with a strong technical bias.

Other locally member driven business clubs include the **Cambridgeshire Small Business Group**, the **Cambridge Businesswomen's Network** and the **Cambridge Business & Professional Club**.

There are also regional branches of national professional institutions, such as the **Chartered Institute of Marketing**, the **Institute of Management** and the **Institute of Directors**.

Exhibit 5.4. **CHASE** (www.chase.org.uk)

Background	Founded in 1987 by a group of technology enthusiasts.
Purpose	To provide a support structure for the individuals and start-up enterprises that will be the key to the technology that shapes our lives tomorrow. To foster a networking culture that can provide entrepreneurial thinkers with links to those who can provide the technical, financial, marketing or legal backing needed to drive their ideas forward.
Format	Free monthly talks held in the evening at St. John's Innovation Centre on technical topics and areas helpful to entrepreneurs (eg. business plan assessors, fund raisers, etc.), attended by 40 to 50 people. Also informal monthly pub meets held at the Free Press pub in Cambridge, attended by up to 25 people. Meetings sponsored by a local start-up company. Also plan to provide training workshops.
Membership	Over 50 individuals and companies, usually of under 10 employees.
Stated benefits	• Mutually supportive environment • Up-to-date technology information and advice • Environment for generating and developing ideas
Annual cost	£25 for an individual & £50 for a company or group.

Exhibit 5.5. **Enterprise Link** (www.enterprise-link.co.uk)

Background	Founded in 1999 by joint sponsors, St. John's Innovation Centre, Business Link (Central & Southern Cambridgeshire), University of Cambridge Institute for Manufacturing and the University of Cambridge Entrepreneurship Centre.
Purpose	To assist the growth of early stage knowledge-based companies by offering first level advice, sign-posting, information and contacts from specialist business advisers at St. John's Innovation Centre, Business Link and third parties.
Format	Networking events held in the evening every two months including presentations from recently successful early stage companies and local 'experts', attended by up to 100 people. Informal networking lunches held every month at the St. John's Innovation Centre. Free telephone advice available, although not well used.
Membership	170 members from early stage companies, less than 10 employees, and tenants of St. John's Innovation Centre.
Stated benefits	• Access to a team of specialist advisers (including Walter Herriot, well respected amongst the local business and entrepreneur community) • Discounts on selected Business Link programmes • Discounted rates for use of meeting rooms and conference facilities at the St. John's Innovation Centre • Quarterly newsletters
Annual cost	£100 plus VAT, with discounts available to specific groups.

Exhibit 5.6. **Eastern Region Biotechnology Initiative** (www.erbi.co.uk)

Background	Founded in 1997 by individuals from the local biotech community with DTI grant funding, although finance is now raised primarily through private sources.
Purpose	To enhance the growth and development of biotechnology in Cambridge and the East of England through local, national and international networking, supporting successful growth of new and emerging ventures, and ensuring the infrastructure of the region allows for growth of the bioscience community.
Format	Annual conference and more regular local seminars on specific topics. Access to national Biotechnology Industry Association seminars and events.
Membership	Members include local biotech companies, international food and pharmaceutical companies, research institutes, professional service providers. Over 300 local organisations included on its directory.
Stated benefits	• Access to membership database • Advantageous terms to a purchasing scheme • Publications including newsletters, survey reports, sourcebooks and biomaps • Company details on web site • Publicity at international events
Annual cost	Ranging from £50 + VAT for individual or academic membership to £300 + VAT for large company membership (over 50 employees).

Exhibit 5.7. **Cambridgeshire Small Business Group** (http:\\csbg.netcentric-solutions.com)

Background	Founded in 1979 to allow small businesses to mix with like-minded business leaders outside their immediate working environment.
Purpose	To promote growth and development among small and medium sized enterprises by encouraging links between members and facilitating their introduction to new skills.
Format	Lunch meetings, usually held at a Cambridge college, at which prominent people in business, commerce, industry and politics address and debate issues of interest and value to small business owners and managers.
Membership	Over 100 individuals and companies from a wide range of industry sectors.
Stated benefits	• Opportunity to meet 'like-minded' people • Speakers include inspirational leading entrepreneurs • Opportunity to entertain clients at the lunch meetings • Refresh skills through presentations and workshops
Annual cost	£15 for individual membership, £30 for small corporate membership (under 5 employees) & £60 for corporate membership (over 5 employees).

Community based

As with any local community, Cambridge has many organisations focused on developing the local community and environment, such as Neighbourhood Watch schemes, charity fundraisers including the local Lions Club and local branches of the major political parties. Organisations made up specifically of the local business community include the **Cambridge and District Chamber of Commerce and Industry**, which offers services in association with the government led Business Link initiative. These organisation have different focuses but all bring people from the Cambridge community together and therefore potentially offer some benefits to local entrepreneurs.

There are also on-line communities, such as CamNet (www.cam.net.uk) which is establishing itself as focal point for community information.

Exhibit 5.8. **Cambridge Chamber of Commerce** (www.cambridgechamber.co.uk)

Background	Formed in 1917 by local businesses who wanted to present a united voice to local government.
Purpose	To represent the views of the local business community to local, regional and national government, and provide business information, networking opportunities, business skills training and international trade support to members.
Format	Monthly business lunches, held at various venues around Cambridge, and monthly breakfast seminars. Also special events, such as debates.
Membership	1,100 businesses from the Central and Southern Cambridgeshire region.
Stated benefits	• Advice and services for international trade • Access to business information • Networking events • Training courses
Annual cost	Ranging from £110 + VAT standard membership for companies of 1 to 3 employees to £600 + VAT export membership for companies of over 200 employees.

Special Interest

In addition to local organisations focusing on the community and environment, there are many other local groups for particular interest areas, particularly in the charity and voluntary sector.

Sports/Social clubs

The Cambridge areas has a number of sports clubs, including rugby, football, tennis, rowing and cricket. There also exists the sports clubs of ex Cambridge University sportsmen and women, the Hawks' and Osprey's Clubs, which act as networks for past and current university students. An example of the networking effect of non-business related clubs includes the Cambridge Real Tennis Club, which includes a number of prominent individuals from the business and entrepreneurial community.

Non-organised networks

One of the major non-organised types of networks that exists within the Cambridge high tech community is that of past and current employees of the major technical consulting companies, such as Scientific Generics. Other personal networks revolve around prominent local business people, such as ex Acorn founder Hermann Hauser. Such networks can be important for generating interest in particular ventures or finding suitable contacts.

6. The Case of 3 High Tech Entrepreneurial Ventures

The cases of activeRF Ltd, 1… Ltd and Fontal Ltd are presented in the following pages. The cases are presented in the following form for ease of comparison.

- Summary
- Background to entrepreneur
- Conceptualisation stage
- Start-up stage
- Growth stage

In addition to explaining the process that each entrepreneur went through in the creation of their companies, I have provided supporting exhibits to aid the readers understanding of the companies' development and their technologies.

The cases do not exclusively focus on the use of networking groups in the companies' development, rather they focus on the key milestones and events in the companies' history, incorporating the individual entrepreneurs' use of networks.

6.1. activeRF

activeRF, founded in 1998, is developing radio frequency technology to be used in the identification, location tracking and status monitoring of objects or people.

With experience in the high-growth environment of California's Silicon Valley its founder, Pilgrim Beart, was looking to apply the lessons he learnt in the US to his own company in Cambridge's 'Silicon Fen'. After changing the focus from his initial consumer-oriented product strategy, activeRF began building its business as a provider of monitoring devices to businesses wishing to get a better understanding of their own assets and operations.

Exhibit 6.1. **Background to the activeRF technology**

Tracking using Radio Frequency technology

Tiny radio frequency (RF) devices can be manufactured into purpose built tags or embedded into objects to enable them to be independently monitored. These RF tags can either be passive, externally powered through an electromagnetic field, or active, continuously powered by a small battery.

Typically passive tags require the source of the electromagnetic field, such as a powerful coil, to be situated no more than 50centimetres away. They can be found in applications such as 'smartcards' for access to underground transport and in shop products for anti-theft security systems.

In contrast, active tags contain an onboard battery, making them capable of communicating over much larger distances - the battery can last over a year through the use of sophisticated power management systems built into the tag. Active tags can continuously communicate with each other or to compact base stations, therefore allowing them to be constantly tracked and monitored.

Making real-time monitoring an option

Without the need for any structural installation, the use of active tagging devices offers a less disruptive and more flexible solution to asset monitoring.

activeRF has developed the core hardware and software technology for miniature, low-power, low-cost local radio frequency devices. It also provides the network infrastructure and software for managing the location data gained from monitoring these devices.

Background to the entrepreneur

Pilgrim Beart

Born and educated in the UK, Pilgrim Beart gained a degree in Computer Engineering from City University in London.

He has over 12 year's business experience within high-tech companies at various stages of growth in the UK university cities of Oxford and Cambridge and, more recently, in Silicon Valley in California. This experience extends from VLSI design and software engineering to technical leadership and management. In January 1998, Beart's job brought him back to the UK after 6 years working in Silicon Valley.

Exhibit 6.2. **Pilgrim Beart's motivations**

In answer to the question 'why start up on his own?' Beart summarised his motivations as being;

- "for the excitement and challenge;
- to learn from the experience;
- to leverage my knowledge and experience;
- because I enjoy building a team and investing in people;
- to develop a philosophy, and;
- because it is all or nothing!"

Conceptualisation stage

After his return to the UK in January 1998, Beart spent the following months formulating his ideas to set up his own company. In August Beart made the decision to 'go alone' and began undertaking market research for his active radio frequency tagging system.

During these months on his own Beart attended as many courses, events and meetings in Cambridge as possible in order to learn how to develop his ideas and gain a better understanding of the Cambridge business environment. He attended a week's course run by the Cambridge Enterprise Agency, which has subsequently proved to be inappropriate without a focus on high technology ventures. He also found the local Chamber of Commerce of limited value due to its focus primarily being on businesses whose customers were in the local area (such as shopkeepers and local traders), rather than high tech businesses who were serving a potentially global market. Other groups also had limited value because of the make up of their membership, such as the professional focus of the Cambridgeshire Small Business Group.

During this formation period Beart found reassurance from some speakers, such as at the Cambridge Enterprise Conference and the Judge Institute of Management Studies,

because they were successful entrepreneurs reaffirming his own attitudes. Social networks of family and friends were also an important source of support.

Start-up stage

In November 1998 Beart formed the company that was to be named activeRF. In the initial months since the registration of the company Beart spent much of his time continuing to 'bang the drum' about his technology. Even without any developed technology, Beart attended events such as Cambridge Network open meetings and introduced himself to local, well-known entrepreneurs and businesspeople so they were aware of his company for potential business encounters in future. In addition to local networks Beart used trade associations to gain necessary credibility to his company, none of the local networks being able to provide such technical credibility.

Refocusing the business

In the initial months Beart also used the Cambridge Hi-tech Association of Small Enterprise (CHASE) as a source of support. Discussions with fellow entrepreneurs at meetings such as these, without fear of inappropriate disclosure, were particularly useful for creating and developing ideas. CHASE also became a good source of advice and support over the coming year.

As a result, in March 1999 Beart had a major rethink about his strategy for developing the company. Beart had initially planned to develop his technology as a consumer product but came to realise that by doing this he would be heavily reliant on marketing, in which he was less experienced. He therefore concluded that the company should first develop with a wider focus on commercial applications. This area was closer to Beart's personal experience and would provide activeRF with a lower risk strategy in its early years. activeRF would still be able to develop a consumer product in the future, particularly having established its own patents to strengthen its competitive position.

Gaining seed funding

In the early months of activeRF's formation Beart used as many avenues as possible to publicise his new company. He used personal networks of friends and ex-colleagues and continued to develop networks through local business groups including Cambridge

Network, Enterprise Link, CHASE and Cambridgeshire Small Business Group. He also wrote newsletters, generated newspaper articles and created a web site.

In addition to 'getting the word out' Beart prepared for raising finance by arming himself with a full business plan including a strategy for releasing stock, non-disclosure agreements and his personal biography and references. Then, having kept a full list of his new network of contacts, Beart sought finance from a number of different sources; from his own partners, friends and relatives to wealthy business angels, local and national venture capital firms and even his own company service providers.

In May 1999 activeRF succeeded in completing its first round of funding. Having completed the experience Beart learnt that investors bring much more than money, with the two investors joining as directors, and the importance of checking the skills of his direct and indirect team, with the recruitment of his first new employee in June 1999.

With the new investment activeRF then began planning to take advantage of some of its short and medium term opportunities and grow its intellectual property base before its next round of financing. In the months immediately after the investment, about one third of the investment was spent on professional fees, including lawyers for investment and commercial contracts, and patent agents.

Growth stage

With the newly strengthened board, activeRF began to develop through the contacts and networks that the new investors could bring. Beart found that the networks within Cambridge were becoming less relevant and that his attendance at CHASE meetings and other networking events began to decline. Having outgrown CHASE Beart felt that his time was better spent on more focused contacts provided by his growing network of business relationships.

More aggressive growth

From the beginning of 2000, having established its intellectual property base, activeRF started to grow more aggressively. The third full time employee was recruited in January 2000 and, in February, activeRF became the first tenants in a converted barn in the

Downing Park Innovation Centre, in a village outside Cambridge. Over the subsequent six months a further 5 employees were recruited.

As activeRF grew so did its strategy and product offering. activeRF was now being positioned as a provider of solutions to companies wishing to gain a better understanding of their assets and operations. In the late summer of 2000 activeRF was preparing to trial its technology as a shopping trolley anti-theft system in Asda (Walmart)'s largest store in the UK (in Bristol).

In August 2000 activeRF completed its first round of external equity funding, raising £1.5million from two major investment funds, one being Cambridge financiers NW Brown's newly raised Cambridge Gateway Fund. As a result plans were put in place to double activeRF's staff again to 16 by the end of 2000.

Throughout this period of more aggressive growth, Pilgrim Beart regarded the Cambridge Network as the most important of the networking groups within Cambridge. The experience of its members and particularly its web site, which has been activeRF's most common source for external parties to make contact, have meant Cambridge Network has been a consistently useful network.

Future plans to develop networking

Despite having 'outgrown' networking groups such as CHASE, activeRF plans to continue to support networking groups for smaller enterprises by organising and speaking at future events, particularly those developing contacts from within the departments of the University of Cambridge. This will not only act as a means of public relations but also provide activeRF with a means of exploiting the potential of university graduates and their research.

6.2. 1… Ltd

1… Ltd (named after the companies core patented Unary technology) was founded by Dr Tony Hooley in July 1995 to develop the world's first digital loudspeaker.

Over a period of 3 years Dr Hooley learnt some key lessons in raising finance and developing his business whilst operating from a room within his own house. However, with a clear vision of what his technology could achieve, Dr Hooley successfully gained backing from government grants and private individuals.

By the middle of 2000 1… Ltd had been granted UK *Millennium Product* status, grown to 26 employees and was in a position to begin commercialising its product through its strategy of licensing and partnership. Dr Hooley still retained a significant minority of the company's £30million valued shareholding.

Exhibit 6.3. **Background to the 1… Ltd technology**

Bringing speaker technology into the 21st Century

Although there have been some improvements in design practices and materials used, conventional loudspeaker technology is largely unchanged from that used to invent the original moving coil speaker in the 1920s.

Conventional loudspeakers are by far the weakest link in the chain between recording live sound and reproducing it. Modern microphones, digital recording and playback systems (such as DAT and DVD) and latest power amplifier electronics together are capable of producing nearly ideal performance, with virtually no distortion. However, the best conventional loudspeakers operate at ½% distortion levels, about 100 times greater than from the technology used to reproduce the sound.

1… Ltd's breakthrough has been to design the first completely digital loudspeaker, a feat that has eluded other researchers for over 20 years. The core technology at the heart of its digital loudspeaker is the encoding of digital signals in Unary (base 1), rather than Binary (base 2). This technology forms the basis of one of the company's core patents and is the reason for the company name. The digital loudspeaker has an array of unary acoustic transducers, or an array of 1s, which is expressed mathematically as "1…".

The benefits of the digital loudspeaker

1… Ltd has a target of less than 0.1% distortion for its first designs, which will be significantly better quality than can be bought at any price currently. As its loudspeaker is entirely digital, it can be produced without the need for a bulky analogue power amplifier or speaker cables. There is no need for a digital to analogue converter and the transducer array is much flatter than a conventional high power loudspeaker, therefore resulting in it being lighter and more portable. Its efficiency and low input power requirement also make operation from small rechargeable batteries feasible.

Background to the entrepreneur

Dr Tony Hooley

Hooley studied for a PhD at the Cavendish Laboratory, the University of Cambridge's physics department, and later became an IBM Research Fellow at the Institute of Astronomy in Cambridge.

He has over 25 years experience in electronics, digital and software design and has been a technical and managing director of companies in Cambridge and Australia before setting up 1… Ltd to develop technology in an area of his own personal interest.

Conceptualisation stage

Hooley had the first ideas for the technology in 1994 and had to self-fund his initial experiments for nearly a year. Spending approximately £1,200 on a local patent agent Hooley achieved the first patent for the unary encoding technology in March 1995.

In these formative months Hooley looked to develop his technical networks. He attended regional meetings of the Institute of Electrical Engineering in the university's Engineering Department. Although these meetings were interesting there was only a limited opportunity to spend time meeting people. Hooley did find the university itself as a good network for technical knowledge, where academics would refer him to appropriate colleagues in other departments.

Learning an important lesson

In April Hooley made an application for a Department of Trade and Industry (DTI) SMART[4] award. Despite a close personal relationship with his original 'would-be' financial partner, Hooley ran into problems over the terms for the funding. These problems ultimately resulted in a failure to reach agreement and an acrimonious parting, requiring the involvement of lawyers. The problems also jeopardised the SMART award application and created anxious times for Hooley. As a result he learnt the importance of sound legal advice as early as possible.

Start-up stage

In July 1995 1… Ltd was formally founded and in August it was successful in achieving the maximum SMART award value of £45,000, against stiff competition. The award, however, required Hooley to match the funding with private funding and, without his original financial partner, this initially had to come from Hooley's own pocket.

With the financial resources to develop 1… Ltd as a business, Hooley began to extend his networking activities to include seeking business advice. He found that organisations based around an area of interest were more useful to him. The local Chamber of Commerce did not seem to understand the needs of the high-tech entrepreneur aiming at a global market. Although not specifically aimed at local entrepreneurs, Hooley found that the subjects discussed at CULIL (Cambridge University Local Industry Links) meetings were relevant to small businesses and the environment more suited to meeting relevant local business contacts. Cambridge Europe & Technology Club (CETC) meetings were also indirectly useful to Hooley.

Securing equity funding

Having raised funds from the SMART award and his own resources, including cashing in his own pension fund, Hooley sought 1… Ltd's first equity funding in 1996. In May Hooley was successful in raising over £50,000 from a small group of moderately wealthy, local business people, one of which he was introduced to at a CULIL meeting.

After a further year, 1… Ltd sought its next round of funding through the DTI SPUR[5] programme and further private equity. Hooley undertook further networking, including through contacts from existing investors, and presented to the local business angel network, the Great Eastern Investment Forum (GEIF). As a result 1… Ltd generated notable interest but failed to gain any funding. After gaining feedback from the potential investors, Hooley filed for additional patents and re-approached the GEIF a second time. Ironically at his second presentation Hooley generated less interest but was successful in raising investment.

---

[4] SMART is the DTI's package of support to encourage individuals and small and medium-sized businesses to develop innovative technologies

[5] SPUR, Support for Projects Under Research, is the DTI's programme of support for projects that represent a "significant technological advance"

In July 1997 1… Ltd successfully raised approximately £63,000 from the DTI under the SPUR programme and nearly £140,000 in private equity. Having spent significant time attempting to generate interest from over 100 venture capitalists during the funding round, without success, Hooley learnt that venture capital was only appropriate for larger sums of money, such as amounts over £500,000.

Over this period Hooley also attended CHASE meetings on a regular basis. As well as having interesting speakers, Hooley benefited from the regularity of the meetings which allowed members to get to know each other. A couple of 1… Ltd's early investors were CHASE members and Hooley also learnt about the GEIF from CHASE members at a critical time in his fund raising activities. As 1… Ltd developed Hooley found that discussions at CHASE meetings were extremely helpful in helping him realise the areas in which he needed help and providing contacts to provide this help.

Growth stage

Moving towards a commercial reality

By 1998 1… Ltd had completed much of the necessary development work, including applications for more than 15 patents, the work for which Hooley used the services of a fellow CHASE member. The company had also established a network of researchers at the Universities of Cambridge, Birmingham, Manchester and Paris. At this stage 1… Ltd was now ready to move towards the development of a high quality demonstration digital loudspeaker. In July 1998 1… Ltd went to its existing investors for more short term funds, raising over £110,000, in preparation for a major fund raising round.

Between July and September 1… Ltd pushed forward a public relations 'blitz' in the technical press. With sound financial advice from City financiers Flemings, 1… Ltd spent the next 9 months talking to a large number of venture capitalists, as well as local and City business investors.

In December 1998, as part of their preparations for serious fund raising, 1… Ltd finally moved out of Dr Tony Hooley's house, in which it had been situated for 3½ years, into premises within Cambridge's St. John's Innovation Centre. Hooley had been receiving

free advice by the Centre's Director, Walter Herriot, over the early years of 1… Ltd, even though he could not afford premises in the Centre. Herriot had helped with early drafts of business plans and recommended sources of advice for other areas such as marketing.

It was not until March 1999 that 1… Ltd received its first new investment, but this then acted as a trigger for 5 other investment groups to quickly follow suit. Within a short time afterwards 1… Ltd had received over £1million new investment entirely from private sources. All of the venture capitalists were eventually turned away as they each wanted a 'better deal'.

Exhibit 6.4. **1… Ltd achieves recognition**

1… Ltd received a series public relations boosts during 1999. In March, the company was awarded 'Small Business of the Year' at the Cambridge Evening News Business Excellence Awards, the mid-Anglia region's most prestigious business event.

This was followed in April 1999 by the announcement by Stephen Byers, the Secretary of State for Trade and Industry, that it had been granted *Millennium Product* status by the UK Design Council. The *Millennium Product* initiative is Prime Minister Tony Blair's challenge to British industry to show the world its creative power.

Then in June 1999 1… Ltd received the 'Product Innovation', 'Technology and IPR Exploitation' and 'Best Business Start Up' Awards from the Cambridgeshire Small Business Group.

Finally, in September 1999, 1… Ltd received the 'Design Product of the Year' award at the Manufacturing Industry Achievement Awards, a prestigious national competition, where amongst the competition were companies such as Rolls-Royce, Hoover and Jaguar.

Delivering the technology to the market

In August 1999 1... Ltd appointed Alan Wheatley, former head of PriceWaterhouse London and Deputy Chairman of Cable & Wireless, as its Chairman to lead the company through its next stage of growth. Instead of attempting to deliver its innovative technology to the marketplace alone, 1… Ltd recognised the need for licensing and partnership.

With a small nucleus of individuals, 1… Ltd continued to operate through keeping its intellectual property 'in-house' and collaborating with other technology companies, based in Cambridge (UK), Caswell (UK), Frankfurt (Germany) and Maastricht (Netherlands).

At the end of 1999 1… Ltd (numbering 5 employees) and its partners applied for a 2.1million Euro Fifth Framework[6] award, which they subsequently won in April 2000.

By the time the 5th Framework award was granted 1… Ltd had already progressed towards the completion of a major round of fund raising, and in May 2000 it raised £3.9million in equity investment. With the new investment 1… Ltd began to grow rapidly, building its engineering teams for both the digital loudspeaker and the newly developed actuator, for which there was a much larger base of potential applications. By August 2000 1… Ltd had grown to a team of 26 employees.

Changing networking practices

During this period of faster growth Hooley's networking activities changed. CHASE became less relevant to the larger 1… Ltd and, having a larger team, there was an immediate source of support rather than needing to go outside the company. Hooley found that the contacts made at Cambridge Network meetings were still relevant, although many of 1… Ltd's future national and international business relationships were being developed by its new investors and board members.

By the late summer of 2000 1… Ltd was in talks with the major global electronics manufacturers with a view to finalising a licensing deal by the end of the year, ahead of the next round of fund raising in March 2001. Through its early investors, 1… Ltd has built up a network that has enabled it to seriously consider a public flotation as one of its next means of fund raising.

[6] the Fifth Framework Programme is the European Commission funded research and development programme

6.3. Fontal Ltd

Since its foundation, Fontal has taken advantage of the growth of the Internet to grow its business without any need for major fund raising.

In 1994, ex chartered accountant and finance director, Stephen Bartlett built on his experience, knowledge and financial resources to start Fontal Ltd. By satisfying customer's information management and on-line publishing needs, Fontal has developed its own form of competitive advantage. And by gaining repeat contracts Fontal has funded its own growth and built up its in-house technical skills to now consist of a team of 30 employees.

Exhibit 6.5. **Fontal's business model**

Managing information on-line

Fontal's primary business focus is to provide;

- information management consultancy and services, and
- outsourced Internet publishing solutions (including plan-design-build services and ongoing web hosting and maintenance)

Bnet

At the same time as delivering services to revenue-providing customers, Fontal is also developing its own on-line database of business information (www.bnet.co.uk). Bnet is a categorised and searchable knowledge base of;

- business best practice documents,
- management improvement learning materials, and
- other relevant business information (including abstracts from management journals and content from business-oriented events).

Fontal is able to populate Bnet through its ongoing information management services to clients, and simultaneously gain competitive advantage by leveraging Bnet as an integrated component of its information management and Internet publishing services.

Background to the entrepreneur

Stephen Bartlett

A forestry graduate from Aberdeen University, Bartlett qualified as a chartered accountant in 1982. By 1985 he had become the finance director of a publishing company which, on its flotation on the London Stock Exchange in 1987, made him one of the youngest finance directors of a fully listed company. In 1989 the company was

taken over and, having already achieved his ambition of becoming a finance director of a listed company, Bartlett left to become a freelance consultant.

From his base in Cambridge, Bartlett spent the 5 years consulting for new media companies until the end of the recession gave him the opportunity to put his ideas for Fontal Ltd into practice.

Conceptualisation stage

With an interest in creating value out of knowledge Bartlett began developing his ideas for Fontal after he left his finance directorship in 1989. During subsequent months and years he spent a significant amount of time developing a client base for his consulting work as well as researching the necessary technology and opportunities to launch Fontal. Bartlett used publicly available resources, such as libraries, and his own knowledge of the publishing sector to lead him to the necessary expertise that existed in and around Cambridge. A research doctor from the Engineering department of the University of Cambridge was particularly helpful by referring Bartlett to a book reviewing applications of information technology.

Throughout this period of self-employment Bartlett remained focused on his vision for Fontal, of creating value out of knowledge. With the self-confidence provided by having achieved his ambition of being finance director of a listed company, and the business management experience that he had achieved, Bartlett felt no need to seek external help from any formal networking group.

Publishing goes on-line

Having originally planned to set up with a business contact, Bartlett found a newly qualified graduate from King's College, Cambridge to be his partner for Fontal. During 1993 and early 1994 they held discussions with the Department of Trade and Industry (DTI), one of the largest publishing houses in the UK, as a potential customer and the newly developed local Internet service provider, PIPEX as a potential supplier to Fontal.

Start-up stage

Then, with the recession over and signs of a likely contract from the DTI, Fontal was founded, with Barlett as managing director and his partner a non-executive director. They both invested £2,000 each and bought a computer, otherwise Bartlett supplemented his income with ongoing consultancy work. Bartlett had been discussing information sharing using networked computers with the DTI, and with the development of the Internet he was able to offer a much cheaper solution than initially anticipated. In August 1994 Fontal won its first contract from the DTI worth £100,000, and which resulted in the DTI publishing a significant amount of its information on the Internet for the first time.

During the completion of the first DTI contract Bartlett worked from home and outsourced the technology work. By now Cambridge was emerging as a centre for Internet companies, with two of the world's largest companies, UUNet and PSI Net, having bases there. At the end of 1995 Bartlett moved into office space in the St. John's Innovation Centre, where one of his consulting clients was already based, and he continued to consult and grow Fontal from there.

Growth stage

Organic growth

After its initial work, Fontal continued to win contracts from the DTI, growing as the DTI's on-line information needs grew. Over the first 4 years of the business, the DTI contracts represented the majority of Fontal's revenue. But the cash from these contracts, and the credibility that having the DTI as a customer provided, enabled Fontal to fund its information gathering process for Bnet, Fontal's own on-line business information resource. As well as from the DTI themselves, content for Bnet came from business consultants and professional bodies who had a desire to publish their material on the Internet.

With the development of Bnet, despite having no formal connection to the business networks within Cambridge, Fontal became known within the business community and started attracting work from new sources. Between 1997 and 1999 Fontal grew from

four to eight employees and the flexibility of the St. John's Innovation Centre allowed Fontal to grow in the piecemeal fashion.

More aggressive growth

During Fontal's growth Bartlett's original business partner had become less and less involved. In September 1999 the partner exited by introducing a new investor, who bought his shares and made a £250,000 investment in the company. The new investment allowed Fontal to grow more aggressively and over the following 12 months Fontal grew to its team to 30 employees. By offering a variety of on-line publishing and programming solutions, from simple text-based web sites to complex information management systems, Fontal has been able to develop the skills of its team and stay at the edge of technology innovations. During 1999 Bartlett was also been appointed vice-chairman of another Cambridge based software company, which developed a sophisticated time-tabling solution for universities and colleges across the world.

By mid-2000 Fontal's customer base had grown to include customers in the UK, Europe and the Pacific Rim, in the private, public and academic sectors. Its founder, Stephen Bartlett, had achieved this growth through leveraging his resources at various stages the company's development and backing this up with detailed research in necessary areas. His personal determination and use of existing business contacts enabled Bartlett to overcome the problems of a growing company without turning to external formal business networks.

7. Findings & Discussions

The following chapter summarises the evidence from the research carried out, in relation to the framework for analysis, and discusses the extent to which each potential role of the networking groups were fulfilled in each of the stages of venture creation. It concludes by commenting on the relative effectiveness of the networking groups with particular reference to the relationship building characteristics articulated in chapter 3.

7.1. Summary of findings

Summarising the evidence from the 3 cases, the entrepreneurs attended the following organised networking groups and organisations at some point during the development of their ventures;

Networking groups

- Cambridge & District Chamber of Commerce and Industry
- Cambridge Europe & Technology Club (CETC)
- Cambridge Hi-tech Association of Small Enterprises (CHASE)
- Cambridge Network (CN)
- Cambridge University Local Industry Links (CULIL)
- Cambridgeshire Small Business Group
- Enterprise Link
- Great Eastern Investment Forum (GEIF)

Other organisations

- Business Link
- Cambridge Enterprise Agency
- Cambridge Enterprise Conference
- St. John's Innovation Centre (SJIC)

The entrepreneurs did not gain significant benefit from all of the above organisations, however I have summarised those that did against the benefit they provided on the table below.

Exhibit 7.1. **Research findings summarised on analysis framework**

Stages of venture creation

	Conceptualisation	**Start-up**	**Growth**
Leads to customers			
Leads to investors	CHASE	GEIF CULIL	GEIF CN
Leads to partners			CN
Leads to suppliers		CHASE	CN
Leads to employees			
Technical and market knowledge / information			
Credibility / legitimacy	Enterprise Link / SJIC CN	CN	CN
Advice and problem solving	Enterprise Link / SJIC	CHASE Enterprise Link CETC	
Confidence and reassurance	CHASE	CHASE	
Motivation / inspiration	CHASE Enterprise Conference	CN	
Relaxation / interest	CULIL CETC		

'Harder' benefits ↑ ↓ *'Softer' benefits*

7.2. The extent to which networking groups were used in the stages of venture creation

Firstly, the cases demonstrate that not all entrepreneurs choose to take advantage of networking groups in the development of their ventures. The case of Fontal does include the use of networks of contacts built up over time in growing the company however its founder had little interest in the practice of 'artificial networking'. Where networking groups were used, the extent to which their use was beneficial at each stage of development is discussed below.

Conceptualisation stage

The cases suggest that in the early stages of development some entrepreneurs 'cast their net' as widely as possible to seek the benefits of all types of networks, including networking groups. Right from the outset some entrepreneurs seem to attempt to establish themselves and their ideas within the entrepreneurial community. By ensuring they, and their ventures, are known by people in positions of influence they are paving the way for the development of future business relationships, such as gaining investors.

At this early stage, there also appears to be a role for networking groups in providing the less tangible benefits of confidence and reassurance, and motivation to the 'lone'

entrepreneurs. The practice of mutually sharing experiences and opinions help provide reassurance and, by regularly having to articulate the business ideas, entrepreneurs gain feedback which helps to develop and refine their concepts.

Start-up stage

As the initial ideas become reality there appears to be some shift in use of networking groups towards gaining more tangible benefits. Of the groups used by the entrepreneurs in the case, there begins to be more use of networking groups that have a wider focus than simply technical and short term business growth. The entrepreneurs continue to gain some motivational benefits from speakers at events and networking groups, although the prospect of this benefit alone is not enough for their attendance.

The networking groups where the entrepreneurs have established a trusting membership, such as CHASE, then begin to be the source of the more tangible support of practical advice and ideas for potential for solutions to problems. The issue of professional confidence and sensitivity becomes more of an issue at this stage therefore the establishment of trust is particularly important in sharing details of individual problems. Groups where the entrepreneur has not established a rapport, therefore, seem to have little or no benefit in this area.

In order to continue the development of business ideas into reality, the entrepreneurs also use appropriate networking groups to provide new business relationships at this stage. GEIF plays an important role in this respect as the provider of funds to fill the 'equity gap' between entrepreneurs' own, or family, funds and larger venture capital investments. It continues to be useful into the next stage of company growth in that its membership also includes larger City organisations, such as law firms and merchant bankers, that can provide support for larger national and international fund raising, including public flotations.

Growth stage

Once the entrepreneurs have established their companies' products and competitive positions, they begin to plan for the next stages of growth. By this stage they begin to establish wider teams that begin to provide their own support structures. As a result there seems to be no role for networking groups in providing the less tangible benefits of

problem solving, reassurance and motivation. Having progressed this far with their ventures, the need for motivation and inspiration seems particularly redundant.

At this stage, the entrepreneurs appear to prioritise their time away from the networking groups that once provided them with benefit and support, due to their reduced relevance. They do, however, continue to recognise the need for networking, but now in a more formal public relations sense. In this way, the more ambitious outlook of the Cambridge Network seems to be suited to the companies in later stages of establishment. Their goal of encouraging inward investment to the area can then be more directly beneficial to such growing companies in the provision of new investors, suppliers and development partners.

7.3. The extent to which networking groups fulfilled specific roles

Reviewing the specific roles that networking groups can fulfil, as detailed in chapter 3, it is clear that some are not relevant to local face to face networking groups.

Leads to formal business relationships

Entrepreneurs in each case used a variety of sources to gain their formal business relationships, many from prior experience. Due to the global nature of their products, local networking groups were not a useful source of customer leads. The groups were not found to be beneficial in providing contacts for building their teams as the companies grew, the majority of recruitment coming via personal recommendations and recruitment agencies.

Perhaps demonstrating the strength of the Cambridge cluster as a provider of seed and venture funding, networking groups were used to provide leads to investment funding. The formal role of the GEIF fulfils a very particular, and necessary, role in local venture creation. The clustering effect is also apparent for the identification of potential suppliers and research partners, also this was not always via networking groups in the cases studies.

Technical and market knowledge/information

Despite the sharing of knowledge and information being a stated factor a clustering activity in other research, the entrepreneurs interviewed did not state that any networking group provided them with any significant benefit in this area. It was evident that networking groups were a means of keeping people 'up to date' and that informal discussions were useful in general however not to the exclusion of other information gathering activity.

Credibility/legitimacy

In terms of giving their companies or ideas credibility in the market place, local networking groups did not provide any benefit. The companies studied tended to use national trade associations for this purpose. However, in terms of providing a platform to make people aware of their innovations and generate interest in the company, networking groups did fulfil a role.

At the early stages of the idea formation, having the tacit support of Walter Herriot, the experienced director of the St. John's Innovation Centre, and being able to use his name as a form of recommendation was beneficial. Then as companies grew there was some evidence of the Cambridge Network being a suitable forum for establishing recognition of the new ventures.

Advice and problem solving

As discussed earlier, networking groups, particularly those managed by members as opposed to those organised by external organisations, did play a role in providing advice and problem solving support to entrepreneurs. However, the issue of professional confidence and sensitivity was a limiting factor to the level of support that the groups could provide.

The groups in which the entrepreneurs were able to relate to those providing the support, either due to common experiences or interests, seemed to be the most useful, even above those agencies specifically set up to provide support. Some of the entrepreneurs recognised that they would probably have overcome many of the problems without the assistance of the networking groups, but that the groups helped them to avoid unnecessary mistakes.

Confidence and reassurance

Two of the three entrepreneurs interviewed did recognise the benefit that networking groups gave them in providing confidence and reassurance in the 'lonely' early months and years. The relevance of previous experience of the entrepreneur may be a factor in the whether he seeks confidence and reassurance from external networking groups or from within his existing personal network, or simply by drawing on the successes of past experience.

Whilst there is a role for networking groups to provide an environment which encourages the generation of confidence and reassurance, it is clear that this alone is not sufficient to encourage the participation of some, more self-motivated, entrepreneurs.

Motivation/inspiration

There are many factors that contribute to innovation, therefore it is difficult to attribute inspiration to any particular event or group membership. However, evidence does suggest that some entrepreneurs cast their nets as wide as possible in order to feed the development of their business ideas. Evidence suggests that the driven and determined nature of entrepreneurs is such that the issue of motivation is less relevant as a role for networking groups to fulfil.

Relaxation/interest

There was little evidence to suggest that the networking groups included in this research provided relaxation as a benefit, with the exception of the CHASE pub meets, rather the business of networking was regarded as a necessary business function by some parties. However there is evidence that some business benefits did accrue from some networking groups that were originally attended for their areas of interest. This would suggest that some networking groups could be the source of benefits to entrepreneurs simply by bringing together people for a common interest alone.

7.4. The effectiveness of individual networking groups

The evidence from the cases reveals that the effectiveness of the individual networking groups varied markedly. The more tradition and established organisations, such as the

Chamber of Commerce, Business Link and Cambridge Enterprise Agency were found to be almost completely inappropriate for the relatively new high tech companies. Also, the effectiveness of the other groups varied due to their individual characteristics, with CHASE appearing to be more useful in the early stages than other groups.

The characteristics necessary for building trusting relationships reviewed in chapter 3 consisted of,

- Face to face contact,
- Communal relaxation,
- Shared experiences & common interests,
- Intense experiences.

My definition of networking groups is such that all the groups in this research have face to face contact. However, there are differences in the level to which they provide environments to build trust in the other ways. This is important in considering the less tangible role of networking groups particularly useful in the conceptualisation stage of the venture creation process.

Communal relaxation

Informality and organisation are important factors in creating a relaxed environment, yet they can appear to be mutually exclusive. The groups, such as CHASE and Enterprise Link, encourage open discussion at meeting by providing food or drink. They also help to provide a relaxed environment by limiting membership to primarily entrepreneurs in similar situations.

Organisation, such as providing suitable venues at convenient times and reasonable cost, helps to create a relaxed environment in that the attendees do not have to sacrifice other priorities in order to attend. Simple organisational aspects such as providing name tags, contact details and background information about attendees also helps in that it simplifies initial contact between people. However, organisation such as this can appear overly bureaucratic.

Regularity of contact is also important in establishing a relaxed communal environment. CHASE pub meetings every month in addition to monthly talks provide opportunities

for members to be in face to face contact very regularly and quickly get to know each other, or least see familiar faces.

Shared experiences & common interests

The cases suggest that some groups and organisations are not effective to entrepreneurs due to inability of their administrators or members to relate to the entrepreneurs. Administrators within some organisations were identified as simply not being 'dynamic enough'.

Also, the more effective organisations appear to be those that regularly gain feedback from their members about relevant speaker and discussion topics, rather than being driven by external sponsors or influencing partners.

Intense experiences

Very few of the networking experiences encountered by the entrepreneurs interviewed can be regarded as truly intense experiences, however some have aspects that have a similar effect in bringing people together.

The enthusiastic nature of the leader of CHASE and some of its members has an impact on the culture and style of the group. High profile speakers and high impact presentations held by the Cambridge Network also have a memorable effect on attendees. Entrepreneurs' experience of the GEIF presentation days to potential investors could certainly be regarded as intense however, the intensity of the experience differs between presenters and potential investors.

8. Conclusions

From this initial research from a small population, the evidence suggests that different networking groups play different roles to entrepreneurs and companies at various stages of their creation and growth. At the initial stages of companies, when entrepreneurs are developing their ideas, there appears to be role for networking groups in helping entrepreneurs establish recognition of themselves and their ideas in the community. The research also suggests that, at the early stages of developing a business idea and starting-up companies, there is a role for networking groups to provide support and 'softer' benefits to entrepreneurs, however these benefits become less relevant as companies become more established. At later stages of companies' development there appears to be a need for networking groups to provide more commercial 'harder' benefits.

However, this research also suggests that there appears to be no specific correlation between attendance at networking groups and the success of a start-up, although attendance can help entrepreneurs avoid common mistakes and overcome short term barriers to progress.

The findings of this research support other research conclusions that local government funded or formal support agencies appear to play a limited rather than major role in advising or helping technology based firms. This research suggests that groups and membership to which entrepreneurs can relate, either from a common interest or the style and culture of the group, will provide more benefit to the entrepreneurs. Networking groups organised by external groups, such as local government or major sponsoring organisations, that do successfully provide benefits to entrepreneurs tend to provide more commercial, 'hard' benefits. Less formal, member-organised networking groups tend to be more suited to providing less tangible, 'soft' benefits such as support, advice and reassurance.

Whilst this research recognises the development of the Internet in creating new means of networking, it has focused on the effect of face to face networking within an entrepreneurial 'cluster'. With the increased acceptance of new means of communication, the importance of 'virtual' networking groups across common interest

areas, and not bound by geographical constraints, will inevitably become more prominent. However this is an area for further research subsequent to this work.

There are a number of lessons that this initial research has highlighted for entrepreneurs and networking groups alike.

8.1. Lessons for networking groups

- Entrepreneurship is about taking risks and entrepreneurs need a degree of confidence in order to take risks. By helping to build self-confidence, networking groups can help encourage local entrepreneurship.

- Many early entrepreneurial decisions are made more by judgement than by detailed analysis. Therefore building trusting relationships is an essential if entrepreneurs are to use information provided by such relationships in their decision making processes.

- The creation of a relaxed environment will help entrepreneurs to build trusting relationships and therefore provide each other with mutual support as a result.

- Enthusiasm is a characteristic demonstrated by many entrepreneurs, in order for them to encourage the development of their business ideas. Networking groups that encourage enthusiasm will better relate to many entrepreneurs, and therefore are more likely to provide a relaxed and supportive environment.

- Networking groups that are interesting, frequent and accessible to their target entrepreneur members are more likely to provide support to entrepreneurs in the early stages of the growth of their companies.

This initial research has also resulted in some more specific suggestions that may help the networking groups in the Cambridge high tech cluster become more effective.

- Networking groups can increase their appeal to potential entrepreneurs by defining their role in assisting new ventures and publicising the specific benefits they offer.

- There is an opportunity for networking groups to recognise their differing roles and identify ways in which they can operate more synergistically.

8.2. Lessons for entrepreneurs

- Without any prior record for a new venture an entrepreneur can help establish local business relationships, such as new investors, by establishing recognition of himself and his venture within the local community via networking groups.

- The benefits of making new contacts at networking groups do not always emerge immediately.

- Networking groups are more likely to prove beneficial to entrepreneurs if they actively participate in meeting new contacts.

- Networking is based on the perceived balance of give and take. The more successful networkers engender trust in others by;
    - Being open-minded to other people
    - Demonstrating a willingness to learn about, and from, others
    - Being willing to make genuine gestures of goodwill
    - Being willing to invest time in networking activities

With the rise of entrepreneurship within the 'enterprise economy', and ever-increasing competition, entrepreneurs are looking to take advantage of all avenues of support to help them grow their ventures. The emergence of the 'enterprise economy' has also led to a new generation of entrepreneurs who have new values, expectations and role models. These factors may explain the emergence of new entrepreneurial networking communities and the recognition of the importance of the phenomenon of 'networking' by leading business schools.

9. References

Aldrich, H. & Zimmer, C. 'Entrepreneurship Through Social Networks' in Sexton, D. & Smilor, R. 1986 'The Art and Science of Entrepreneurship', Ballinger, Cambridge, Massachusetts.

Birley, S. 1985 'The Role of Networks in the Entrepreneurial Process', *Journal of Business Venturing*, 1: 107-117.

Birley, S., Cromie, S. & Myers, A. 1988 'Entrepreneurial Networks in Northern Ireland', Northern Ireland Small Business Institute, Ulster Business School, University of Ulster.

Birley, S., Cromie, S. & Myers, A. 1991 'Entrepreneurial Networks: Their Emergence in Ireland and Overseas', *International Small Business Journal*, 9, 4.

Brown, B. & Butler J.E. 1995 'Competitors as Allies: A Study of the Entrepreneurial Networks in the US Wine Industry', *Journal of Small Business Management*, 33, 3:57-66.

Bryson, J., Keeble, D. and Wood, P. 1992 'Business Networks, Flexibility and Regional Development in UK Business Services', Small Business Research Centre, University of Cambridge, Working Paper no.19.

Camagni, R. 'Local "milieu", uncertainty and innovation networks: towards a new dynamic theory of economic space' in Camagni, R. (ed), 1991 'Innovation Networks: Spatial Perspectives', Belhaven Press, London.

Casson, M. 1997 'Entrepreneurial Networks: A Theoretical Perspective', Discussion Papers in Economics and Management Series A, University of Reading Department of Economics, No. 371.

Child, J. & Faulkner, D. 1998 'Strategies of Co-operation: Managing Alliances, Networks, and Joint Ventures', Oxford University Press.

Cooke, P., Extebarria, G., and Uranga, M.K. 1998 'Regional systems of innovation: an evolutionary perspective', *Environment and Planning A*

Curran, J. & Blackburn, R.A. 1992 'Small Firms and Local Economic Networks: Relations Between Small and Large Firms in Two Localities', Business Paper Series, Kingston Business School, Kingston University.

Curran, J., Jarvis, R., Blackburn, R.A. and Black, S. 1993 'Networks and small firms: Constructs, methodological strategies, and some findings', *International Small Business Journal*, 11, 2.

Drakopoulou Dodd, S. 1997 'Social network membership and activity rates: Some comparative data' *International Small Business Journal*, 15, 4: 80-87.

Dubini, P. & Aldrich, H. 1991 'Personal and Extended Networks Are Central to the Entrepreneurial Process', *Journal of Business Venturing*, 6, 5.

Ebers, M. 1997 'The Formation of Inter-Organisational Networks', Oxford University Press.

Galunic, C. & Moran, P. 2000 'Social Capital and Productive Exchange: Structural and Relational Embeddedness and Managerial Performance Link', INSEAD Working Papers; no. 2000/07/OB.

Granovetter, M. 1985 'Economic Action and Social Structure: The Problem of Embeddedness', *American Journal of Sociology* 91: 481-510.

Greico, M.S. 1980 'Social Networks in Labour Migration', *Industrial Relations Journal*, 5,1.

Greve, A. 1995 'Networks and Entrepreneurship – an analysis of social relations, occupational background, and use of contacts during the establishment process', *Scandanavian Journal of Management* 11,1: 1-24.

Holmen, M. & Jacobsson, S. 1998 'A method for identifying actors in a knowledge based cluster', Danish Research Unit for Industrial Dynamics, Working Paper No. 98-26.

Johanisson, B. 1986 'Network Strategies: Management Technology for Entrepreneurship and Change', *International Small Business Journal*, 5, 1.

Johanisson, B. 1991 'Designing supportive contexts for emerging enterprises', paper presented at the international workshop, 'The Formation, Management and Organisation of Small and Medium Sized Enterprises', Jönköping, Sweden.

Johanisson, B. & Monsted, M. 1997 'Contextualising entrepreneurial networking', *International Studies of Management & Organisation*, 27, 3: 109-136.

Jones, O. & Beckinsale M. 1999 'Analysing the innovation process: networks, micropolitics & structural change', Research paper series / Aston Business School Research Institute, RP9919.

Keeble, D., Lawson, C., Lawton Smith, H., Moore, B. and Wilkinson, F. 1998 'Collective Learning Processes and Inter-Firm Networking in Innovative High-Technology Regions', ESRC Centre for Business Research, University of Cambridge, Working Paper no. 86.

Krackhardt, D. & Hanson, J.R. 1993 'Informal Networks: The Company Behind the Chart', *Harvard Business Review*, July / August, 104-111.

Larson, A. 1992 'Network Dyads in Entrepreneurial Settings: A Study of the Governance of Exchange Relationships', *Administrative Science Quarterly*, 37: 76-104.

Lawson, C., Moore, B., Keeble, D., Lawton Smith, H. and Wilkinson, F. 1997 'Inter-Firm Links Between Regionally Clustered High-Technology SMEs: A Comparison of Cambridge and Oxford Innovation Networks', ESRC Centre for Business Research, University of Cambridge, Working Paper no.65.

Lipparini & Sobrero 'Co-ordinating Multi-Firm Innovative Processes: Entrepreneur as Catalyst in Small-Firm Networks' in Ebers, M. 1997 'The Formation of Inter-Organisational Networks', Oxford University Press.

Marshall, A. 1920 'Principles of Economics', Macmillan, London.

Nadvi, K. 1998 'Knowing Me, Knowing You: Social Networks in the Surgical Instrument Cluster of Sialkot, Pakistan' Institute of Development Studies, Brighton, Discussion Paper 364.

Sako, M. 1992 'Prices, Quality and Trust: Inter-firm Relationships in Britain and Japan', Cambridge University Press.

Saxenian, A. 1994 'Regional Advantage: Culture and Competition in Silicon Valley and Route 128', Harvard University Press, Cambridge, Massachusetts.

Segal Quince & Partners 1985 'The Cambridge Phenomenon: The Growth of High Technology Industry in a University Town', Segal Quince, Cambridge

Sobrero, M. & Schrader, S. 1998 'Structuring Inter-firm Relationships: A Meta-analytic Approach', *Organisation Studies*, 19/4: 585-615.

Snow, C.S., Miles, R.E., and Coleman H.J. 1992 'Managing 21st Century Network Organisations', *Organisational Dynamics*, 20: 5-20.

Storper, M. 1995 'The resurgence of regional economies, ten years later: the region as a nexus of untraded interdependencies', *European Urban and Regional Studies*, 2, 3: 191-221