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Building Intellectual Capital in Incubated Technology Firms

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Purpose: The value of relational capital generated by entrepreneurs with their internal and external environment (Hormiga, Batista-Canino and Sanchez-Medina, 2011), provides considerable resources when properly leveraged. It is particularly important in environments such as the high tech sector of incomplete information and weak economic markets such as new products, markets or technologies (Davidsson, and Honig, 2003). The paper examines how incubated technology entrepreneurs build relational capital for a new venture formation in the social context of a Higher Education Institution.

Design/methodology/approach: Our study took a qualitative approach based on content analysis of business plans and in-depth interviews with twenty-five technology entrepreneurs on an incubation programme – South East Enterprise Platform Programme - for technology graduates in the South East of Ireland.

Findings: Our study found that technology entrepreneurs during new venture formation engaged in four types of relational capital activities, namely, development of networks and contacts, relationship building, accessing and leveraging knowledge experts and members of associations.

Practical Implications: Incubator programmes need to actively support social building activities of technology entrepreneurs. HEI knowledge assets and networks are critical elements in supporting incubator technology entrepreneurs.

Originality/Value: Our study identified four types of relational capital building. We also found using Evans Jones (1995) categorization of technology entrepreneurs that users, producers, opportunists and non–technical entrepreneurs engaged in client focused relational capital building, whereas researcher types networked with service providers and displayed arms length relational capital building styles.

Paper Type: Research Paper

Keywords: Technology Entrepreneurs; Relational capital; New Venture Formation; Start-Ups; Social Context; Networks; Relationship Building; Leveraging Knowledge Experts

1 Introduction

New venture formation is integral to entrepreneurship (Edelman, Manolova and Brush, 2008) and consists of those activities that establish the physical structure and organisational process of a new firm (Bhave, 1994). Katz and Garter (1988) posit four major properties of intentionality, resources, boundaries and exchange that signal the emergence of organisations. Tornikoski and Newbert (2007) regard organisational formation as a quest for legitimacy and Tesfaye (1997:66) defines it more pragmatically as 'the series of activities and decisions undertaken in founding a company'. However, little is known about the process undertaken in launching a new venture or in how new firms come into being (Allen & Stearns, 2002; Bhave 1994; Carter, Gartner and Reynolds, 1996; Delmar and Shane, 2003; Liao and Welsch, 2008; Reynolds and Miller 1992).

The creation of technology based companies within an economy bring benefits of wealth and job creation, new knowledge generation and new industrial sectors (Audretsch *et al*, 2008; Shane, 2001; van Stel *et al*, 2005). Technology entrepreneurship is focused on exploiting and realizing a technology idea (Bollinger et al, 1982). Supporting institutions and the context are of significant importance to technology entrepreneurs during the new venture formation (Shane and Venkataraman, 2003). High technology firms require different input factors in comparison to other types of start-ups with one common element being the importance of a complex local infrastructure such as universities, laboratories, and mature companies (Cooper, 2000). Providing a social context to support technology new venture formation in the form of incubators has grown significantly across many national innovation systems. Incubators provide a range of services for incubatees that support their new venture formation including marketing, business planning, business development, mentoring and networking (see Abetti, 2004; Aert *et al*, 2007). Some incubators require mandatory participation by incubatees in their programmes (Bergek and Norrman, 2008). This social context is important for technology entrepreneurs to build intellectual capital which facilitates the creation, validation and implementation of their technology idea. Intellectual capital is of significant importance and value for incubated technology entrepreneurs during new venture formation, given the additional specific challenges they face with regard to their technology, market and pricing (Gately and Cunningham, 2014). We focus on a specific dimension of intellectual capital; relational capital in casting light on the social activities incubated technology entrepreneurs engage in to enable new venture formation.

Our paper begins with setting the theoretical context, which considers intellectual capital and new venture formation. We conclude this section of the paper by considering incubating new technology entrepreneurs. The next section of our paper outlines the methodology, design, data collection and analysis. We then present our key findings on the relational capital activities incubated technology entrepreneurs engage in during new venture formation. We conclude our paper by discussing the implications of enabling relational capital activities for technology entrepreneurs and incubators.

2 Theoretical Background

2.1 Intellectual Capital and Relational Capital

Choosing and acquiring resources is a key activity of start-up and influences or restricts future venture competitiveness and success (Hormiga, Batista-Canino and Sanchez-Medina, 2011). Both tangible and intangible (competence and relational) resource acquisition is necessary in building a business (Lowendal, 1997). Recent literature places emphasis on the intangible, knowledge-based equity of a firm and its importance to venture success (Pena, 2002). This is particularly true in the technology sphere where much of the firm's knowledge is embedded in the start-up team (Juma and Payne, 2004). The concept of Intellectual Capital (IC) encompasses non-tangible knowledge based assets that create or have the potential to create value for the firm (Juma and Payne, 2004). Whilst the literature still debates the multidisciplinary interpretations and boundaries of IC (Marr, 2005), a consensus has emerged on its three dimensions namely: human capital, structural capital and relational capital (Pew Tan, Plowman and Hancock, 2008). Of particular interest to this study is relational capital which emphasizes the development of productive business networks and access to stakeholders (Pena, 2002). The new venture is faced toward the market and the customer in developing an image, reputation, a product and accessing resources needed for product development and sales. The similar concept of customer capital; the extent and intensity of the organsiational relationships with customers was postulated by Stewart (1997). A closely linked concept was also devised by the Danish Confederation of Trade Union Model (1997), with the market consisting of the relationship (and access to resources such as labour and money) between the organisation and outsiders. Hormiga, Batista-Canino and Sanchez-Medina (2011) describe relational capital as the value generated by entrepreneurs with their internal and external environment. These include relations with suppliers, customers, investors but equally with internal customers and stakeholders. They investigated the link between relational capital and new venture success. Their research and earlier work of Pena (2002), concluded that the value added through relational capital has a positive effect in building reputation with early clients, suppliers and other stakeholders. Further, they discovered that the emotional support and active, cost neutral, participation by family, friends and the entrepreneur's personal network are also linked to new venture success.

The concept of relational capital is closely aligned with social capital*;* that knowledge embedded in the activities and processes of people. This knowledge, when properly leveraged is particularly important in environments (such as the high tech. sector) of incomplete information (Davidsson, and Honig, 2003). Nahapiet and Ghoshal (1998) describe social capital as networks of relationships which constitute a valuable resource for the conduct of social affairs, providing members with 'the collectivity-owned capital, a 'credential' which entitles them to credit.' Van De Ven (1993:223) notes that the individual entrepreneur, having limited skills and resources is dependent on others to achieve firm formation; it is a 'collective achievement'. Because of this, entrepreneurs make strategic choices: 'concerning the kinds of proprietary, resource endowments and institutional functions in which it will engage, and what other actors it will transact with to achieve self-interest and collective objectives'. The involvement and dependency on other people during the start-up

process including the network of strong and weak ties are of great benefit in terms of emotional and affective support in linking the entrepreneur to needed resources (Gartner and Carter, 2004). Thus, as postulated by Nahapiet and Ghoshal (1998) and Hormiga et al (2011), the existence of social capital enables the creation of intellectual capital.

Taking network theory Aldrich and Zimmer (1986) contend that the entrepreneurial process is embedded in 'shifting networks of continuing social relations' that provide access (or control access) to resources and opportunities. Aldrich and Martinez (2001) delineate three dimensions to social capital; social resources, network position and the strength of relationships. A network of relationships is useful in gaining access to anothers' contacts and resources. The diversity of that network in terms of its social location and the entrepreneurs' involvement in the larger community network will also affect their ability to access resources and information. As Aldrich and Martinez (2001:47) note: 'diversity is important because ties with more than one person with similar characteristics do not provide access to new information'.

Traditionally, thinking prevailed of the strength of loose ties (see Granovetter, 1974), yet newer research confirms that strong ties 'ties with high levels of trust and emotional closeness between two individuals' are important in helping the start-up effort (Aldrich and Martinez, 2001:47). While it is difficult to maintain strong ties Aldrich and Martinez (2001) report that most entrepreneurs have between three and ten strong ties, most commonly a mixture of business associates, close friends and family members. Individually developed social ties are important to the venture formation process particularly in highly innovative spheres. Moreover Aldrich and Martinez (2001) found that a certain degree, but not a high degree of embeddedness to suppliers is good for survival.

For technology entrepreneurs Liao and Welsch (2003) point out for instance that a lean social network is a beneficial factor in that they can access rich, non-redundant information and knowledge. Information being a key element of pre-initiation development as Tesfaye (1997:85) noted: 'Ultimately, pre-initiation gestation has to do with identifying, obtaining and processing requisite information. Thus, the information base underlying company formation decisions may be a good indicator of the level of pre-initiation development. The nature and amount of information required, the relevance of sources perceived and approached, and the speed and accuracy of the final interpretation of information obtained is decisive.'

Beaver and Prince (2002) and Gartner (1985) contend that the development of successful new firms requires pertinent information that can only be found through external networking. It is the means by which entrepreneurs can strengthen their knowledge base, fashion their competitive advantage (by providing the stimulus for change and progress) and undertake genuine product and competitive analysis. In Hess' (1987) survey of small business owners he discovered that the time spent on networking and customer relations is far greater and is perceived as being more valuable to business success than academic coverage would indicate. Juma and Payne (2004) discovered the link between firm collaborations and strategic alliances in enabling intellectual capital creation to the financial performance of the firm.

2.2 The Social Context of New Venture Formation

The concept of entrepreneurship as a socio-economic process is documented by Jack and Anderson (2002:471) who say that: 'If entrepreneurship is embedded in a social context then it must involve and draw on society. These factors may play a role in the way in which value is and can be extracted in terms of resource availability and opportunity perception, thus shaping the entrepreneurial event.' They argue that the entrepreneurial process needs to be sustained by and anchored in the social context; it is an ongoing process that reflects changes in the local context. The social context itself, does not throw up the opportunities but it can empower the entrepreneur to find the opportunities and inputs that they need from the environment (Jack and Anderson, 2002). Furthermore they argue that in the entrepreneurial process 'the local environment acts as a socio-economic context whereby social relationships impact on economic outcomes'. They refer to this as embeddedness (the nature, depth and extent of an individual's ties into the environment and local structure). It enables the entrepreneur to recognise and realise opportunities and inputs they need to further their venture: 'Embedding provides a mechanism for bridging structural holes in resources and for filling information gaps' (Jack and Anderson, 2002:469).

As density increases, contacts between firm founders and outside agents increase causing 'social networks to change' within that population (Shane and Stuart, 2002). They go on to say that: 'If learning is contact contingent, then more learning should occur in dense environments, up to a point.' This implies that the number of firms established by those without prior industry experience will increase with increasing density. As the population increases founding rates also increase because nascent entrepreneurs are given a map to guide their founding efforts by existing incumbents. Almeida, Dokko and Rosenkopf (2003) posit that as start-ups grow, their propensity to use and learn from externally derived knowledge intensifies. Similarly, Tesfaye (1997) points out that as firm formation intensifies, the need to interact with the external environment also comes into focus to a greater or lesser extent depending on the 'internal strength of the company' and the nature of their business. This may arise from having greater access to knowledge sources; a larger volume of external links and greater potential to utilise the knowledge acquired. However, Almeida *et al.* (2003) point out that as firm size increases firms learn less from informal knowledge mechanisms such as social mobility and geographic proximity and more from formal sources such as hiring of new knowledge experts.

The presence of direct and indirect social ties to funding agents decreases the risk of firm mortality and have a long term positive affect on the performance of the new venture (Shane and Stuart, 2002). Equally, linkages to brokers that in turn have access to contacts of relevance to their needs are recognised as an important resource of venture formation: 'Indirect links with people in advantageous social locations can be created through the work of brokers' (Aldrich and Martinez, 2001:48). These brokers in turn bring together needed resources or expertise to fill gaps in the knowledge or experience of the entrepreneur.

From a sociological perspective, a history of past exchanges between the new venture and an external agent is likely to increase trust and probability of support for the new venture as Shane and Stuart, 2002:156) posit: 'actors rely on social networks to select transaction partners who they believe will behave reliably, even when a partner is not contractually obligated to do so'. Equally Shane and Stuart (2002) note that nearness

in 'social space' of an agent aids a positive assessment of the potentiality of a new venture.

2.3 Incubating the Technology Venture

High technology success is establishing the conditions that support such entrepreneurs (Allen and Stearns, 2002; Cooper and Park, 2008; Prodan, 2007). A research intensive third level institution is regarded as an important element of the 'innovative infrastructure' in supporting spin offs and encouraging new enterprise creation and may even influence the extent of new venture success (Cooper, 2000; Prodan, 2007). An important factor in the success of the spin off company is the degree of support it receives from its parent organisation, which, in the case of university, is usually within a university incubator Prodan (2007). In a wider context, Cooper and Park (2008) argue that the entrepreneur's professional and social environment experienced in their 'incubator firm' shape their attitude toward risk, expose them to knowledge of new technology and emerging markets and, crucially, help develop their relational capital and resources.

In their study of technology-oriented entrepreneurship Pages et al. (2001) identified factors necessary in building an innovatory climate. These factors are complex and often intangible and cannot be created purely through training and advisory sessions alone. Many of the factors relate to environmental conditions that facilitate networking and building relational capital amongst and between like entrepreneurs. Low and MacMillan (1988:150) and Ucbasaran, Westhead and Wright (2001:8) observed a growing interest in incubators in recognition of the importance of building networks: 'The creation of formal networks in the form of innovative milieu (such as a Science Park) can provide a context for entrepreneurs (and their firms) to acquire knowledge and experience.' Incubators link entrepreneurs, technology capital that is expediting the start-up process and exploitation of ideas (Grimaldi and Grandi, 2004:1). Incubator interventions take a variety of forms including business angel investment and mentoring, small business financing, enterprise agency support, mentoring and business incubation programmes (Sherman, 1999). The benefits of incubation are outlined in Table 1 and incubator firms have been found to have higher growth and better at adopting new technology (Colombo and Delmastro, 2002). As well as these benefits, incubator firms can gain credibility by locating in an incubator (Tottermann and Sten, 2005).

Table 1: Incubation Benefits to Incubatees

• Access to information and networks
• Provision of supports and services for
• Developing business plans
• Marketing plan
• Building management teams
• New product development
• Customer validation
• Obtaining capital
• Mentors
• Advisory sessions

Source: Abetti, (2004)

One of the aspects of incubation is the opportunities it creates for collaboration and interactions between incubators stakeholders that are important in developing relationships with suppliers, customers, and knowledge bearers (Prodan, 2007).

The emergence of relational capital as an important element in the formation and resourcing of the new venture has been given considerable research attention in recent years. Similarly, the multiple benefits of incubator environments to the technology startup in accessing relational resources is well documented. We now need to turn our attention to consider both the types of relational capital of particular significance during new venture formation and variances in the relational capital activities employed by the entrepreneur in different contexts. Thus our central research question for this paper is how incubated technology entrepreneurs build relational capital for new venture formation in the social context of a Higher Educational Institutional setting.

3. Metholodology

In addressing this research question we chose a plurality of qualitative methods, namely qualitative interviewing and qualitative content analysis, and triangulated these methods during data analysis to ensure validity and reliability of the findings (Amabile, Paterson, Mueller, Wojcik, Odomirok and March, 2001; Kane, 1995; Scandura and Williams, 2000). We combined three types of content analysis, namely qualitative/interpretative, quantitative and structural, guided by Krippendorff (2004); Shapiro and Markoff (1997) and Symon and Cassell, (1998) but focused particularly on qualitative content analysis to advance our research question.

3.1 Data Selection

The South East Enterprise Platform Programme (www.SEEPP.ie), an incubator programme for graduate entrepreneurs, provided the setting for the study and was used to garner a purposive sample of technology entrepreneurs in start-up mode. We were conscious to ensure study replicability and used, where available, official Irish Government (Central Statistics Office, 2006; 2008), or EU classifications (Eurostat, 2008) or categories pre-existing in entrepreneurship literature (Hambrick, Cho and Chen, 1996; O'Gorman, Bourke and Murray, 2005 and Snow and Hrebiniak, 1980) to define the technology entrepreneur and their stage of development. Following Jones – Evans (1995), interviewees were classified into four different types of technology entrepreneur, namely: researcher, producer, user and opportunist. Three entrepreneurs did not fall within these classifications. They were classified as 'non – technical'. Please refer to appendix 1 for a more detailed description of the technical classifications used. Table 2 depicts the technology entrepreneurs' stage of venture development at the end of the SEEPP programme.

Table 2: Technology Entrepreneurs Stage of Development (n = 25):

Type of Technology Entrepreneur (Jones – Evans, 1995)	**Stage at End of SEEPP Programme**
Opportunist (5)	Up and running (2) Still in the process of trying (3)
User (5)	Up and running (2)

	Still in the process of trying (3)
Producer (8)	Up and running (4) Still in the process of trying (3) Sold/Amalgamated this venture (1)
Researcher (4)	Up and running (3) Trying to set up another venture (1)
Non - Technical (3)	Up and running (2) Still in the process of trying (1)

We devised a filter process to screen for business plans and technology entrepreneurs in start-up mode. First, we screened for completed and available business plans from SEEPP participants. Business plans submitted by participants were regarded as a credible data source, as they were prepared for SEEPP postgraduate award purposes, to apply for CORD funding from Enterprise Ireland and to source finance from other enterprise support agencies. Secondly, we asked for interview volunteers from the SEEPP cohort, clarifying that they were indeed technology entrepreneurs. Interview volunteers were identified as 'technology entrepreneurs' in light of their eligibility for Enterprise Ireland's[2] Commercialisation of Research and Development funding (CORD) which funds 'innovative, technologically advanced projects with international potential and the ability to become High Potential Start-ups (HPSUs) (Enterprise Ireland, 2009). This approach is similar to Jones-Evans (1997:16-17), who used a 'government innovation award scheme' (Small Firms Merit Award for Research and Technology, SMART), which emphasised 'technological innovation and novelty within small independently owned ventures' as its main criteria. The third filter ascertained their stage of the start-up process. Only technology ventures at the start-up stage of their development were chosen for further study. The stage of development was matched to pre-existing classifications or theory in the field (see Reynolds' Entrepreneurial Process Model, 2000). The entrepreneur was categorised as being in the start up phase of development if they have begun the start up process. In total, forty business plans and twenty-five interviewees passed the filtering process and were used as the primary research data sample. Twenty of those interviewed furnished their business plans for analysis. The remaining twenty business plans were furnished by CORD-funded entrepreneurs who declined to be interviewed. Five interviewees declined to provide a business plan, had never prepared one or asked not be included in the business plan analysis. We were mindful of Delmar and Shane's (2004; 407) comments: 'Researchers interested in evolutionary processes need to adopt research designs that represent the population of new ventures, rather than just those that become legal entities'. Thus, we included all those in the population under study (See Table 1), not just those that survived, as is common in much empirical entrepreneurship research (Shane and Stuart, 2002). Consistent with other researchers (Bhave, 1994; Liao and Welsch, 2008) first sale was used as an indicator of completion of the start-up process.

3.2 Data Collection

We undertook pilot studies of both research methods before the full empirical research. The pilot studies were conducted to test and reshape perspectives generated from both extant literature and from the researchers experience in this field.

[2] Enterprise Ireland is the state agency responsible for the development and promotion of Ireland's indigenous industry

Furthermore, the pilot studies helped identify gaps which were tested and redeveloped throughout the remainder of the primary research process (Miles and Huberman, 1994). A coding framework was formulated based on *a priori* codes from existing studies (see Edelman, Manolova and Brush, 2008; Reynolds, 1995; Reynolds and Curtain, 2008) and from codes specific to technology entrepreneurs and technology start-up developed developed from the literature and testing during pilot studies. These were refreshed during the qualitative interviewing and content analysis process.

An average interview length of 53 minutes, 14 seconds (not including time spent on the face sheet questionnaire administered to all interviewees) was recorded. In total 247 pages (single line, font size ten, Times Roman style) of interview transcriptions were taken, equating to 137,229 spoken words. All transcribed interviews were read through by the researchers and then coded using NVivo. The same thematic codes used in the interview material were used to code the qualitative content analysis of business plans, lending to the triangulation of research methods. The content of forty business plans were used in the sample and 909 pages of content were analysed. For the year 2003–2004 twelve plans were analysed, six plans were analysed for 2004–2005, in 2005–2006 eight plans were analysed, for 2006–2007 eleven plans were analysed and for 2008, three plans were analysed.

3.3 Research Limitations

In recognising the appropriateness of the phenomenological perspective in management research (Wilson and Jarzabkowski, 2004), methodological concerns arose concerning the criteria for rigor in social science inquiry, truth-value applicability, consistency and neutrality of qualitative research (Guba and Lincoln, 1985; Scandura and Williams, 2000). To address these concerns and noting the researchers' interest in ensuring rigor throughout the research process, traditional criteria (albeit the sense in which the terms are used were changed slightly to reflect a qualitative perspective) for the evaluation of research, namely reliability, replicability and validity, were considered. These were mixed with alternative criteria for assessing qualitative research proposed by Guba and Lincoln (1985) which were considered appropriate to the research at hand; trustworthiness (encompassing credibility, transferability, dependability and confirmability) and authenticity (encompassing fairness, ontological authenticity, educative authenticity, catalytic authenticity and tactical authenticity). Furthermore, the researchers attempted to limit interference in the research through the mix of research methods used. Ultimately, the criteria of relevance of research (Bryman, 2008:34) guided our study.

4 Findings

4.1 Building Relational Capital

While strong links were evident between relational capital building and legitimising activity, we considered them separately to distinguish between implicit personal attempts to legitimise and the more deliberate attempts, through social means, to effectuate formation efforts. In exploring the business plans and interviewee transcripts, five types of relational capital building engaged in by CORD-funded start-up entrepreneurs were identified and set out in Table 3.

Table 3: Types of Relational Capital Engaged in During New Venture Formation

Type Of Activity	Nature Of Activity

A. Development of Networks and Contacts:	• Local/Regional Business Contacts • SEEPP and WIT/HEI Contacts • Services/Supplier Contacts • Supply Chain Relationships • Sector Specific Contacts • Support Agencies Contact • Customer/Client Contacts
B. Building Public Profile:	• Public Relations - Letters To Newpapers/Ezines/Company Newsletters/Blogs/Twitter Pages, Research/White Papers and Reports; • Social Media Sites and Web Site • Participation (and Sponsorship of) in Sporting and Other Outside Interests • Attendance and Participation in Trade Fairs/Conferences • Trials and Demonstrations • Advertorials, Editorial Features
C. Relationship Building:	• Referrals and Introductions • Confidant(e) • Use of Reference Clients and Beta Sites
D. Accessing and Leveraging Knowledge Experts:	• Research Links • Strategic Alliances • Innovation Partnerships
E. Membership of Associations:	• Professional Bodies • Industry Associations • On-Line Forums/Networks/Groups

These activities were deliberately deployed by the entrepreneur to gain access to resources, support agencies and potential clients, develop sales or marketing channels, build relationships, access knowledge and information, draw attention to or enhance their public profile, legitimise themselves or their new venture. Thus, an obvious symbiotic link exists between these relational capital building activities and legitimacy activities.

The findings indicate that the type and nature of activity engaged in varies considerably throughout the formation process becoming less general and more sector-specific as the process intensifies. The technology entrepreneur's efforts turn from personal legitimising activity to building explicit partnerships and value chain relationships. Thus a key point to emerge is that personal legitimacy precedes or is encompassed in relational capital efforts, the latter activity is dependent on the former activity to enact to some extent. Each type is addressed more fully in this section of the paper beginning with development of networks and contacts.

4.2 Development of Networks and Contacts

From an analysis of the business plans, it is evident that some of the entrepreneurs studied had networks that were aspirational rather than real in that they had set out in their business plans who and how they will build networks with, but had not activated the process of relational capital building. On further examination, those that recorded aspirational relational capital building are less likely to be up and running by the end of the programme or never set up the business.

Strong variances were apparent in the type of relational capital developed with Professional, Scientific, and Technical Activities and Financial and Insurance Activities sectors pursuing local and regional business contacts more than the other sector categories. This most likely arises because of the need to develop a local and regional client base in the services industries. Other economic sectors such as Manufacturing and ICT displayed interest in pursuing national and international networks from early on.

Building value chain relationships and sharing information, with suppliers, network partners, OEMS, subcontractors, are very much in evidence, particularly amongst those involved in outsourcing and shared product development. Sector specific contacts, particularly those gained from prior employment are notable, oftentimes providing the first sales leads or reference site to the emerging enterprise. A key point to note, the youngest age cohort relied heavily on their university or college *alma mater* for networks and research inputs which dissipated over time as the firm became established, as evidenced from interviewee 11 and business plan 27 extract:

> …so when XXXX shut down in Dublin in 200X, then about 10-20 different companies all spun out from the people that worked there …so there was a really entrepreneurial spirit about the place and everyone wanted to go out and do their own business after that...so I have a great network of people that I used to work with there.
>
> The first approach will be to XXXX because of close connections with that company.

Quid pro quo arrangements were cited by 15 out of the 25 interviewees in our study as a means to share knowledge with others and engage in casual advisement or consultancy roles to peers or first clients. Oftentimes this stretched to providing a first product or service for free or for a trail period to gain access to a market, without any financial commitment from the customer as described by Interviewee 18:

> …then with our first customer to build credibility we said we'd build something for free, we'd build a piece of software for nothing and if they liked it and if they could see a use in it then…so it was a gamble really like…but they liked it and they did see a use in it, so they did go for it

4.3 Building Public Profile

Public relations is regarded by the entrepreneurs as an effective and cheap means of self and new venture promotion: 'Media will be used sparingly due to cost, but we will plan a P.R. campaign based on attracting food writers in the print media (Broadsheets and Irish Weekly and Monthly Magazines)' [Extract Business Plan 12].

A combination of letters to newpapers/ezines/company newsletters, research/white papers and reports to gain access to the media, to gain legitimacy and build brand awareness, to use as a platform for future promotional activity and to attract take-up and referral from other media were used.

Attendance and participation in trade fairs are heavily used amongst interviewees, especially prior to first sales to introduce the product and promoter in the industry and at formation and to help launch the product onto the marketplace. Trade exhibitions were the favoured outlet for networking and product promotion rather than conferences or seminars, which were not conducive to developing sales. This forum has proven invaluable for showcasing new product innovation and for garnering initial market reaction to the product or service to be introduced or to test market the new innovation or product offering as outlined in extract for Business Plan 36:

> Once XXXX have built up suitable numbers of customers and revenue reserves, we will actively attend the most appropriate trade/road shows. This activity will primarily be used as the sales activity to generate sales and leads for the sales channel.

It is interesting to note that nine of entrepreneurs mentioned their participation in (and sponsorship of) sport, particularly Gaelic football or soccer as a means of generating exposure for their business. Participation in local sporting activities was considered a cost effective means of garnering local knowledge about services and other local businesses with potential leads to a local client base as noted by Interviewee 4:

> I participate in a fair bit of sport, football, and the company now sponsors a Gaelic team, a club in XXX so all these things allow you to network to some extent and as well as take the benefit from these places and bring some benefits to them….socially and everything else from our own point of view so that you have people to talk to and maybe do business with…get involved…so the approach to networking is try and talk to as many people as you can, even though sometimes you can't get away from the desk.

Venture-specific feedback from trials, demonstrations or the introduction of a tangible working prototype or model, such as a 3D model or simulation, provided a huge endorsement of the new product innovation. In some instances beta sites, prototype testers or those involved in the development of same became first customers. Trials or demonstrations were used to create momentum for the product and draw in potential buyers simultaneously. Three of the technology entrepreneurs in business to business market (e.g. highly technical products or heavy machinery type equipment) found trials most useful to allow people see and visualise the product in action and helped illustrate its efficacy to those unfamiliar with the promoter or the new venture.

4.4 Relationship Building

Our findings indicate that the overriding purpose of relationship building to the new venture entrepreneur was to establish credibility with individuals important to their venture formation efforts. Two types of activities used for relationship building were in evidence, first, *referrals and introductions* from existing contacts and second,

building and maintaining customer relationships, which was considered most imperative to relationship building. This form of relationship building was linked most often by the entrepreneurs to sales development. The business plan 1 extract below succinctly illustrates this:

> Our goal is to increase turnover to approximately €2m within three years. This will be achieved through building successful long-term relationships with our clients and by having the ability and resources to expand our business in line with our customers' needs.

The symbiotic relationship between winning sales and building a client base is apparent, with each becoming easier as the other is developed and maintained as evidenced from interviewee 3: 'so the initial business that was won was by dint of the relationship we had with clients'. Using referrals and introductions to their advantage is also a skill that the entrepreneur learned to hone in the course of venture formation as outlined by interviewee 11:

> …for me the credibility is that with people that would count at the moment in terms of business contacts and investors and recommendations, so I am not afraid to say to someone can you introduce me to that person or can you recommend me for that.

The use of reference clients, those involved in prototype development and beta sites were used extensively by the cohort examined to lend weight to early sales pitches and provide much-needed product and market feedback during the new venture formation process as outlined by Interviewee 2 and from Business Plan 5:

> …get a couple of names behind you and the product has to be good…we always use them as references you know…I mean if you say it to one XXXX manager that "well so and so has it down the road"…they kind of feel a bit well...we should have this too.
>
> We need brand-name reference clients. By the end of 200X, we need to have fifteen major brand names we can cite as clients.

An interesting difference emerged across the cohorts examined between younger (age group 25-34 years) and other age categories, with the younger age group using social networking sites to build contacts whereas these are not mentioned at all by older age cohorts. This is especially noted in the last two years intake 2007 and 2008 studied. Interviewee 8 explains the rationale for this:

> ...it's very easy to access people through the web directly rather than through a third party, so using things like Facebook all those social network sites, YouTube you can get access to an awful lot of people very quickly.

4.5 Accessing and Leveraging Knowledge Experts

Our study found that entrepreneurs accessed and leveraged external expertise more than internal. Only three entrepreneurs mentioned accessing knowledge expertise at WIT. Instead the entrepreneurs focused on accessing and leveraging external

expertise that were specific to their development or market needs. Of the entrepreneurs that did mention links with experts (lecturers) at WIT, they were accessed initially on a casual basis to provide a sounding board during concept development and to provide specific services such as developing a marketing strategy.

More specific third level expertise was called on during prototype development and to further legitimise their activities and provide tacit support for the venture in the market place as described by Interview 5:

> …there is a resources there so from the technical side... there would have been a lecturer in XXXX who would had been interested. She would have been consulted but we never had to go back and utilise her but it was a facility that was there.…I would advocate the importance of a centre like this where you have all the resources behind each feature that is required to set up a business. I would have struggled if you went into a centre in the middle of nowhere. By virtue of the course you had that continual linkage to all those facilities. I think that once you actually decide to go and do it you, to all to all intents and purposes, you are operating in a big environment where there is specialist skills for any kind of problem that may arise.

Notably, those that switched economic sector had a protracted search for research partners or links which delayed product development phases as noted by Interviewee 25:

> I just knew it would take a bit of time before I was going to meet the people that I could actually sit down and communicate with ….the first meeting with XXXX, I knew instinctively that this man knew exactly what I had ….because of the concept, the idea and where we could take it.

Outside of WIT, knowledge expertise was predominantly sourced through word of mouth, referrals or from previous employment contacts: 'so we started off with people we knew…. and took them from companies that we worked with before who know us' (Interviewee 10). Where the entrepreneur had existing contacts the findings indicate that they were in a better position to leverage those contacts to find other people pertinent to their formation effort:

> …so if I needed resources I went back through own network of people ….and I asked them 'do you know any one who can do XYX?'…..so if it was technology I am pretty self sufficient. I know who to go to (Interviewee 11).

Two entrepreneurs mentioned that they could not find a business partner, which collapsed the growth aspirations of the business and forced them to redirect efforts away from development or production to licensing or sale of the business.

4.6 Membership of Professional Bodies or Industry Associations

A surprising result emerged from those that mentioned strong involvement with industry associations (3 of those interviewed); all were still in the process of formation at the end of the Programme. Engagement and participation in industry associations did not seem to have a positive effect on the entrepreneurs ability to be

up and running post Programme or subsequently. The future tense used in the quote below from an interviewee that also supplied a business plan, indicates the aspirational rather than actual networking undertaken and perhaps points to arms length or loose contacts (and thus of no immediate benefit to them in developing contacts therein) rather than relationship build-up in the sector:

> Through its affiliation with the Irish Association of XXXX, XXX will target directly its intended market by advertising it's unique services through their monthly newsletters and annual conferences [Extract Business Plan 26].

4.7 Relational Capital Building

Across the entrepreneurial types studied, developing a client-based network is the most significant form of relational capital building undertaken (See Table 4 below). User type entrepreneurs used other incubatees and significantly, entrepreneurs in a related niche market to build their network. They also networked with technology development partners or would-be partners.

Producers similarly followed their clients and networked and developed contacts in their client base. Differing from this was the researcher type entrepreneur who networked with service providers and through referrals from service providers. Furthermore, this category tended to use social networking sites more often than the other categories. Their relational capital building efforts were noticeably more arms length (conferences and courses, through web sites, making contacts online through Facebook and other social networking sites), than the other categories. The researcher type were least likely to mention industry contacts or a close industry network of contacts. The relational capital building efforts of opportunist type entrepreneurs were similar to those of the producer and user categories other than they cited the use of fellow SEEPP participants for referrals and contacts. Non-tech entrepreneurs also pursued a client-focused contact base and mentioned the use of the Enterprise Ireland seminar series and expert contact base as did the researcher and opportunist entrepreneur.

Table 4 Approach to Building Relational Capital in Incubated Technology Start-Ups

Type of Technology Entrepreneur	**Relational Capital Activity**	**Approach**
Opportunist	Development of client network	• Referrals through other incubates • Contacts with specific expertise
User	Development of client network	• Referrals through other incubates • Referrals from contacts in related niche markets • Networking with tech. development partners/would-be partners
Producer	Development of client	• Referrals through other

	network	incubates • Contacts with specific expertise
Researcher	Development of contacts amongst service providers	• Referrals from service providers • Arms-length networking (conferences, courses, websites, industry association, social networking sites) • Contacts with specific expertise
Non- Technical	Development of client network	• Enterprise Ireland Seminar Series • Non HEI/WIT expertise

5. Discussion

Our findings suggest that researcher entrepreneurs tend to rely more on their alma mater and incubator firm as the source and starting point of relational capital building with half of this cohort mentioning them in their relational capital building efforts compared to less than twenty four percent of other types of technology entrepreneurs. Outside of this, their relational capital building efforts are predominantly arms-length (for example joining industry associations, Chamber of Commerce, attempting to become recognised in their industry through joining industry forums or advisory bodies). Conversely, all other types of technology entrepreneurs use client-focussed networking and targeted networking opportunities in industry or niche-specific fields uncommon amongst the researcher group. The conscious move away from loose industry connections such as industry associations and Chamber of Commerce events towards specific industry groupings or expert advise is very evident across this cohort: 'we got a bit more shrewd we stopped going to all these conferences...one to one that is all ….we are not interested in anything else' (Interviewee 7).

The use of social networking sites seems to be industry with the highest usage recorded amongst those, not surprisingly, in the ICT field. Novice entrepreneur's efforts to build a network seem more aggressive than those of nascent entrepreneurs. For instance, they mention asking for referrals, resources or contact leads, particularly from their service providers such as solicitors and accountants and using word of mouth more frequently than nascent types. Cold calling specific would-be clients and suppliers, introductions from industry contacts were also frequently cited techniques. Novice and serial entrepreneurs also displayed a strong ability to leverage their contact base in building new relationships evidenced by novice interviewee 19:

> As you build momentum, you find that referrals come from all angles like your suppliers will pass you referrals, Irish people overseas, the E.I. overseas office, so it all starts to come back.

Those engaged in international sales activity, cite the use of the Enterprise Ireland (E.I.) overseas network. Seven of the novice entrepreneurs mentioned that they used

their SEEPP network (referrals by other participants or contacts made through SEEPP) in building their business.

Customer and reseller agreements also featured strongly in their relational capital building efforts. Interviewee 11 who progressed from a nascent entrepreneur at Programme end to novice entrepreneur at time of interview best encapsulates relational capital endeavours:

> Sometimes it's just by chance you meet the right people but it is important to network, with the bank, the funding agencies, I don't mean network but they need to know you. They know me, I have credibility with them, but with the bank I never did, I never considered the bank as an investor. I never went in to meet my manager and give him an update on where the business is going so in that respect I kind of regret that. I am starting to do that now so it's really just people you think can make a difference to your business.

Conversely, serial entrepreneurs display a reversion to activities similar to the nascent entrepreneurs by using local services and displaying greater entrenchment in their local communities through active engagement in sporting and voluntary work. This, they assert, provides them with 'general knowledge about local service availability' and a quick forum for word of mouth. Serial entrepreneurs also display a heavy use (4 out of 5) of the SEEPP network for contacts, informal advice and *quid pro quo* arrangements. One key difference relates to their use of collaborative arrangements such as E.I.s Innovation Voucher Scheme, reseller or distributorship agreements and outside involvement in prototype development more often than the other cohorts (60 percent as opposed to 25 percent of novice and nascent entrepreneurs). Their relational capital techniques may reflect their older age profile with the average age of this group being fifty compared to thirty six for novice entrepreneurs.

The criticality of relational capital in accessing resources, markets, expertise and innovation is highlighted by Nahapiet and Ghoshal (1998); Juma and Payne (2004); Gartner and Carter (2004), Liao and Welsch (2005), Van de Ven (1993) it is a 'collective achievement' that falls within broader social processes. The relational capital building activities pursued by the technology entrepreneurs investigated pointed to variances, with those still in the process of start-up having aspirational, arms length or loose networks rather than resourcing or client-level ties or alliances established. This is evidenced by the surprising finding that engagement and participation in industry associations, most prominent amongst those 'still in the process of trying', did not seem to have a positive effect on venture formation.

Thus the difference between those that were 'still in the process of trying' and those that were 'up and running' by the end of the programme maybe attributable to the *type* of relational capital engaged in, thus supporting Davidsson and Honig (2003) stance. This finding points to the importance of leveraging relational capital in ways to develop ties that provide immediate access to pertinent resources to effectuate the formation process as postulated by Pena (2002). Gabrielsson and Paulsson's (2004) description of an agent that is socially capable (ability to convince others) that facilitates the mobilisation of resources is supported here. Conversely, pursuing weak ties or networking at arms length does not seem to provide the resources required to

build the new venture as previously noted by Aldrich and Zimmer (1986); Beaver and Prince (2002) and Gartner (1985). Of particular resonance with this finding is the work of Aldrich and Martinez (2001) who delineated three dimensions to social capital; social resources, network position and the strength of relationships. In line with this research, they discovered that 'diversity is important because ties with more than one person with similar characteristics do not provide access to new information'. In extending this point, while traditionally, thinking prevailed of the strength of loose ties (see Granovetter, 1974), newer research confirms that strong ties 'ties with high levels of trust and emotional closeness between two individuals' are important in helping the start-up effort Aldrich and Martinez (2001:47) as were individually developed social ties particularly in highly innovative sectors (Jack and Anderson, 2002). The fact that many of the entrepreneurs mentioned their spouse or partner as their key confidant in making difficult decisions supports contemporary thinking of the value of maintaining close personal ties as a trusted, supportive sounding board and in sense making (Hormiga, Batista-Canino and Sanchez-Medina, 2011). The findings indicate the importance of maintaining a breadth of strong ties that provide access to resources and a depth of personal ties that provide support and facilitate sense making.

6 Concluding Thoughts

In summary, our study identified four types of relational capital building development of networks and contacts, relationship building, accessing and leveraging knowledge experts and members of associations. Using Evans Jones (1995) categorization of technology entrepreneurs that users, producers, opportunists and non–technical entrepreneurs engaged in client focused relational capital building, whereas researcher types networked with service providers and displayed arms length relational capital building styles.

We see that knowledge assets and networks are critical elements in supporting incubator technology entrepreneurs. New ways need to be explored to facilitate exchange and relationship building between the technology entrepreneur and Higher Education Institute (HEIs) as hothouses of relational capital resources. Further, the incubator setting provides a strong opportunity to hone the technology entrepreneur's relational capital building skills not least the researcher type who is slower to engage with the outside world. Finally, from a policy perspective, much work has been done at national and EU level to develop a supportive environment for technology start-ups. The recent initiation of Horizon 2020 funding to facilitate and fund ICT start-ups is welcome news. Focus needs to be granted to the intangible, intellectual capital resources needed by the technology entrepreneur. Whilst the effect is harder to measure, intellectual capital is without question a much needed resource for the new venture in accessing the markets, products and knowledge to grow the technology enterprise.

References:

Abetti, P.A. (2004) 'Government-supported Incubators in the Helsinki Region, Finland: Infrastructure, Results and Best Practices', *Journal of Technology Transfer,* 29 (1): 19-40.

Aerts, K., Matthyssens, P. and Vandenbempt, K. (2007) Critical role and screening practices of European business incubators, *Technovation*, 27(5), 254-267.

Aldrich, H. and Martinez, M.A. (2001) 'Many are Called, but Few are Chosen: An evolutionary perspective for the study of entrepreneurship', *Entrepreneurship Theory and Practic*e, Summer 2001, pp 41 - 56.

Aldrich, H. and Zimmer, C. (1986) 'Entrepreneurship Through Social Networks'. In Sexton, D. and Smilor, R. (eds.) *The Art and Science of Entrepreneurship*. New York: Ballinger, pp 3- 23.

Allen, K and Stearns, T. (2002) 'Nascent High Tech Entrepreneurs; The Who, Where, When And Why'. In Libecap, G. D. (ed.) *Issues in Entrepreneurship: Contracts, Corporate Characteristics and Country Differences*. Elsevier Science: UK, pp 195-218.

Almeida, P., Dokko, G., and Rosenkopf, L. (2003) 'Start-Up Size and The Mechanism of External Learning: Increasing opportunity and decreasing ability?' *Research Policy,* Vol. 32, pp 301-315.

Amabile, T., Patterson, C., Mueller, J., Wojcik, T., Odomirok, P. and March, M. (2001) 'Academic-Practitioner Collaboration in Management Research: A case of cross – profession collaboration', *Academy of Management Journal*, Vol. 44, No. 2, pp 418-431.

Audretsch, D., B., W. Bönte, and M. Keilbach (2008) Entrepreneurship capital and its impact on knowledge diffusion and economic performance, *Journal of business venturing*, 23, 687-698

Beaver, G. and Prince, C. (2002) 'Innovation Entrepreneurship and Competitive Advantage in the Entrepreneurial Venture', *Journal of Small Business and Enterprise Development,* Vol. 9. No. 1, pp 28 – 37.

Bergek, A. and Norrman, C. (2008) Incubator best practice: A framework. *Technovation*, 28(1-2), 20-28.

Bhave, M (1994) 'A Process Model of Entrepreneurial Venture Creation', *Journal of Business Venturing*, Vol. 9, pp 223-242.

Borchert, P. and Zellmer-Bruhn, M. (2010) Great Expectations: The Influence of Human and Relational Capital on the Magnitude of Early Venture Goals, *Journal of Applied Management and Entrepreneurship*, Vol. 15, No. 4, pp53-72.

Borchert, Patricia; Zellmer-Bruhn, Mary (2010). Great Expectations: The Influence of Human and Relational Capital on the Magnitude of Early Venture Goals, *Journal of Applied Management and Entrepreneurship*, Vol. 15, No. 4, pp53-72.

Bryman, A. (2008) *Social Research Methods (3rd edition),* London: Oxford University Press.

Carter, N., Gartner, W. and Reynolds, P. (1996) 'Exploring Start –Up Event Sequences', *Journal of Business Venturing*, Vol. 11, pp 151-166.

Central Statistics Office (2006) *Statistical Yearbook of Ireland,* Dublin: Government Publications Office.

Central Statistics Office (2008) *Statistical Yearbook of Ireland,* Dublin: Government Publications Office.

Colombo, M. G. and Delmastro, M. (2002) How effective are technology incubators?: Evidence from Italy. *Research Policy*, 31(7), 1103-1122.

Cooper, S. (2000) 'Technical Entrepreneurship'. In Carter, S and Jones – Evans, D. (eds), *Enterprise and Small Business: Principles Practices and Policy*, Financial Times/Prentice Hall : UK, Chapter 13, pp 220 – 241.
Cooper, S. and Park J. (2008) 'The Impact of' Incubator Organizations' on Opportunity Recognition and Technology Innovation in New, Entrepreneurial High-technology Ventures. *International Small Business Journal*, Vol. 26, No. 1, pp 27-50.
Danish Trade and Industry Development Council, (1997), *Intellectual Capital Accounts: Reporting and Managing Intellectual Capital*, Danish Trade and Development Council, Copenhagen
Davidsson, P., and Honig, B. (2003) 'The Role of Social and Human Capital Among Nascent Entrepreneurs', *Journal of Business Venturing*, Vol. 18, pp 301-331.
Delmar, F, and Shane, S. (2003) 'Does Business Planning Facilitate The Development Of New Ventures?' *Strategic Management Journal*, Vol. 24, pp 1165 - 1185.
Delmar, F, and Shane, S. (2004) Legitimating First: Organizing activities and the survival of new ventures. *Journal of Business Venturing*, Vol.19, pp 385 - 410.
Department of the Taoiseach (2008) *Building Ireland's Smart Economy: A Framework for Sustainable Economic Renewal*, Dublin: Government Publications , COffice.
Edelman, L., Manolova, T. and Brush, C. (2008) 'Entrepreneurship Education: Correspondence Between Practices of Nascent Entrepreneurs and Textbook Prescriptions for Success. *Academy of Management Learning and Education*, Vol. 7, No. 1, pp 56 – 70.
Enterprise Ireland (2009) *Commercialisation of Research and Development (CORD)* [Online] Cited 5th December 2009) Available from: URL<http://www.enterprise-ireland.com/researchInnovate/Research+Commercialisations>
Eurostat (2008) NACE Rev. 2: Statistical classifications of economic activities in the European Community, Luxembourg Office for Official Publications of the European Communities.
Gabrielsson, Å. and Paulsson, M. (2004) *Individual and Human Agency in Strategic processes. A synthesis and action logic approach. (English Version),* Studier I företagsekonomi serie B, nr55. Umeå: Umeå Universitet, Företagsekonomiska Institutionen.
Gartner, W. (1985) 'A Conceptual Framework for Describing the Phenomenon of New Venture Creation'. *Academy of Management Review*, Vol. 10, No. 4, pp 696-706.
Gartner, W. and Carter, N. (2004) 'Overview: The start-up process'. In Gartner. W., Shaver, K., Carter, N. and Reynolds, P. (eds), *Handbook Of Entrepreneurial Dynamics: The Process Of Business Creation,* Thousand Oaks: Sage Publications.
Gately, C. and Cunningham, J. (2014 In Press) The Contributions and Disconnections Between Writing a Business Plan and the Start-Up Process for Incubator Technology Entrepreneurs, Academic Entrepreneurships Creating an Entrepreneurial Ecosystem in *Advances in Entrepreneurship, Firms Emergence and Growth,* 16,197-240. ISSN: 1074-7540/doi:10.1108/S1074-754020140000016007
Granovetter, M. (1974) *Getting a job: A study of contacts and careers,* Cambridge, MA: Harvard University Press.
Grimaldi, R. and Grandi, A. (2004) 'Business Incubators and New Venture Creation: An assessment of incubating models'. *Technovation*, Vol. 25, Issue. 2, pp 111-121.
Guba, E. and Lincoln, Y. (1985) *Naturalistic Inquiry*, California: Sage Publications.

Hambrick, D., Cho, T. S. and Chen, M-J. (1996) 'The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves', *Administrative Science Quarterly*, Vol. 41, No. 4, pp 659-684.
Hess, D. (1987) 'The Relevance of Small Business Courses to Management Needs', *Journal of Small Business Management*, Vol. 25, No. 1, pp 26-35.
Hormiga, E., Batista-Canino, R. and Sanchez-Medina, A. (2011) The Role of Intellectual Capital in the Success of New Ventures, *International Entrepreneurship Management Journal [online],* Vol. 7, pp 71-92.
Hormiga, Esther; Batista-Canino, Rosa; Sanchez-Medina, Agustin (2011). The Impact of Relational Capital on the Success of New Business Start-ups, *Journal of Small Business Management*, Vol. 49, No 4, pp 617-638.
Jack, S. and Anderson, A. (2002) 'The Effects of Embeddedness on the Entrepreneurial Process', *Journal of Business Venturing*, Vol. 17, pp 467-487.
Jones-Evans, D. (1995) 'A Typology of Technology Based Entrepreneurs: A model based on previous occupational background', *International Journal of Entrepreneurial Behaviour and Research*, Vol. 1, No. 1, pp 26-47.
Jones-Evans, D. (1997) 'Technical Entrepreneurship, Experience and the Management of Small Technology – Based Firms'. In Jones-Evans, D. and Klofsten, M. (eds) *Technology, Innovation and Enterprise: The European Experience,* London: Macmillan Press.
Juma, N. and Payne, G.T. (2004) Intellectual Capital and Performance of New Venture High Tech Firms, *International Journal of Innovation Management*, No. 8 p297.
Juma, N. and Payne, G.T. (2004) Intellectual Capital and Performance of New Venture High Tech Firms, *International Journal of Innovation Management*, No. 8 p297.
Kane, E. (1995) *Doing Your Own Research*, London: Marion Boyars.
Katz, J. and Gartner, W. (1988) 'Properties of Emerging Organizations', *The Academy of Management Review*, Vol.13, No.3, pp 429-441.
Krippendorff, K. (2004) *Content Analysis: An Introduction to Its Methodology*, (2nd edition), London, UK: Sage Publications.
Liao, J. and Welsch, H. (2005) Roles of Social Capital in Venture Capital: Key Dimensions and Research Implications, *Journal of Small Business Management,* Vol. 4, pp345-362.
Liao, J. and Welsch, H. (2003) 'Social Capital and Entrepreneurial Growth Aspiration: A comparison of technology and non-technology based nascent entrepreneurs', *The Journal of High Technology Management Research,* Vol. 14, pp 149-170.
Liao, J. and Welsch, H. (2005) Roles of Social Capital in Venture Capital: Key Dimensions and Research Implications, *Journal of Small Business Management,* Vol. 4, pp345-362.
Liao, J. and Welsch, H. (2008) 'Patterns of Venture Gestation Process: Exploring the differences between tech and non-tech nascent entrepreneurs', *Journal of High Technology Management Research*, Vol. 19, pp 103-113.
Low, M.B. and MacMillan, I.C. (1988) 'Entrepreneurship: Past research and future challenges', *Journal of Management,* Vol.14, No.2, pp 139 - 161.
Lowendahl, B. (1997) *Strategic Management of Professional Service Firms*, Handelshojskolens Forlay, Denmark: Copenhagen.
Lowendahl, B. (1997) *Strategic Management of Professional Service Firms*, Handelshojskolens Forlay, Denmark: Copenhagen:

Marr, B. (2005) *Perspectives on Intellectual Capital: Multidisciplinary Insights into Management Measurement and Reporting*. Elsevier, Butterworth-Heinemann, UK: Oxford.
Miles, M. and Huberman, A. (1994) *Qualitative Data Analysis: An Expanded Sourcebook*, (2nd edition), Thousand Oaks, CA: Sage.
Nahapiet, J. and Ghoshal, S. (1998) Social Capital, Intellectual Capital and Organisational Advantage. *Academy of Management Review*, Vol.23, No.2, pp242-266.
O'Gorman, C., Bourke, S. and Murray, J. (2005) 'The Nature of Managerial Work in Small Growth-Oriented Businesses', *Small Business Economics*, Vol. 25, pp 1-16.
Pages, E., Freedman, D. and Von Bargen, P. (2001) 'What Makes a Region Entrepreneurial?' *Economic Development Commentary*, Winter, 2001.
Pena, Inaki (2002) Intellectual Capital and Business Start-up Success, *Journal of Intellectual Capital*, Vol. 3, No 2, pp180-198.
Pew Tan, H., Plowman, D. and Hancock, Phil (2008) The Evolving Research on Intellectual Capital, *Journal of Intellectual Capital*, Vol. 9, No. 4, pp585-608.
Pew Tan, Hong; Plowman, David; Hancock, Phil (2008) The Evolving Research on Intellectual Capital, *Journal of Intellectual Capital*, Vol. 9, No. 4, pp585-608.
Prodan, I. (2007) 'A Model of Technological Entrepreneurship'. In Thérin, F. (Editor) *Handbook of Research on Techno-Entrepreneurship*. USA: Edward Elgar Publishing.
Reynolds, P. (1995) 'The Truth about Start-Ups'. *Inc*., Vol.17, No. 2. pp 23-24.
Reynolds, P. (2000) 'National Panel Study Of US Business Start-ups: Background and Methodology', *In Databases for the Study of Entrepreneurship*, Vol. 4, pp153-227, Greenwich, CT: JAI Press/Elsevier.
Reynolds, P. and Miller, B. (1992) 'New Firm Gestation: Conception, birth and implications for research', *Journal of Business Venturing*, Vol. 7, pp 405-417.
Reynolds, P. D., & Curtin, R. T. (2008) Business Creation in the United States: Panel Study of Entrepreneurial Dynamics II Initial Assessment. Foundation and Trends in Entrepreneurship, 4(3).
Scandura, T. and Williams, E. (2000) 'Research Methodology in Management: Current practices, trends and implications for future research', *Academy of Management Journal*, Vol. 43, No. 6, pp 1248-1264.
Shane, S., & Venkataraman, S. (2003). Guest editor's introduction to the special issue on technology entrepreneurship. *Research Policy*, 32, 181-184.
Shane, S. (2001) "Technological Opportunities and New Firm Creation," *Management Science*, 47, 204-220.
Shane, S. and Stuart, T. (2002) 'Organizational Endowments and the Performance of University Start-Ups', *Management Science*, Vol. 48, No. 1, pp 154 – 170.
Shapiro, G. and Markoff, J. (1997) 'A Matter of Definition'. In Roberts, C.W. (editor) *Text Analysis for the Social Sciences*, New Jersey: Lawrence Erlbaum Associates, Inc, pp 9 – 31.
Sherman, H. (1999) 'Assessing the Intervention Effectiveness of Business Incubation Programs on New Business Start-ups', *Journal of Developmental Entrepreneurship*, Fall 1999, Vol. 4, No. 2, pp117-133.
Snow, C. and Hrebiniak, D. (1980) 'Measuring Organisational Strategies: Some theoretical and methodological problems', *Academy of Management Review*, Vol. 5, No. 4 pp 527-538.

South East Enterprise Platform Programme (SEEPP) (2005) *New Course Evaluation – Form CE1*, Waterford: South East Enterprise Platform Programme, Department of Management and Organisation, Waterford Institute of Technology.
Stewart, T.A. (1997) *Intellectual Capital: The New Wealth of Organizations*, New York: Bantam Doubleday, Dell Publishing Group.
Stewart, T.A. (1997) *Intellectual Capital: The New Wealth of Organizations*, New York: Bantam Doubleday, Dell Publishing Group.
Symon, G. and Cassell, C. (Eds.) (1998) *Qualitative Methods and Analysis In Organizational Research: A Practical Guide.* London, UK: Sage Publications.
Tesfaye, B. (1997) 'Patterns of Formation and Development of High-Technology Entrepreneurs', In Jones-Evans, D. and Klofsten, M. (eds). *Technology, Innovation and Enterprise: The European Experience*, London: Macmillan Press.
Tornikoski, E.T. and Newbert, S.L (2007) 'Exploring the Determinants of Organizational Emergence: A legitimacy perspective', *Journal of Business Venturing,* Vol. 22, pp 311-335.
Totterman, H. and Sten, J. (2005) 'Start-ups: Business Incubation and Social Capital, *International Small Business Journal*, Vol. 23, pp 487-511.
Ucbasaran, D., Westhead, P. and Wright, M. (2001) 'The Focus of Entrepreneurial Research: Contextual and process issues', *Entrepreneurship Theory and Practice,* Vol. 25, pp 57-80.
Van De Ven, A.H. (1993) 'The Development of an Infrastructure for Entrepreneurship'. *Journal of Business Venturing,* Vol.8, pp 211-230.
Van Stel, A., Carree, M. and Thurik, A.R. (2005) The Effect of Entrepreneurial Activity on National Economic Growth, *Small Business Economics,* 24.3, 311-321
Wilson, D. and Jarzabkowski, P. (2004) 'Thinking and Acting Strategically: New challenges for interrogating strategy', *European Management Review,* Vol. 1, pp 14-20