The development and use of social resources during the process of new venture development

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This paper sets out to explore longitudinally the use of social resources during the development process of a new venture. This paper empirically investigate the functions that social resources might serve, which include information and advice, bridging, and legitimacy, and their impact across a number of stages of development of a new venture. The focus is upon a single case study of a venture in the Irish Sciences and accounts for over six years of its development from opportunity recognition to the creation of a product line and accounts for the impact that the use of social connections had on their resource base. What emerges is that the social resources of the venture were used to in each of the periods of development of the firm across the functions that social resources can serve and that their use matched the aims of the venture to access or develop perceived salient resources according to their stage of development and had a significant bearing on the survival and development of this venture.

Key Words: Social Resources, New venture development, functions of relationships

Introduction:

The IMP has long championed and explored the centrality of relationships and networks as a central plank on which business is built (Hakansson (edt) 1982, ,Hakansson and Snehota (edt), 1995).Similarly, in exploring literature in the field of entrepreneurship in general and new venture development in particular, the importance of establishing, maintaining, and exploiting relationships and social networks in the development process of new ventures is a similar maxim that resonates within this field (see Hite, 2003; Hoang and Antoncic, 2003). However, although there is a renewal of interest in the area of entrepreneurship in general and new venture creation and development in particular within the IMP, with over 20 papers at the IMP conference in the last five years dealing with some aspect of entrepreneurship or new venture development, there is still many areas that need further exploration. Like Shaw, Grant & Wilson (2009) this paper will in the main move outside of general IMP literature to take in literature from entrepreneurship to explore and account for the use of and functions served by relationships (termed social resources in this paper) across stages of development in in the process of new venture development with the hope that some form of cross-pollenization may occur.

To grow and develop, nascent firms need to identify and access a number of different types of resources during a variety of stages of development with particular types of resources having greater perceived salience at particular points (Brush, Greene, & Hart, 2001; Lichtenstein & Brush, 2001). Such resources can include the likes of human, financial, social, physical and technological (Aldrich, 1999; Brush, Greene & Hart, 2001; Lichtenstein & Brush, 2001; Helfat & Lieberman, 2002). How resources are used and developed will depend on the stage of development of the firm, but during the early stages of development of a new venture it is the identification and access to resources that is crucial to the survival and growth of these firms (Lichtenstein & Brush, 2001). Central to these early stage development processes is the use of social connections, whether inter-organizational or interpersonal relationships, which are considered key as these are the media through which resources are accessed and developed (Hoang & Antoncic, 2003). The use of social connections may assist in acquiring required resources, solving problems in the process of new venture development, and be used to communicate and reduce uncertainty and risk (Hoang &Antoncic, 2003). The focus therefore shall be upon the use of relationships as resources and empirically explores the functions that these social resources can be used in this process of emergence and development, namely information and advice (Ozgen & Baron, 2007), bridging (Granovetter, 1973; Hite and Hesterly, 2001) and the communication of legitimacy (Zott & Huy, 2007) and the impact that these have on

resource acquisition and development. As such what shall be explored is how relationships are used to gain useful information that may assist in acquiring required resources, solve problems in the process of development, and communicate and reduce uncertainty and risk that shrouds such firms (Hoang &Antoncic, 2003).

The paper will begin with a review of literature specifically focused on the importance of social resources in general and the functions that these resources can serve, namely information and advice, bridging, and legitimacy in particular. Following on from a case study shall be outlined that outlines the development of an Irish start-up in the life sciences over a six year period. Following from this a discussion of the case shall ensue accounting for the use of these social resources across by the venture and the impact that they had on the acquisition and development of resources.

Literature Review on Social Resources

The use of social connections, whether through personal or inter-organizational forms of relationships have been a concern of the field of entrepreneurship for a number of years (Hoang and Antoncic, 2003) and the importance of these social connections is well recognized (Aldrich and Zimmer, 1986; Hite and Hesterly, 2001). Why such a focus is placed on these forms of connections is because new ventures start with little or no resources, depending on initial resource endowments (Shane and Stuart, 2002), and as such to build a resource base to develop a nascent firm, they must gain access to external resource providers for survival and future development (Jarillo, 1989; Hite 2005). Accordingly, one of the few resources that very early stage ventures have is the social connections and capital that members of a new venture bring with them.

Furthermore the types of connections that are utilized in the very early stages of development tend to be drawn from a network of socially embedded ties such as family and friends (Larson and Starr, 1993) and based more on personal or social identification (Hite and Hesterly, 2001). Why these connections are utilized initially is because they are more likely to provide resources or support when others are unwilling (Hite and Hesterly, 2001). Baker et al (2003), in their study of improvisation in the founding process observed that the founders from their study relied heavily on pre-existing networks to access resources during this early stages of development. However as a new venture evolves over time these ties tend to develop into broader set of ties that includes more

functional or work-based ties (Hite and Hesterly, 2001). This occurs because the resources required for the development of new ventures may not be available from the initial social network that the new venture started out with. So an important aspect of the development of a new venture is the broadening and diversification of the connections to access required resources and further develop. As well as changes to the type of social connections during the development of a new venture, it is worth noting that these types of connections can be used in a number of ways including use for information and advice (Ozgen and Barron, 2007) acting as bridges (Granovetter, 1973), and providing status and legitimacy (Shane and Cable, 2002, Higgins and Gulati, 2003, Zott and Huy, 2007). Each of these shall now be briefly touched upon.

An interest in the use of information and advice in entrepreneurial research is a well established area of research within entrepreneurship in particular in the area of opportunity recognition and development (Hills, Lumpkin, Singh, 1997; Shane, 2000, Ardichavili, Carodozo, and Ray, 2003; Hoang & Antoncic, 2003). Entrepreneurs during the development process of a new venture not only look for physical or monetary resources but also for reassurance, and information and advice (Birley, 1985) and that both formal sources (such as financial institutions, business associations) and informal sources (such as business acquaintances, family and friends) can be used (Birley, 1985). Of these at the early stages, more informal sources are often judged to be the most valuable (Smeltzer, Fann, and Nikolesean, 1988). The social source of information and advice for new ventures has a wide range from mentors (Ozgen and Baron, 2007), industry association and professional forums such as conferences, workshops and so forth (Ozgen and Baron, 2007), advisors (Smeltzer, Van Hook, & R. Hutt, 1991). Ozgen and Baron (2007) found that entrepreneur's opportunity recognition ability, although mediated by schema strength, was assisted by their use of professional forums. Whilst, Smeltzer et al (1991) found that a number of advisors could be used during the early stages of development with the number of advisors increasing as the length of the pre-operational phase increased. However, although social connections can be used for information and advice they can also be used for a number of other functions and it is necessary to turn and explore these.

Within the entrepreneurial literature on social connections there is a great interest in how connections can be used as bridges (Granovetter, 1973) and/or for brokering (Burt, 1992; see also Hite and Hesterly, 2001; Hite, 2005). Of concern to this paper is not so much the filling of structural holes or the redundancy/non-redundancy of network ties but how social connections that are created and fostered over time can be used as a bridge to gain access to resources over the development of a new venture. For example social connections can be used as bridges can be used

to gain board members or access to gain orders from larger companies that would not normally deal with such a new venture (Robinson & Stubberud, 2010). Similarly, new ventures can use social connections to access other types of resources such as finance, physical resources, technological resources and so forth. It should be noted that the use of connections and the types of resources to be accessed by a new venture will be mediated to an extent by the prior experience of the individuals involved (Mosey and Wright, 2007). Furthermore, social connections do not necessarily have to be used as a bridge but can also be used for gaining direct access to perceived required resources.

Finally, another potential use of social connections, to be considered here, is for legitimating purposes. With the development of new ventures being a process characterized by great uncertainty and risk and new ventures suffering from the liability of newness (Stinchcombe, 1965) with uncertain markets, products, organizational processes and so forth (Aldrich & Fiol, 1994), a new ventures will often try to develop particular types of resources and carry out certain types of activities to gain legitimacy in the eyes of targeted potential resource providers (Suchman, 1995; 269 Zimmerman & Zeitz, 2002). The types of resources required for legitimation will depend on the perceived stages of development of a new venture (Vohora, Wright, & Lockett, 2004; Drori, Honig, & Sheaffer, 2009). Legitimacy for this paper takes Zimmerman and Zeitz's (2002) view that it is a "social judgement of acceptance, appropriateness, and/or desirability" (p. 416). Legitimacy can come through a variety of sources including business plan construction and the legal incorporation of a firm (Delmar & Shane, 2004); inter-organizational endorsement (Stuart, Hoang, & Hybels, 1999) and individuals involved in a new venture and their reputation and prior experience (Shane & Cable, 2002, Higgins & Gulati, 2003). The perception of legitimacy surrounding a new venture will have an impact on the amount and types of resources such a firm can acquire from external resource providers but also how those acquired resources will be developed. Often during this process new ventures will try and use a variety of resources available to the venture to try and symbolically represent the value or prospects of their venture that potentially extends beyond the intrinsic or functional value of a resource at a particular point in time (Zott & Huy, 2007). The use of social connections can be used in part to fulfil this function. Stuart, Hoang and Hybels (1999) in their study of young biotech firms found that the prominence of alliance partners, equity investors and investment banks had an impact on the new ventures of their study to attract targeted resources. Similarly, Higgins and Gulati (2003) in their study of the impact of prior affiliations of senior managers in new biotech ventures found that senior managers whom had perceived prior high

status affiliations impacted the perceived legitimacy of the nascent biotechnology firms for resource acquisition. Finally, Zott and Huy (2007, pp. 92) found from their research that entrepreneurs used the perceived prestige of individuals or organizations associated with a nascent venture to try and acquire more resources.

As can be seen from above, the use of social connections has been investigated from a number of angles. However, what remains unexplored is how do new ventures use the three types of functions that a social resource can perform and what is the outcome from their use on resource acquisition and development across a number of stages of development. As such the aim of this study is to investigate this process. Before outlining and discussing the case it is necessary to turn and briefly outline the research methodology.

Research Methodology

The case presented below is to illustrate the use of social connections on the development of new ventures. The case consisted of a single longitudinal case study (Yin, 1994; Stake, 2000) where primary data was collected over a five year period, from 2001-2006, with multiple sources of evidence used to construct the case (Yin, 1994) ranging from formal face to face interviews to the collection and use of company business plans. The construction and analysis of the case was based upon the qualitative, longitudinal, and case construction ideas outlined by Strauss and Corbin (1990), Miles and Huberman(1994), Ropo and Hunt (1995) and Van der Ven, Angle and Poole (1989). Although the role and use of social resources was not the central target of the data collected, throughout this period information and insights around the construction, role and use of these connections was collected and it is this information that is used to provide an empirical illustration of ideas outlined above on the role and use of social resources in the development of this new venture.

A chronological approach to the process of new venture development (Ropo and Hunt, 1995) was taken and broke new venture development down into a variety of phases of development. Each period was divided out through either a major event or outcome occurring for the venture or the approach of a major event and the plans and anticipated activities that the venture would carry out to deal with these types of events. These are often alluded to as critical events or incidents that occur to a firm over time, whether in looking at episodes in a relationship or in the development of new ventures (Van de Ven, Angle, & Poole, 1989). However, it was not the intention of the

researchers to structure the research around critical events or incidents. The decision on periods of development emerged through natural breaks that the researchers' interpreted from the data. Due to space limitations and the size of the case what shall be presented below shall be a brief description of each of the phases of development of the case followed by a more detailed discussion of the part that social resources played and the functions that they served. This shall now follow.

Period 1: Opportunity Discovery and Initial Activities to Exploit a Perceived Opportunity (October 1999-January 2002)

Levodex is an Irish start-up venture started by two Irish Scientists working in a Dublin University. The nascent firm wished to specialize in the field of asymmetric chiral catalysis and wished to initially operate as a chiral platform provider that would help in the eventual end production of pharmaceutical products (such as for example Advil or L-Dopa), agro-chemicals or flavours and fragrances. The initial idea for the venture was to industrialise this process by using high through put experimentation and screening machinery (known as combinatorial technology) to greatly speed up the discovery and development of chiral catalysts. The idea originated in 1998 at an academic conference but it was not until late 1999 that the two principle promoters, Dr Barry Keenan (junior scientist who became COO/BDO for Levodex) and Dr. David Grant (senior scientist, who became part-time CSO for Levodex), agreed to form a company.

To begin the process of developing a new venture the nascent firm throughout 2000 took part in a campus company programme in their university about basic business principles for starting your own company on which they also received a mentor Stephen O'Sullivan. They constructed a rudimentary business plan and constructed a prestigious Scientific Advisory board which included a Nobel prize winning chemist, Prof. Barry Sharpless, the head of research for a Dublin University, Prof. Fitzsimons and two industrial chemists- Dr. Donald Andrews from NSC Technologies/DSM and Dr. Paul Nesson senior process chemist from Schering Plough/Pfizer. The SAB was constructed by Dr Grant from previous contacts that he had through his scientific work. Their use was premised on their expertise and knowledge in this area that could be utilized once funded as well as the legitimacy that could be communicated by having such experts attached. As well as the above Levodex also looked for guidance from other experienced entrepreneurs, and they in particular sought advice from a successful academic entrepreneur, Prof. Darren Fitzmaurice on their business plan. Levodex's initial plan was to gain funding of £30,000IR but they were advised that this might be too small for an investor so was subsequently scaled up to looking for €5 million to cover a four year

period which would fund the purchase of four trains of combinatorial machinery and the hiring of 12 scientists working in groups of three carrying out over 100 experiments every day.

At this stage they were looking to gain some small scale funding and applied to a campus company programme being run in the University Business School, which they found out about and were introduced to the director of the programme, John Connolly, by their campus company mentor, Stephen O'Sullivan. Just before the interview the chairman of their SAB won the Nobel Prize, which they credited as having a great impact onto their acceptance onto the programme. On being accepted in January 2002 they received €76,000 in grant funding from the campus company programme and Enterprise Ireland[1]. One stipulation was that they had to hire a recent MBA graduate from the Business School running the programme as CEO. For this they choose Paul Cranford, who had a background in Engineering but had never worked in the pharmaceutical or Life Science industries.

Period 2: The search for funding through Venture Capital (January 2002-April 2004)

This period in the main focuses on the search for funding through venture capital, as the amount required (€5 million to cover four years) was a large amount in an Irish context. At the time the venture capital funding in Ireland consisted of just over 20 indigenous funds with in general a tendency towards a lower level of funds (averaging around €20 million) across all the venture capital funds. In 2000, Enterprise Ireland invested in some already existing funds and helped establish new funds (15 in total between new and existing, which began looking to make initial investments between 2001 and 2003) with the express mandate to invest in seed and early stage projects. Within these funds one was specifically established to invest in the biotech/life sciences area (Venture Fund 1 12.7 million (2002 figure) while another, Venture Fund 2 (€19.6 million (2002 figure) was established to focus on Life Sciences, and Enabling Platform technologies. A third fund, Venture Fund 3 (€8.4 million (2002 figure)), was established to invest in spin-outs from universities at the seed stage in the areas of the Life Sciences, Material Sciences and ICT. In the investigation of an investment opportunity the venture funds 1, 2, and 3 considered three main criteria- the management team, intellectual property (IP) or potential IP, and market opportunity and financial considerations.

The first and primary consideration was the management team. For the management team they would look for the prior experience of the team with starting a venture, the success of that venture,

[1] Enterprise Ireland is a development agency for indigenous Irish firms

if they had any relevant international experience. They wanted to make sure that management team knew how develop a venture and be able to fully commercialize and develop and exploit an opportunity. The second consideration was Intellectual property (IP) or potential IP so they could mitigate against imitation, the potential loss of key staff and also have something of value that they could sell from the firm if the investment did not pan out. Finally they looked at the perceived market opportunity and financial considerations. They were wary of firms in this area without IP, relevant prior management experience and limited market opportunities and opaque business plans. Similarly they were unimpressed by SAB's for early stage ventures that were over-relied upon for the promotion of these types of firms. When they invested they did so with co-investors onboard and would put in place investment milestones to be met such as commercial, technological, and managerial. They were open to meeting all different types of potential entrepreneurs, they often met these entrepreneurs through introduction in particular through other venture capitalist, they also all attended technology showcase events like BioConnect Ireland. From the investment they saw themselves as bringing a commercial focus to a new venture.

Upon joining the incubation programme Levodex felt that they were initially well received, meeting 14-15 different funds, which they ascribed to the presence of a Nobel Laureate on their SAB but they were told, amongst other sticking points, that they would not receive any funding without IP. As such they started to search around the senior scientist's (Dr. Grant) lab work to see if there was anything that they could tie to the company in the form of IP to make them more attractive to potential investors. In the summer of 2002 they came up with what they called the P-process. The P-process was a modification of a method that could be used to discover and develop p-chiral catalysts. However, Levodex's method was not fully optimized and was only working at a very rudimentary level which would have to be greatly developed to fulfil this promise. However with this in mind they completely rewrote their business plan and began the process of searching for funding. To help in this process they drafted in a financial consultant Jason Kennedy, whom they were introduced through participants on the campus company programme that they were taking part on, to help with their business proposal, strategies to pursue in attracting investment, and negotiation with potential investors.

However, although there was great interest by venture fund 1 and 2 from the summer of 2002 until the spring 2003, they were turned down by venture fund 1 and 2 for investment. This was for a number of reasons including the amount of money sought, the underdeveloped nature of their potential IP and the lack of the experience of their management team. Upon advice from Kennedy they came up with what they termed the development initiative which they rolled out in the spring

of 2003. The development initiative was to look for around €700,000 in investment for 12 months that would be based on proof of concept and would involve buying a single train of machinery, hiring space in a lab, and hiring two chemists to develop their P-process.

Throughout this time there was some interest from venture fund 3 whom they met through there taking part in industry networking events[2]. From their involvement in a technology showcase at First Biotech they were introduced to Venture fund 3 who showed interest in the nascent firm. However, they were reticent to invest because of three reasons- the amount of finance required, the perceived market opportunity to be developed through their IP and the lack of experience of their CEO. With the introduction of the development initiative they became very interested but the uncertainty around the value of the opportunity and the management still persisted.

To overcome these twin problems the venture took two steps. They firstly used their two industrial chemists on their SAB to help overcome the problem about the potential size of their opportunity. They had Dr. Donald Andrews from their SAB to meet with the principals from venture fund 3 to discuss opportunities in this field. They then used Prof. Fitzsimons from their SAB to arrange a meeting in the UK at a major pharmaceutical multinational where they were told there would be great interest if they could supply the catalysts.

The next step they took was to appoint a new CEO, with the old CEO, Paul Cranford, leaving because of the refusal of the venture capital funds to invest with him at the helm. The new CEO that was appointed, Brendan Egan, had over 30 years experience in the Life Science and Pharmaceutical sectors and had recently been involved in the set-up of and sale of a Belgian venture for over €400 million. They recruited this individual through the use of connections of the COO Dr. Keenan. He had been involved on the organizing committee of BioConnect Ireland and through meeting and talking with another member of the organizing committee, Victor Francis, he was introduced to Egan. Francis worked with Egan through a consultancy firm they were both involved with called Procell. After a number of meetings with Egan and venture fund 3, Egan agreed to become CEO on an initial part-time basis. The signed term sheets in April 2004 with venture fund 3, for an investment of €655,000, with Enterprise Ireland providing half the amount. Stipulations of this contract included technological and commercial milestones such as optimizing the p-process, demonstrating its use for industry and the sourcing of potential customers.

[2] Keenan and Grant were both involved with and took part in Irish Life Science industry networking events (First Biotech and BioConnect Ireland). Keenan was on the board of BioConnect Ireland.

Period 3- Activities to prove concept- commercial and technological development (May 2004- November 2005)

This section will look at some of the activities undertaken by Levodex post-funding. As such it is necessary to look at attempts to develop their technological and commercial resources as well as the search for additional funding.

Commercial Activities:

After the venture signed their term sheet with their new investors they took part on an Enterprise Ireland Trade Mission to the NIH in the U.S. in June 2004. On this mission meetings were arranged for them with a number of senior and relevant decision makers from major fine chemical and pharmaceutical firms. Levodex's aim was to look for investment into their technology by these firms through co-investment deals or to obtain future partnerships agreements. However, without proper samples to supply for testing for these firms or evidence of a more fully optimized p-process they were ultimately unsuccessful. But what they did manage to gain from this trip was a future supply agreement with Wyeth to supply any discoveries of the venture for the firm to test.

Of greater importance was the development of contract work with Pfizer and the venture's dealing with a firm called Stylacats. Taking their dealings with Pfizer first, the venture, as mentioned, had assembled an SAB, of which a member Dr. Paul Nesson, worked in a senior position in Pfizer. Nesson arranged for them meet with a number of decision makers relevant to Levodex's line of business and from this they managed to gain a small piece of contract work. This involved them testing a number of their catalysts (which were limited at this stage) that they had developed from the P-process on a specific step of the production of a blockbuster drug of Pfizer's. The aim was to see if any savings could be made. This ran from March- April 2005. Although unsuccessful the contract was seen as being of great value because they got to work with a large multi-national and provided some sense of legitimacy to what the venture were attempting to achieve as well as partially meeting one of the milestone criteria set out by venture fund 3 upon their investment. Also during this period in May 2005, through the other industrial chemist on their SAB, Dr. Donald Andrews, they managed to sell a small quantity of material to DSM for trial in one of their chemical processes.

The final commercial activity of interest during this period was Levodex's interaction with a firm called Stylacats in the UK. This firm was a start-up based in Liverpool that was started in 1999 and amongst the areas that it specialised in was custom synthesis. This firm had taken on a substantial amount of venture funding but were in trouble and were looking for ways to generate revenue

rapidly when they met Levodex. In January 2005, Stylacats approached Levodex to produce a particular type of chiral ligand for them but no deal could be agreed. Soon afterwards Stylacats went under but from these dealings they ended up contracting in the sales director from Stylacats, Barney Cummins, to act in a part-time capacity as their sales director. Cummins worked for a consultancy firm, called Connect Science, that was based in the UK but had contacts internationally and what he premised his value on was the ability to utilize his contact base and those of his colleagues in Connect Science to help generate commercial contacts and contracts for Levodex.

Developing the ventures technological resources:

During this period the development of their key technological resource was meant to be further optimized and producing a number of catalysts at a high level of purity for industry to try. However, this was proceeding extremely slowly. This was aggravated by the lack of financial resources that the start-up had. To try and develop their key technological resource they had hired in two inexperienced student chemists, who were finishing their PhDs with the CSO David Grant. Grant was also working in a part-time capacity in Levodex, trying to oversee the development of their technological resources. During this period they had only developed one catalyst at a high level of purity and seven at much lower purity levels. To try and further fund the development of their technology they looked to access grant funding and find other pieces of IP to tie into the firm. The first grant they looked for, in September 2004, was a Fusion Grant being offered by InterTrade Ireland. This body was established to stimulate interaction and trade between Northern Ireland and the Republic of Ireland. The grant offered funding of £66,000 over two years that covered the funding of a graduate/researcher to work in a firm in either the North or the South and with an academic institution in either the North or the South offering a mentoring role to the graduate working in the firm. To access this financial resource the venture contacted a well known researcher, Professor Darren Boyle, whom the CSO (Dr. David Grant) knew and who worked in a major University in Northern Ireland. His area of speciality was in biocatalysts as opposed to chemical catalysts. From the development of this relationship and success in gaining the initial targeted grant they decided to jointly apply in May 2005, for the EU Marie Curie TOK grant for €600,000 that would be based on Professor Boyle and the Northern Irish University transferring their knowledge on the use of enzymes (biological agents) to make chiral molecules and Levodex transferring their expertise on the use of high-through put experimentation and its application into the Northern Irish University. To help in this application process they contracted in a contact of the CEO Brendan Egan, called Frank Hammond. Hammond had worked on helping firms apply for EU grant applications for

many years and had helped the Belgian company that the CEO Brendan Egan had previously been involved with obtain substantial grant funding. In November 2005 they received approval for this grant. This also lead to the inclusion of the products of Professor Boyle into the firm, through a licensing agreement with the Northern Irish University, who had a range of biocatalysts ready for commercial sale, which came in sample trays, and could easily be made into intermediate products. This was important to Levodex as they had a very limited set of samples of their own to provide to the market. With products that were market ready they believed that short-term revenue would accrue from this particular resource. Finally during this period they identified a potential competing technology that could possibly create p-chiral ligands being developed by another academic in Dartmouth University and negotiated a licensing agreement in August 2004 that involved Levodex trialling, developing and commercialising any potential ligands from this competing method.

Looking for further financial Investment-

Finally during this period the venture was also looking for further private investment. With a lack of interest for co-investment deals from large firms in the life science industry they looked to gain further financing from either venture capital or through private individual investments. They started this process again in May 2005. To even begin to enter this process they had to redraft their business plan to focus more on their technology and sharpen the future plans and to include their successful grant applications and the small number of commercial contracts and relationships that they had developed. To help with this redrafting process they brought in Victor Francis, the person who introduced them to their CEO Brendan Egan and worked with him in the consultancy business Procell. Francis had lots of experience in this area and helped them complete their business plan over a three month period. Their aim was to raise €1 million in finance to develop their technology.

In pursuing the venture capital route problems arose with their initial investors, Venture Fund 3, as such after protracted negotiations Levodex decided to pursue private investors through a Business Expansion Scheme. This was a scheme run by the Irish Government to get people to invest long-term into certain allocated sectors and that provided tax relief for investors into these schemes. Levodex's plan was to raise the €1 million through this scheme by finding a number of private investors to put money in with a minimum investment of €20,000. They planned to launch this scheme during Christmas 2005.

Period 4: Developing the product line for commercial relationships (December 2005-July 2006)

This short period will focus on the key problem faced by the venture during this period, which is the development of their technological resources. However before exploring this avenue it is necessary to mention a number of other activities undertaken by the venture to try and further develop Levodex.

Financing, Manufacturing Capabilities, Distribution and Commercial Relationships:

At the end of the previous period the firm was engaged in the process of seeking to raise financial capital in the region of €1 million from private investors through a Business Expansion Scheme (BES). The firm advertised the scheme in a major Irish newspaper, amongst other BES schemes, at the end of November 2005. Although the firm advertised, most of the money that they eventually accessed was through their own contacts, in particular those of the CEO Brendan Egan. By March 2006 the firm managed to acquire the full €1 million with a total of 20 private investors in the firm. In December 2005 the firm also applied for an Enterprise Ireland Innovation Partnership grant. This grant was to provide and to further develop applied research from third level institutions and was between an academic institution and an industrial partner. Partnering with the University they were affiliated to they applied for this particular grant. They received grant approval for €441,000 in April 2006.

A further key capability they perceived that they might need in the future was to have in place a manufacturing capability to produce chiral platform products and building blocks at scale if required for customers. To realise this essential requirement the firm had, in November 2005, signed an initial agreement with Joe Hall to use his company, XFIS, to find a partner to manufacture their product at scale when required. Hall was a close associate and friend of the CEO of Levodex and had worked with Egan previously. Hall was involved with many of the start-up companies that Egan had been, and was at that time, still involved with. At the end of February the COO/BDM, Keenan travelled to China to meet up with Hall's company that operated there. Whilst in China Keenan signed a production agreement with Shanghai Pharmaceuticals and an agreement was signed to provide their manufacturing services for Levodex when required. It is worth noting that the Shanghai Pharmaceutical plant was a plant the Egan and Hall had a relationship with going back over 25 years.

Through the use of Hall during this period they also got to pitch for a major project in Janssen Pharmaceuticals for a catalyst screening service although they were unsuccessful in their pitch. They

also through the use of their sales director's (Barney Cummins) connections got to pitch to a large Korean firm, SK pharmaceuticals, for a major contract on which they were still awaiting an outcome. The venture also managed to sell a small sample of their biocatalysts to a connection of Keenan into a major pharmaceutical firm (GSK). At the end of this period they were also in the process of negotiating another contract with Pfizer. Finally, Levodex was also considering alternative routes to market and was considering the types of distribution channels they should develop. As such during this period they signed a supply agreement with Compound Chemicals, who the BDM Barry Keenan had met at an industry conference in May 2006. This firm were an Irish chemical brokering firm, whom operated in all major markets. Compound Chemicals operated by maintaining a catalogue and database of potential chemical compound producers or custom synthesis suppliers, listing their products and services. They signed a supply agreement with Compound Chemicals in June 2006.

However, to fully enter into all these potential commercial relationships, manufacture at scale, and potentially supply Compound Chemicals they still faced a major problem in that the venture had a very thin product line, in particular the key issue revolved around the underdevelopment and the lack of optimization of their P-process. They also had estimated revenue generation of €1.5 million from their commercial activities for 2006 (Levodex Business Plan, Q4, 2005).

Developing Levodex's technological resources

At the start of this period, and after close to two years of funding, the venture still only had eight samples from their proprietary p-process, only one of which was fully optimized. For industry Levodex needed to be able to create a range of sample ligands (these are the main element that are used to make chiral catalysts) that would come in chiral toolkits (a tray with a number of samples for firms to test). One of the key issues identified as hindering the development of their product line was that the chemists in the lab lacked commercial experience, as they came from academia, and that the senior chemist, the CSO, only being able to spend 20% of his time working for Levodex. As such an industrial chemist was hired in to take charge of the laboratory and the development of their commercial technological resources. They hired in a chemist, George Frost, at the end of February 2006 to take over. Frost had over 30 years experience as a commercial chemist, much of it at a very senior level. He was introduced to the venture by Barney Cummins (Levodex sales director), who knew him from the UK and had worked with him in Stylacats where Frost had worked for a short period in an advisory capacity.

Frost effectively took over the running of the laboratory where he tried to create a focus and structure that would most effectively allow them to develop a commercial product line, in particular further developing their patented P-process. As well as tightening up their procedures in the lab, he became centrally involved in recruitment for the laboratory with one of his first hires being an experienced commercial in the area of chiral catalysis. In March Frost focused the venture on producing a catalyst known as DiPAMP (it is used in the production of aspartame (used in artificial sweeteners) and L-Dopa (treatment for Parkinson's disease)), one of the few P-chiral catalysts in use and which they perceived there was a substantial demand for. The attraction was that there was a substantial market demand, where the going market rate had traditionally been high at about €50,000 per kilo. DiPAMP was also off patent and was a very desirable ligand to be able to supply because there was a relatively limited supply in the market because a major stumbling block had been in the difficulty and cost to produce it. It also showed the versatility of Levodex's method and ability if they could produce it.

By the end of the period, they were able to produce DiPAMP at pilot scale (100 gram batches) and could produce it at scale but did not because they lacked space in the lab to produce in multi-kilogram form. They also found that they were able to create analogues (slight variations) of the PAMP family, which was novel to the market and could be used for testing by fine chemical and pharmaceutical firms. At the time this period ends they were considering how to properly price DiPAMP and in what volumes to produce it in.

In sum, by the end of this process of development of Levodex the new venture had moved from two scientists and an idea in 1999 to the point where they had been funded in various forms for over €2 ½ million and had produced their first potentially viable commercial products. To more fully realise the impact that the social resources of the firm played in this process it is now necessary to turn and explore the how the development and use of social connections were central to this firm.

Analysis and discussion on the use of social connections in Levodex

The role of social connections has an important part to play in the development over time of this firm from its very earliest stages of the development of their initial perceived opportunity to the point when they are beginning the process of filling a nascent product line. In considering Levodex's social connections it is worth noting that a number of interesting issues arise with regards to the use of the social connections that Levodex started out with, developed and used. Accordingly, Levodex, like many new ventures start out with a paucity of resources but of the resources that they initially

start out with one that they start to use immediately and through the case is their connections, whether personal or organizational to try and develop the venture. At first, like the study of Baker et al (2003) and Brush, Green & Hart (2001), they start by utilizing their pre-existing network utilizing their prior connections to others and from contexts that both were involved in, that is to say the world of academia to initially try and develop the venture. For example at the very early stages of development the construction of their Scientific Advisory Board is constructed through the relationships the Dr. David Grant (CSO) had accumulated over the years or the initial advice they receive on the scaling up of their idea is impacted by another academic entrepreneur that Grant also had a connection to. It should be noted that the over-reliance on pre-existing social networks can constrain (Hite & Hesterly, 2001). For example, the hiring of two inexperienced academic chemists, hired from Dr. Grant's research group, to develop the key technological resources of the venture in part delays the further development of the firm.

However, as the case evolves and the venture moves through a number of periods of development the connections develop from being rooted in the academic realm towards a mix between commercial and academic connections that are developed as the venture evolves and based primarily on their instrumental value and with an accent put very much on the commercial aspects. As suggested by Hite & Hesterly (2001) the ties of the venture broaden out over time.

Furthermore, it is worth considering the part that professional forums play in the development of this venture. As suggested by Ozgen & Baron (2007) professional forums, in the shape of conferences, seminars, workshops can act as a valuable source of information to help recognize or shape a perceived opportunity. Interestingly in this case professional forums, such as academic conferences, industry conferences, and organized networking events (like First Biotech, BioConnect Ireland) all had an impact on the venture for both generating information but also in creating social connections that in their use extended beyond the provision of information and advice for opportunity recognition and development. Although it was through an industry conference that the perceived opportunity came to one of the promoters these professional forums also helped them recruit their new CEO in period 2 (through meeting and working with Victor Francis who was part of the committee of BioConnect Ireland), initially meet with venture fund 3 at a First Biotech event whom ended up funding Levodex, and meet with Compound Chemicals (a chemical brokering firm) at an industry conference which lead to the creation of an alternate distribution arrangement. So as well as helping with opportunity recognition these forums also helped to generate additional social connections that served functions beyond information and advice in the process of resource acquisition and development.

When considering the stages of development of this venture what emerges is that the initial stages of development in periods 1 & 2 focus mainly on discovering, developing and communicating about a perceived market opportunity, whilst periods 3 & 4 are centred on developing the resources and capabilities to deliver on a market opportunity. Only at the end of the case was Levodex actually moving towards more fully trying to exploit commercially their perceived opportunity. What impact this has is that in exploring the development of the case at particular points in time certain types of activities and resources are particularly salient for this venture. As such to fully appreciate the use of these social connections it is necessary to consider the particular acquisition and development aims of Levodex according to the periods of development that emerged from the case and to understand the use of these social resources. With this in mind it is necessary now to turn and explore the impact that this had on the specific uses of Levodex's social connections.

Social resources: function of providing information and advice

Beginning with the function of information and advice, it was mentioned previously that nascent entrepreneurs will use connections that they have to provide information and advice to help the development of a new venture over time. This use of advice was particularly prevalent in periods 1 and 2. Examples of this abound within this case, which can be seen in the table below.

Table 1- Social Resources used for advice and surrogate experience and outcomes from use-

Period	Source	Use	Outcomes from use
1	Stephen O'Sullivan (Business Mentor from Campus Company Programme)	How to start and manage a business	General advice feeds into plans and understanding
1	Prof. Darren Fitzmaurice (academic entrepreneur)	Advice on acquiring presenting opportunity for financial investment	Change in scale to initial Plan
1 & 2	Dr. Donald Andrews (Industrial Chemist-SAB)	Advice on chiral industry	Industry Information for Plan
2	Jason Kennedy (Financial Consultant)	Advice on plans and dealing with venture capitalists	Development Initiative
3	Victor Francis (Procell Business Consultant)	Advice and help with final business plan	Revised Business Plan for BES scheme
3	Frank Hammond	Advice and help with EU grant applications	Use for application and receive EU Marie Curie Grant
4	Barney Cummins and Connect Science	Advice on sales and marketing	Undetermined

In exploring the use of information and advice supplied to Levodex it is necessary to consider it across the sources used, the functions such information and advice served, and the outcome through their use of the information and advice provided. Taking the sources used it can be quite clearly seen that the sources used matched to an extent the perceived resource requirements according to the periods of development of Levodex. Initially the venture starts out in periods 1 & 2 using connections either previously existing or newly formed to help shape their opportunity and provide information and advice on their business plan, how to start and run and business, as well as attract investment. What can be seen is that each has an impact in a number of ways leading to such outcomes as changes to how they should exploit their perceived opportunity (Prof. Fitzmaurice), the

commercial application and importance of their area of application (Dr. Donald Andrews), and when they have difficulty attracting venture capital investment further changes to their business plans (Jason Kennedy) through the idea of the development initiative. Furthermore because of their lack of commercial experience of the initial promoters in periods 1 & 2 they use a number of these connections for surrogate experience such as the use of their business mentor, and the use of the two scientists with industrial experience, which is not surprising given that this is a common way in which entrepreneurs that lack direct experience try to compensate (Baker et al, 2003; Aldrich & Ruef, 2006). In viewing the use of social sources of information and advice it can be seen that they are used generally for opportunity recognition and development (;Ozgen & Baron, 2007) and more specifically in this case, in identifying the commercial opportunities as well as the commercial application of their research (Lockett, Wright & Franklin, 2003; Mosey & Wright, 2007) driven by their lack of commercial experience and their backgrounds as academic researchers.

In periods 3 & 4, the use of social connections again matches key activities of Levodex to access and develop perceived salient resources. Information and advice that had a tangible impact on Levodex can be seen, for example, to feed into their desire to gain significant grant funding (Frank Hammond), private investment (Victor Francis), and commercial contracts (Barney Cummins and Connect Science). The uses of these connections helped to achieve certain desired outcomes such as gaining EU funding and successfully completing BES funding allowing the venture to further develop their technological, human and commercial resource. What should be noted is that of the connections mentioned above Francis and Hammond are both connections of the new CEO Brendan Egan, and like some of the participants in Mosey & Wright's study (2007) he would fit very much into the category of a habitual entrepreneur, where he brings experience as well as a wide professional network that he had used previously and which draws on. These act in a more professional advisory capacity as they are hired in by Levodex and are more based on a formal and instrumental basis rather than informal and relational basis. Having briefly outlined the uses of information and advice by Levodex and who was used and the outcomes from use it is now necessary to turn and briefly explore the use of social connections as bridges.

Social connection use as a bridging function-

Social connections can also be used to provide bridges to other actors that may be of use to the new venture (Granovetter, 1973, Burt, 1992, Aldrich, 1999, Hite, 2003, 2005). A new venture may have no direct connection to the resources that they require or anticipate requiring in the near future, so to gain potential access to these resources a social connection is used to another actor that may help them gain access. What is of interest to this case is not so much the debate surrounding the use of

connections for bridging or brokering in entrepreneurial networks (Burt, 1992; Hite and Hesterly, 2001) but how social connections were used in this case to attempt to access or develop perceived salient resources and what the outcomes from their use were. Table 2 below outlines the bridges used and the person(s) or organization connected to and the outcomes from use.

Table 2- Social Resources used by Levodex as Bridges across periods:

Period	Bridge	Person/Organization connected to	Outcomes from Use
1	Dr. David Grant	Senior academic and industrial chemists	Construction of prestigious SAB
1	Victoria Waldron (former student of CTO/CSO)	Donald Andrews- Experienced Industrial Chemist	Industrial Chemist Joins SAB
1	Stephen O'Sullivan (Business Mentor from Campus Company Programme)	John Connolly, Director of Business School Incubation Programme	Acceptance onto incubation programme and CORD Grant
2	Participants on incubation Programme	Jason Kennedy, Financial Consultant	Development Initiative
2	Victor Francis, member of BioConnect Ireland Management Committee	Brendan Egan	New CEO with expansive industry experience
2	Prof Fitzsimons (member of SAB)	GSK (UK)	Meeting with process scientists to show market need to VC's
3	Enterprise Ireland	NIH and US operations of pharmaceutical and chemical firms	Meetings with US firms, future supply agreement with Wyeth
3	Dr David Grant (CSO)	Prof Derek Boyd (Northern Irish university Scientist)	InterTrade Ireland Funding EU Marie Curie Funding Addition to product line
3	Dr. Paul Nesson, (member of SAB)	Pfizer Scientists	Contract work with Pfizer
3	Dr. Donald Andrews,(member of SAB)	DSM	Sale and supply of Ligands
3	Dr. Barry Keenan, Business Development Manager	Scientist in major pharmaceutical firm	Sale of sample of Northern Irish products
4	Barney Cummins and Connect	George Frost; South	New lab director;

	Science	Korean and Italian Firms	Help in Optimizing key technological resource; pitching for and negotiating for commercial contracts
4	Joe Hall	Janssen Pharmaceuticals; XFIS	Pitch for screening service; manufacturing capabilities

In viewing the above table a number of issues begin to emerge. Similar to the section on advice and information and commented on earlier, is that the individuals used as bridges in each of the four periods of development is that many are drawn from the pre-existing networks of those attached to the venture (Hite & Hesterly, 2001; Baker et al 2003; Hite, 2005; Aldrich and Reuf, 2006). For example the prior connections of Dr. David Grant leads to the construction of Levodex's SAB (period 1), access to and addition to Levodex's product line through his prior connection to Prof Derek Boyd (period 3), access to the some of their first pieces of contract work (in period 3- through the use of Dr. Paul Nesson and Dr. Donald Andrew's on their SAB whom connect Levodex to Pfizer scientists and DSM respectively). Similarly, the new CEO uses connections of his own (period 4) in the form of Joe Hall to pitch for commercial contracts and to add manufacturing capabilities as does the junior scientist Barry Kennan use a connection of his own to GSK make a sale of one of their products in period 4.

Furthermore the connections used as bridges, once again matches the key concerns of the venture through the different periods of development. So for example in period 1 and 2, Levodex are centred on developing their opportunity and gaining venture finance and as such the connections used as bridges in these periods serve these ends. For example, the use of Stephen O'Sullivan (their initial business mentor) for introduction to John Connolly who ran an incubation programme and lead to a small amount of grant funding as well as an office space and a CEO. As well as this, the use of a bridge to Jason Kennedy helps with business planning and the negotiations with venture capitalists for access to finance or the use of Victor Francis for an introduction to Brendan Egan, who becomes CEO, and helps overcome a major concern of the venture capitalists. In matching the salience of certain types of resource acquisition and development, many of the bridges used in period 2 were primarily used to address concerns of the venture capitalists from whom they wished to gain investment from. This can be seen for example in the use of Prof Fitzsimons, Victor Francis, and participants on the incubation programme. Whilst in period 3 & 4 the concerns become broader

with the inclusion of the establishment of commercial relationships, underpinned by the development of Levodex's technological resources as well as the need for additional and relatively substantial finance to undertake these activities. This is also reflected in the connections that are used in these periods for example the use of Dr Nesson and Dr Andrews for meetings with major chemical and pharmaceutical manufacturers or the use Joe Hall for similar purposes as well as for the establishment of future manufacturing capabilities in China. Another example is the use of Barney Cummins who helps solve a major problem of Levodex's with regards to the commercial capabilities of the venture in their laboratory and the development of a commercially viable product line by introducing them to George Frost who becomes their lab director and helps to overcome problems that they were having in the laboratory.

Finally it is worth noting that this is a cumulative process in that the connections made by a bridge to the venture can also then themselves be used later on to perform a bridging function. For example many of the connections made by Dr. David Grant to construct the SAB are then utilized as bridges later on to acquire or develop salient resources. Having considered the development and use of these social connections it is now necessary to turn and look at the final function that these social resources could serve which is to communicate a sense of legitimacy for resource acquisition.

Social resources: legitimating function

New ventures operate in conditions of uncertainty with unforeseeable hazards (Stuart et al, 1999) and can struggle to survive with a high possibility of failure (Stinchcombe, 1965, Aldrich, 1999). To try and avoid failure and reduce the risk and commensurate uncertainty attached to a new venture, a key activity that is often undertaken is to try and provide a sense of legitimacy around the proposition and activities of such a firm. It should be noted that there a numerous resources that could potentially be inferred to communicate legitimacy in the eyes of potential resource providers as well different types of legitimating activities. Such sources for example can include the reputation and management experience of the promoters (Shane and Stuart, 2002), business plans and firm incorporation (Delmar and Shane, 2004), IP (for Life Science Firms) (Baum and Silverman, 2004), imitation and conformance (Aldrich and Fiol, 1994), and finally affiliations and inter-organizational endorsements (Stuart et al 1999; Higgins & Gulati, 2003). Legitimacy, as pointed out by Packalen (2007) is an elusive concept but generally inferred through resource acquisition. So at this point it is necessary to consider the social resources, which are one of the sources of legitimacy, which can be inferred to have been used to symbolize the legitimacy of Levodex.

In exploring the case an undercurrent too many of the activities of this new venture was to create an impression of legitimacy for resource acquisition of which the social connections, whether personal or inter-organizational were used. Across each of the periods of this particular case the use of social resources to attempt to communicate this can be seen below in table 3 below.

Table 3- Individual and Inter-organizational connections used to communicate legitimacy:

Period	**Social resources**	**Resource providers to communicate legitimacy to**
1 &2, 3& 4	Dublin University Affiliated to	EU and other grant funding agencies, Venture Capital and Other Private Investors
1&2	Dublin University incubation programme and Enterprise Ireland	Venture Capital and Other Private Investors
1, 2, 3, 4	SAB, in particular Nobel Prize Winner	Government Agencies, Venture Capital and Other Private Investors. Potential client firms
3&4	Professor Boyd and Northern Irish University	EU, Government Agencies, Venture Capital and Other Private Investors
3&4	Dartmouth Professor and Dartmouth University	EU, Government Agencies, Venture Capital and Other Private Investors
3 & 4	Venture Capital Investors and Enterprise Ireland	Private Investors and other Venture Capital Investors
3& 4	Work, Sales and supply agreements with Pfizer, Wyeth, DSM, GSK	Private Investors, and Venture Capital Investors, grant agencies. Other potential client firms
3&4	new CEO, grant fund manager, and Joe Hall involvement in Levodex	Private Investors, and other Venture Capital Investors. Other potential client firms
3&4	InterTrade Ireland Fund, EU Marie Curie fund	Private Investors, and other Venture Capital Investors, grant agencies, Other potential client firms

In exploring the table above, it is worth noting that once again the use of social resources, to attempt to communication legitimacy matches the salient resources targeted for acquisition during each of the periods of development of Levodex. For example, the SAB in periods 1 &2 was used to try and convince a number of potential resource providers, in particular venture capitalists for financing, about the potential of the venture and is highlighted as a key part of their ability to exploit their perceived opportunity. This SAB is then further used across the periods of development for legitimating purposes in trying to access various forms of grant funding, as well as other forms of private investment. Whilst in period 3 & 4 the types of social resources used to communicate legitimacy, such as the work and/or supply agreements with major pharmaceutical and chemical firms, serve the function of both attracting in further financing as well other potential commercial clients. The value of these commercial contracts extended beyond their economic value (which was small) in that they functioned to an extent by validating what Levodex was attempting to do and could be used to communicate with both future investors and future commercial clients.

Similar to Stuart et al (1999) it is possible to infer that such affiliations can and do act as an external endorsement that influence perceptions of the quality of such a young organization. It is worth commenting that Zott & Huy (2007, pp.92) found that associations with prestigious external actors are important for new ventures that have no real concrete achievements or reputation. They draw on the symbolic meaning of these actors to attempt to acquire required resources. This is very much the case for Levodex, where through their associations they attempted to highlight in both presentations and the iterations of all their evolving business plans the status of the individuals or organizations connected to their venture, initially focusing on their SAB, and then widening to include various funding agencies and the work for or sales to major organizations. With a mix of both upstream and downstream affiliations (Higgins & Gulati, 2003) Levodex, operating in both an uncertain market and with only partially developed technological resources and therefore limited commercial ability, partially tried to overcome problems surrounding their legitimacy through communicating the prestige and potential value of their external connections.

However, it would be naive to assume that such affiliations alone necessarily have the ability to convince potential resource providers of the legitimacy of a venture. For example, the prestigious SAB constructed by Levodex, although an initial attraction to venture capitalists, had a very marginal impact on the final decision to invest in the firm by any of the venture funds. The human resources, in the form of their new CEO and his prior experience, and the technological resources, in the form of their potential piece of IP were key to convincing on the legitimacy of this venture as well as other factors. As such these types of resources are combined with a variety of other types of resources and

activities, which in this case includes the likes of the management, their technology as well as their commercial potential, as well as later on the variety of types of funding, and commercial contracts and alliances acquired, to convince potential resource providers of their legitimacy. Having discussed the three main functions that the social resources of the venture performed over the period of this case it is now necessary, to briefly consider the combined impact of the use of these social resources across all the periods of development

Combined Impact of the use of social connections across all periods:

In exploring the function that the social connections served in this case and to understand their influence on Levodex it is necessary to consider how each type of connection together had a bearing on Levodex's development. To appreciate this particular aspect it is necessary to view table 4 below.

Table 4- period of development and overview of Levodex's uses of social connections across the functions served:

Period of Development	Levodex Primary Aims	Use of Information and Advice	Use for Bridging	Use for Legitimacy
1	Recognize and refine opportunity, seed funding	Revise scale of plan that would be potentially commercially viable Industry information to help with initial plans	International industrial chemist joins SAB Acceptance onto an incubation programme and grant funding	Use of SAB, in particular Nobel prize winner, to gain access to incubation programme
2	Attract financing	Development initiative to attract VC financing	Introduction to individual who comes up with Development initiative and negotiates with VC's Introduction to experienced commercial individual (Brendan Egan) who becomes CEO and helps gain venture funding Introduction to industrial chemists in UK who meet with VC's to overcome problem of uncertainty of commercial potential	Try to use SAB to attract financing (but does not suffice alone) as other considerations are more primary
3	Develop technology, initiate commercial relationships and gain further financing (both grant and private funding)	Advice and help with business plans	Contract work with Pfizer Introduction and sale to DSM Supply agreement with Wyeth	Use of SAB, CEO and contacts, venture capitalists and Enterprise Ireland investments to try and attract financing
4	Further develop	Advice on sales	connection to	Use of SAB,

	and commercialize technology, gain further financing	and marketing	many BES investors Sale of diols to GSK Introduction to commercial chemist who becomes lab director Introductions to pitch for commercial contracts Introductions to Shanghai Pharmaceuticals	agreements with Dartmouth, Northern Irish University, EU investment, work with/supply to Pfizer, DSM, Wyeth to attract investors, further grants and further commercial relationships

In considering this table what becomes abundantly clear, and emerged in the discussion sections of each individual function that social connections could serve, is that each type of function is used according to the key aim for resource acquisition and development of the venture at a particular period in the development of this nascent firm. As Levodex switches from one period of development to the next these social connections are used to either attract or develop the perceived salient resources at a particular point in time. Furthermore, as the venture develops, the uses of their social connections widens from a more narrow focus on opportunity recognition, development and funding to include further and deeper development of the idea and it commercial possibilities, the actual development of technological resources and commercial relationships, and additional and alternative sources of funding. Similarly in considering this table it emerges that Levodex utilize all three functions of social connections across all four periods of development outlined in this case. Each type of function used over each of the periods helps Levodex continuously develop and achieve key resource acquisition and development aims and it is worth noting that a number of the social connections attached to the venture end up performing multiple functions for the venture across multiple periods. For example Dr. Donald Andrews from Levodex's SAB provides information and advice in period 1, acts as a bridge for a small sale of Levodex's products to DSM in period 3(which also has a legitimating aspect to it), and helps communicate a sense of legitimacy around the venture by being a member of their SAB throughout all of the periods of development. As such it is not just one function but the multiplicity of functions that these social resources can perform over time that can have a major bearing on resource acquisition and development and thus on the emergence and development of a new venture.

Conclusions:

This paper has set out to explore longitudinally the use of social connections in the process of the development of a new venture across a number of stages of development. What emerged from this particular study is that the nascent firm at the centre of this study moved through four periods of development with particular types of resources and activities to access or develop being critical for the further development and even survival of the venture. Greatly aiding this process was the use of social resources which were used to serve multiple functions including information and advice, bridging, and the communication of legitimacy across each period and what can be seen is that their use matched the salient resource acquisition and development aims according to the perceived stage of development of the venture.

The value of this study as such lies in a number of areas. Firstly, this study does not just explore one particular function, such as information and advice, but is able to account for a number functions that social connections can serve and the impact that these uses have on a fledgling ventures resource bundle. Secondly, it explores a relatively unexplored area within the IMP with regards to the stages of development of new ventures, with the exception of Partanen et al (2008), accounting for the role that relationships played and the impact that this had on the new venture resource base. Furthermore, this study compliments that of Lichtenstein & Brush (2001) in its focus on the stages of a venture's development and resource salience but on one that is very much pre-commercialization and only at the end entering into the process of commercial exploitation therefore showing both the value and use of social resources from an very early stage and their impact on resource acquisition and development. Finally, Bygrave (2007) outlines a number of gaps and challenges within entrepreneurial research. These include a lack of studies of very early stage firms during the periods when they are initiating activities to develop, a paucity of true longitudinal studies, and a focus on micro businesses as opposed to high potential start-ups that have the ability to make a true economic impact. This paper with its focus on a type of venture can be termed a high potential start-up and the longitudinal nature of the research, with data collected from its very earliest stages over a 4 ½ year period is also of value and meets some of the challenges set by Bygrave (2007). Although there are many limitations to this paper the authors believe that this paper has shown the impact that the social resources of a new venture has through various stages of development and that their power lies not in one particular function but in the myriad ways that they can be utilized and used across time.

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