NARRATIVES OF ONLINE COLLABORATIVE EXPERIENCES:

LEADERS AND LURKERS

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Abstract

The purpose of this research was to unpack the reasons why people engage in varying levels of online collaboration in a self selected group. The research investigated (1) the role of online interaction platforms, (2) participants' perceived constraints on, and enablers of online collaboration in order to answer the main research question on (3) how leaders and lurkers deconstructed the online experiences underlying their differing participation levels.

An action research methodology was adopted to study how a virtual group evolved. Four iterations of the action research cycle, each building on previous learning, describe the online group's activities "following the actors" through the emergence and establishment of the online actor-network.

Participants adopted a distributed email listserve to support initial online group collaboration and a web-based discussion forum to grow the actor-network. Thematic analysis of postings outlined seven main themes, translated as either constraining (time and trust), or enabling online collaboration (beliefs on the value of networking, success aspirations, community belonging, communication channels, storytelling and online trust building).

A narrative framework was developed to collect and analyse participants' stories and motives. Self-selected leaders and lurkers constructed different online practice. In narrative terms, leaders experienced most 'unique outcomes' by

experiencing and storying online communication skills previously unknown to them. Additionally, leaders emphasised 'social entrepreneurship' motivation to contribute towards their country's growth and proposed 'temporal virtual consultations' as an alternative to conventional conceptions of online groups.

Lurkers, on the other hand, were divided about the value of 'virtual networking' in extending business networks. A novel lurking experience was coined 'silent commitment' describing reluctance to participate online contrasting with high face to face involvement.

A 'virtual leadership' model was developed integrating the findings to illustrate the contribution of individual self-selected virtual leaders in building social capital. This model illustrates how virtual leaders built online collective capacity constructing an 'archetypal' online narrative.

Chapter 1: Introduction

In recent years, many countries have emphasised innovation as a means to increasing the wealth of their citizens and the strength of their economies (Leadbeater, 2000). Most innovation-enhancing initiatives focus on business information-sharing as a key strategy. To enhance information-sharing and consequently increase the success rate of new business ventures, a number of collaboration and networking methods are being explored (Osterle, Fleisch, & Alt, 2001). These collaborations increasingly rely on novel information and communication technologies such as computer-mediated communication methods (Brown, 2001) amongst individuals engaged in increasingly complex networks.

This action research project followed a network of 54 emerging online innovators. Firstly, two groups of participants interacted in two different online environments, and the emerging faction was monitored throughout the planning and establishment stages of an online group. Its activities resulted in the formation of the Innovators' Online Network (ION) group that subsequently described itself as a "synergistic community of individuals and their professional networks which streamlines access to people, knowledge and capital, accelerating New Zealand's innovators towards business success".

The thesis describes how participants perceived barriers to and enablers of collaboration as the group formed online. It also documents participants' online experiences. The participants' narratives were also analysed, thus providing

insights into the reasoning and motives of the self-selected leaders and 'lurkers', *viz.* those not actively participating in online discussions.

1.1 Statement of the problem and research questions

Much research has investigated online environments (Hinds & Kiesler, 2002). A great deal of this studied how emerging communication technologies supported patterns of communication in online groups (DeSanctis & Fulk, 1999). Three types of online groups are relevant to the present research: virtual teams, online communities and self-selected groups.

"Virtual team" include workers belonging to either the same organisation, or those collaborating across different organisations to accomplish a specific task (Gibson & Cohen, 2003b). Online communities of "voluntary participants", that is not in a work setting, coming together around common interests or ideas. The sphere of action of these online communities is either social or, as in the case of Communities of Practice, professional (Lave & Wenger, 1991; Wenger, 2001).

These different types of online workgroups and communities vary in the type of leadership that directs them (Lewis Tyran, Tyran, & Shepherd, 2003). Participation levels vary from 'lurkers', who read others' contributions but do not directly contribute to the group (Nonnecke & Preece, 2003), to recognised leaders who actively motivate the groups (Pauleen & Yoong, 2001a), helping it move in specific directions. Social science researchers have studied online leadership

competencies in these two online group types. Although lurkers form the great majority of online community members, there are relatively few empirical studies about them (Nonnecke & Preece, 2000). Lurkers were naturally more challenging subjects to study, being 'invisible', but also their role has often been considered less important within the online groups (Rafaeli, Gilad, & Soroka, 2004).

A third type of online group has been less studied: self-selected groups of people from multiple organisations that form online in order to collaborate around business-related issues (Gibson & Cohen, 2003b). These groups do not evolve around a pre-identified person that will lead them toward their aim; rather their leaders emerge together as the group itself does. There is a dearth of empirical evidence relating to the experiences of participants in such self-organised groups. A second gap in the extant literature concerns a particular type of leader – leaders who self-select and rise in online environments (Bryman, 2004). Research in this area could be informative in terms of online leadership as well as the general fields of enquiry that are concerned with online interaction.

This type of research encounters two types of challenges. The first challenge is that it is, by definition, difficult to document the rise of self selected leaders who use the online environment to build their leadership capability. This is often a spontaneous occurrence, as opposed to a planned one, hence accumulating meaningful data on the topic is arduous. The second type of challenge concerns collecting research material on some of these leaders' followers. While online

communities have been extensively studied and surveyed, it is typically hard to collect meaningful information on, let alone interview, lurkers because they are not easily identifiable. Understanding lurkers' motivation to lurk, however, would be extremely valuable, if we seek to engage more people in online fora.

It is with these challenges in mind that this research was planned. The research was conceived as one means to generate researchable data on two types of online participants that are typically difficult to study. Following an Action Research model designed by Yoong and Galluppe (2001) to generate empirical data on particular online group processes, the present research set out to answer questions about online leaders and lurkers. This is an important topic for consideration also because of the potential leverage effect of online leadership as a social capital building agency (Nahapiet & Goshal, 1998).

The overall purpose of this research was to unpack the reasons why people engage in varying levels of online collaboration in a self selected group. To achieve this objective two research questions addressed (1) the role of online interaction platforms; (2) participants' perceived constraints or enablers of online collaboration. These laid the foundation for the main research question (3) how do leaders and lurkers differ in deconstructing their online experiences?
The first two questions first resolved the issue of what online collaboration platform participants would choose to interact on and secondly how leaders were to be identified. Lurkers were a second group that was of interest in the present

research. Leaders and lurkers were asked to describe the online experiences underlying their differing participation levels. The thesis describes an action research whereby the researcher established a virtual group, which later evolved into the "Innovators Online Network" and studied its development. Five iterations of the action research cycle, each building on previous learning, describe the online group's activities "following the actors" through the emergence and establishment of the online network.

The first research question was: "In what ways is group emergence impacted by different online discussion platforms?" In order to address this question, two different online environments were created, in which innovators could participate, and activity on each platform was traced.

The second research question was: "What do participants perceive to be the factors that enable or constrain online collaboration?" In order to address this question, data were generated by designing a number of situations in various online and face to face settings for discussions to take place and these discussions were analysed.

The third research question was: "How do online leaders and lurkers differ in deconstructing their online experience?" This question was answered through analyses of individual interviews.

1.2 Online collaboration in the New Zealand context

Experts agree that developing business collaboration is a priority in the current New Zealand economic environment. For example, Christie (2002) argued that New Zealand needs to make an unparalleled effort to support collaboration, as well as networking nationally and internationally in order to reap the potential benefits of the "Knowledge Wave". Concepts of innovation and collaboration are frequently mentioned concurrently in official sources such as the government's policy framework, "Growing an Innovative New Zealand", emphasising three key elements: strengthening the economic foundations, investing in innovation, talent and global connectedness and focussing sectoral policies on the bio-technology, ICT and creative sectors (Growth and Innovation Framework, February 2002). The need for global connectedness brings to the forefront the role of electronic as well as conventional networks, connecting New Zealand innovators to their international colleagues and clients. New Zealand needs to overcome at least two types of obstacles in this domain: closing its "entrepreneurial gap" and encouraging its professional networks development.

A recent study found that, although New Zealand was rated as the world leader in entrepreneurial activity, its entrepreneurs' aspirations towards success are modest, and their survival rates are low to moderate (Frederick & Carswell, 2001). This phenomenon was labelled by the authors as an "entrepreneurial gap". Both these obstacles would benefit from these individuals being assisted to develop networks for peer and expert support, encouragement and help. Results from studies of

ongoing successful companies of various sizes show that small New Zealand entrepreneurial firms who networked either formally or informally, increased international marketing activities (Covielo & Munro, 1995). The value of networking could thus point towards possible solutions to the entrepreneurial gap. The Competitive Advantage New Zealand project (CANZ) additionally showed that successful established companies overcome limitations of size, distance, technology, production and marketing skills through the extensive use of networks of business partners (Campbell-Hunt et al., 2001). In a similar vein, another New Zealand wide scale survey (Clark et al., 2001) confirmed that local business could greatly benefit from new networking opportunities and that an increase in networking activities is in line with their strategic aspirations. This follows worldwide similar trends (Brown, 2001; Brown & Duguid, 2000). Christie (2002) concluded that collaboration and networking activities are identifiable as critical to the success of New Zealand businesses and, by extension, to its economic prosperity. Christie argued that "there is a need for facilitators or brokers to assist people to form clusters, network across networks, and become skilled collaborators. We have to be more active in bringing players together". (p. 21)

The other obstacle in New Zealand reaping the fruits from developed networks is pointed out by Davenport (2001), who explained that complex working environment networks have been damaged in the past decade by successive re-organisations. This flurry of re-organising activities has also had an inhibiting

effect on the practices and processes of the New Zealand business environment, affecting entire networks of relationships over a short period of time. Since some networking channels have to be re-built anyhow, it seems an appropriate point in time to introduce networking platforms using alternative communication modes, such as online ones. Finally, since networking patterns are built over time, it is crucial to allow for sufficient observation and recording of the resulting phenomena (Aldrich & Zimmer, 1986; Gilmore & Carson, 1996; Orlikovski & Baroudi, 1991).

Harnessing the power of the Internet towards network building is another challenge to overcome. Most start-up businesses make (minimal) use of the Internet, principally to collect or disseminate information or exchange email communications (Clark et al., 2001). Major web sites sponsored by government, for instance www.bizinfo.co.nz, www.businessnz.org.nz, or www.ecommerce.govt.nz), provide information for innovators and entrepreneurs. This information may include lists of useful addresses, articles on topics of interest such as human resource practices, marketing, financial news and even networking. In some instances, they provide bulletin boards where participants can post certain requests, such as about selling and buying goods or services. Relatively few websites however, offer wide-ranging interactive capabilities or enable ongoing interactions between participants, such as discussion fora. Firstly, there are financial reasons for this: maintaining interactivity online necessitates significant human resources. Secondly, there are political reasons reflected in the

problematics of controlling contents of online fora. Thirdly, there is a 'credibility' element: government bodies would need to see evidence of the value added to the New Zealand innovation scene of having interactive sites.

Focus to the present research, the Virtual Networking Project was initiated to address the aforementioned obstacles. The project offered innovators an interactive medium providing both information and peer support. The project aimed to assist New Zealand innovators strengthen regional and national networks and access global networks, thus enhancing survival rate and success of innovation ventures. The project offered innovators novel ways of interacting and networking in an online community of practice, through facilitated peer support, mentoring and expert advice. The overall intention was to optimise their chances of success and minimize the entrepreneurial gap (Frederick & Carswell, 2001), thus increasing the survival rate of their businesses. Research accompanied network emergence, collecting data as the project unfolded. The economic goal of the project was to assist in creating more business opportunities for New Zealand through connections with global networks to facilitate the sourcing of New Zealand intellectual property, knowledge and resources. It was thought that this greater objective could be advanced by creating smaller networks for innovators, entrepreneurs, businesspeople, policy makers and professionals. This would be applied at both national and regional levels, thus facilitating delivery of expert aid as well as peer support. On a societal level, this was the first project of its kind, providing a platform where collaborative patterns were able to emerge in an

environment more typically characterized by competition. A deeper understanding of novel collaboration pathways would be useful if implemented during innovation networks development. While collaboration and connectedness are very often mentioned in innovation circles, there is less attention given to the question as to whether the knowledge workers who are meant to build and populate these networks have the necessary mix of skills. These would include social and technical skills, and determine what their motivations to partake in online groups. There is little recognition that the knowledge on how to initiate and maintain these networks remains to be developed. Since there were no other online fora for innovators in New Zealand when this study was commenced, one had to first be created.

This research was planned with the intention of adding to the body of existing knowledge as described below. It used a unique combination of research and analyses methods as follows: Action research provided a robust and rigorous, yet flexible procedure that could be adapted to the changing needs of the group as it developed. An Actor-Network Theory (Callon, 1986a) provided the framework to follow the emergence of this particular group and identify the role each actor played. This allowed for, in particular, early identification of some of the more silent participants often described as 'lurkers'. Lurkers are generally difficult to trace, let alone interview, using more traditional research methods. A third research method, narrative interviewing (White & Epston, 1990), allowed for complementing participants' 'public' reflections, as posted in online discussions,

with more personal ones, as expressed in individual interviews. This was conducted through a guided process of retrospective analyses of their motivations for participating in the online group. Finally, narrative analysis provided new information as to the motivations of actors for the roles they chose to play: why did the leaders choose to lead and was 'lurking' a choice or simply a lack of commitment?

Chapter 2: Literature review

The purpose of this research was to examine why people engage in varying levels of online collaboration in a self selected group. To achieve this objective research questions addressed (1) the role of online interaction platforms; (2) participants' perceived constraints or conversely enablers of online collaboration and (3) how leaders and lurkers describe the online experiences underlying their differing participation levels. This chapter will review the main concepts relevant to such study. First the literature on human collaboration in the organisational context is reviewed and it is shown how the organisational discourse of collaboration has somewhat evolved in past decades. Section 2.2 follows, reviewing empirical research on the emergence of online teams, focusing on groups interacting and learning in different virtual environments within the working or learning environments and in online communities, where participants volunteer to collaborate. The section will review findings on factors that enable or constrain online collaboration in the aforementioned environments and formed the basis for formulating the second research question regarding factors perceived to enable or constrain online collaboration. The section also reviews how technology can either enable or constrain online collaboration thus leading to the formulation of the first research question regarding the impact of different discussion platforms upon group emergence. Section 2.3 reviews the literature reporting how participants of online groups have articulated their motives for, and their perceptions of the advantages to participating in such groups. Little is known

about 'virtual leaders', and much of the literature addresses virtual leaders within pre-existing teams. Similarly, more research needs to be carried out on 'lurkers' who are, by definition, silent in online discussions, hence difficult to study. This led to the formulation of the third research question as to how leaders and lurkers describe the online experiences underlying their differential participation levels. Section 2.4 follows with the description of the Actor-Network Theory used in this research to explore some fundamental choices that online self-emerging groups have to make early on in their development and how they reach their decisions. This section therefore completes our approach to the second research question.

2.1 Background: the organisational discourse of collaboration

The 20th century witnessed the culmination of the industrial revolution and with it the emphasis on production factors, individual success, company growth and revenue based on the commercialisation of industrialised goods and services. Discourse about success often also emphasised fierce competition between companies. Even competition between individuals within the same companies often prevailed, and was seen as a positive force contributing to setting high competitive standards (Pralahad, 1998). This competition paradigm permeated many levels of Western society, glorifying individual success. The language used to describe, analyse and inspire simultaneously reflected the competition model and reinforced it. Metaphors portrayed competition as positive and necessary and collaboration as dangerous: 'beat the competition', 'compete or perish', 'our knowledge is our power'. Borrowing from war language, discourse played a

central role in perpetuating the myths of individualism as opposed to collectivism in the business 'arena' - the place where businesses fought each other. The competition model also offered fertile grounds for the development of feelings of isolation amongst groups of people such as innovators (Carroll, 2002) since novel ideas would be prime targets for competitors.

Some contemporary economists refer to this past model as the 'old economy', in contrast to the 'new economy'. Descriptions of the differences between old and new economy stress a profound dichotomy between their organisational structures, respectively hierarchic and bureaucratic vs. networked and entrepreneurial, and in their relations with other firms, respectively competitive vs. collaborative (Thurow, 1998). Critics of the new economy concepts propose that the 'new economy' was invented by the 'Wall Street fraternity' often exaggerating the benefits of technology to justify the artificial growth of certain sectors (Madrick, 2000).

Borgman (2000) proposed a middle view that counteracted the view that changes in information technology will either revolutionise relationships between people, or that these changes are merely evolutionary and that networked information technology will eventually become integrated in business and personal practices just as earlier information technologies. Borgman rather views these changes as co-evolutionary, and theorises that novel technologies and perceived needs evolve, building on each other in a balancing act, between effort and reward. She

adds that adoption processes may happen in ways unanticipated by the architects of these technologies and that is it impossible to predict longer term effects on communication of these changes – hence the importance of researching them in different contexts. Whilst the competition model still lives on, a different discourse is heard also emphasising that no one individual or company – as big as it may be – can master the complexities of the innovation process single-handedly. Rather, forming alliances and partnerships with selected others is evolving into a sound basis for a success model (McIntosh, 2003).

Jablin and Sias (2000) added that moves toward globalisation have had significant implications for communication competence at the organisational level. The development of informal communication networks may impact communication competence amongst entire groups of people within or between organisations that may or may not be included in these communication networks. Another manifestation of the popularity of the 'collaboration model' is the flurry of geographic or conceptual clusters being set up worldwide to provide a new (and implicitly 'safer') stage for collaboration against global competitors (Brown & Duguid, 2000).

Empirical studies increasingly report collaboration as an essential ingredient in business success. Peled (2001), for example, researched how groups of individuals facilitate innovation processes in their expertise domain. Innovation is described as an idea perceived to be new to a particular person or group (Rogers,

1995). Peled studied nine cases of innovative processes in organisations, including one in New Zealand. He distinguished three phases of the innovation process (network, coalition and institution). He outlined the importance of the networking stage as laying the foundations for the future of the project – a stage during which like-minded individuals locate each other and form a network to promote the ideas they share. After some initial contact and trust building, they look to recruit new individuals to widen the knowledge base of their group. Thus the outcome of the project depends on basic networking and "politicking" (p. 184) of the early players in the innovation process and the study of innovation needs to account for the players' interactions.

In summary, organisational discourse has shifted from discouraging collaboration to emphasising collaboration across organisations. Yet the collaboration model is neither yet explicit nor well enough documented. Research spanning across international borders has revealed, however, that projects' outcomes were dependent on basic networking of the early players in the innovation process. Hence, the study of innovation is necessarily the study of players' interactions. This is one reason for the focus of the present research. Given the central role of collaboration and networking in innovation processes, as developed above, the exploration of online environments in which workers can interact and collaborate becomes critical.

2.2 Online collaboration

The previous section established that discourse around collaboration is evolving, placing it at the core of sound business practices. Given that the purpose of this thesis is to examine why people engage in varying levels of online collaboration in a self selected group, it is important to consider what body of knowledge has been accumulated about online collaboration. The first part of the section will review research conducted on work-related computer mediated groups; the second part will describe research conducted within online communities that self-selected and self-formed and the third part will review the literature relating to barriers and enablers of online collaboration.

2.2.1 Computer-Supported Collaborative Workgroups

This section will show how studies addressing computer-supported Collaborative Workgroups (CSCW) describe enablers and constraints of online collaboration as evolving from work-related tasks, as well as taking into account data from the social domain. Collaborative activities, by definition, involve more than one participant, and central to their quality is the relationship between the work of individuals and the group in its entirety. Concepts of 'collaboration' and 'cooperation' are central to this field of enquiry and refer to the activities of participants who work together to produce a product or service (Bannon & Schmidt, 1989).

CSCW research developed from the need of workplace teams to collaborate in increasingly more complex environments and operating from geographically distant locations (McQueen, 1999; Shadbolt & Burton, 1995). Historically, computers entered the organisation world through the considerable changes brought about by the introduction of mainframes. Whilst the first models involved colossal machines, it took some time before computers could actually take on significant task loads from humans. Grudin (1994a) notes, in a review of the development of CSCW research that, while the 1960s were characterised by the rise of the mainframes, these were only programmed to take on relatively simple tasks such as airline bookings. The 1970s saw the development of mini-computers and with them the possibility of connecting many people working together as never before possible. Grudin (1994a) distinguished between two currents of research within the CSCW research field. The first wave of research addressed Information Systems (dealing with complex networks of users) and the second focussed on complex small-group applications (dealing with smaller networks of users and by extension, more accessible and cheaper underlying technology to support their communication). Small-group applications, most relevant to the purpose of the present review, are construed as specifically designed to bring people together that need to communicate as part of their tasks; hence researchers in this field have studied communication outcomes as part of the evaluation of the software (Grudin, 1994b).

Optimising collaboration and enabling virtual groups to complete their defined tasks is a major focus for project managers, especially since most organisations today have online components (DeSanctis & Monge, 1998). Moreover, these need to be taken into consideration at all levels of planning. Computer supported collaboration, such as in the case of project management tasks, has been shown to help avoid redundancy in such work groups (Malone & Crowston, 1994). The value that computer supported collaboration can add through effective coordination, however, depends on communication mechanisms that principally use combinations of two fundamental human skills: the first is direct communication with other participants and the second is indirect communication in the form of manipulation of shared artefacts (Schlichter, Koch, & Bürger, 1997). The latter will be further developed in section 2.4 of the literature review as 'artefact' manipulation within an actor-network becomes a topic for enquiry in itself.

DeSanctis and Monge (1998) offered initial research contributions in the realm of constraining characteristics of computer mediated communication, as they first described some aspects of it as inferior to face to face communication in the completion of certain tasks. They queried the future role of virtual networks as compared to face to face personal relationships. This was particularly salient in the area of consensus formation (DeSanctis & Monge, 1998) and in the more general area of message understanding, for instance in establishing shared meaning of information and managing the feedback process in discussions

(DeSanctis & Monge, 1999). In addition, DeSanctis and Monge (1998) showed that computer mediated groups generally scored low on communication efficiency – because they typically took longer time to complete tasks, as opposed to groups who interacted face to face.

An additional constraint of computer mediated communication projects was brought about by the way they were presented to end users. Researchers came to recognise the mediating impact of social variables in project outcomes through analyses of failures and successes of implementation of computer-supported collaborative projects (Rafaeli, 1988). Kling (1999) described implementation failures caused by planning that did not appropriately take human or organisational dynamics into consideration. He related how two major consulting companies got opposite results from the implementation of groupware packages (software that support group interaction) because one held the technology as the main impetus for change implementation while the other presented it purely as a means to the end of achieving better human performances. The former company did not take into account that learning the new system was not billable time for their staff, hence used sporadically. The latter, on the other hand, first implemented a "human organisational intelligence system" introduced as people-centred for which the technology was only presented as an information support system and was, as a result, widely used. Research in the last decades supported the proposition that technology-focused projects fail, whereas people-focus projects have better chances to succeed (Gibson & Cohen, 2003b; Kling, 1999).

As a result, more recent trends of CSCW projects frame technology simply as a means of helping people achieve their objectives and re-instate the primary focus of collaborative research on people (Gibson & Cohen, 2003a).

The study of virtual teams outlined another social issue of relevance here - that the leadership of geographically distributed teams was facing a novel challenge. Virtual teams, at the core of these studies, are defined as such if they possess the three following attributes (Gibson & Cohen, 2003b).

> *"It is a functioning team – a collection of individuals who are interdependent in their tasks, share responsibility for outcomes .... the members of the team are geographically dispersed (and) the team relies on technology-mediated communications rather than face to face interaction to accomplish their task (p. 4)*

Virtual teams operate in the context of organisations where collaboration to achieve certain is mostly predetermined by the organisation's aims. Leaders of geographically distributed teams need to address multi-level tasks involving coordination of workers and communication of complex messages through new media. Studies of virtual teams brought about issues of "virtual leadership", a novel phenomenon under scrutiny and issues of how such leaders motivate their teams through online channels (Gibson & Cohen, 2003a). Research on virtual leaders will be addressed in section 2.3.2 of the literature review. CSCW

researchers also recognise the importance of documenting the processes of building online environments and of choosing the technology to best fulfil the group's aims. This will be addressed in section 2.4.3 of the literature review.

In summary, CSCW research focused on studying virtual participation in the workplace studying groups which, by definition, functioned within organisational constraints. Research findings in this field first described computer mediated communication as inferior to face to face alternatives and potentially heavily sensitive to social influences that are not always obvious. One such example is the contribution of this research field in describing group attributes such as the quality of their decision-making and the implementation of technical solutions to increase efficiency in achieving given tasks. However, once the impact of social issues was acknowledged this allowed the CSCW research field to make significant contributions in describing initial constraints and exploring ways to transform them into potent enablers of virtual communication. This was achieved through early CSCW systematic study and field experiments leading to the design and trial of technical solutions to overcome early problems. Since studies of implementations of Information and Technology projects emphasise that such projects should be planned and performed as 'people' projects, as opposed to 'technology' projects. This teaches that the needs of the participants should be of primary focus in the development of the research program in, for instance, giving participants the opportunity to decide which online communication platform they wish to use, instead of imposing one. How to implement this within the unfolding

processes of group emergence is not well documented and requires further input from other field. One such field encompasses within it the study of online communities.

2.2.2 Online communities

Given that the purpose of the thesis was to examine why people engage in varying levels of online collaboration, the previous section focused on studying workplace online collaboration. The goal of this section is to review the research related to online communities - where participation in virtual interaction is a choice of the individual, as opposed to a work requirement. What are the characteristics of online experiences of voluntary online participants? Online community research also investigates a second stream of research, namely to what extent the skills that need to be acquired to effectively interact online are technical skills or rather complex communication skills. In the former case, training on how to use the equipment should suffice to produce online communicators. In the latter case a whole array of collaboration skills need to be mastered through computer mediated networking.

Online communities supporting community interaction and networking activities appeared in the 1970s with the development of bulletin board systems and grew exponentially. Online communities offered their members a range of local information such as maps, event timetables and local advertising and a range of activities such as community activism jobs. Housing and veterans' issues, for

instance, formed a significant part of the online activity of the Berkeley Community Memory. Another well documented example of such bulletin board system is the California's Public Electronic Network (PEN) provided by the city of Santa Monica, California (Rogers, Collins-Jarvis, & Schmitz, 1995). The Public Electronic Network demonstrated how, not only could residents supplement existing face to face networking activities but also how such network could be designed to give a voice to those community members who had been previously disenfranchised. Special efforts, for instance, were addressed to allow homeless people access from public libraries, leading up to an online conference on homelessness generating more than 20,000 messages in the ten years research was conducted (Rogers et al., 1995). Communities interacting on the internet are numbered in six digits and still growing rapidly. Researchers have emphasised different aspects of online community such as online identity (Turkle, 1995), social context cues (Sproull & Kiesler, 1986), collaborative learning environments (Bruckman, 1998) and communication processes (Hiltz, Johnson, & Turoff, 1986). Others have documented more specific aspects of online interaction such as the taxonomy of online conversations - transacting, transforming and transcending. The latter happens when participants rise above the specifics of the interaction situation – transcend it – and seek to produce coordinated action in order to bring about genuine social change (Sherry, 2000). This body of research stemmed from human behaviour fields of study such as, but not limited to, psychology, sociology, communication, social psychology and anthropology, but has not yet, according to Preece (2000) yielded an accepted definition of online

community. There are, according to her, elements of a definition that are common to researchers, such as shared goals, interests or needs providing the main reason for participation, ongoing interaction and contact, access to shared resources regulated by policies, reciprocity and shared context of social norms, communication means and protocols. Reflecting upon the history and emergence of online communities, Preece, Maloney-Krichmar and Abras (2003) noted, however, that in spite of the growing body of knowledge accumulated about online interaction, there still are gaps that need further investigation, such as in participants' perspectives and evaluations as to the way online communities emerge and organize themselves.

Online communities fostering professional interaction and issues of voluntary collaboration, as opposed to workplace collaboration, were addressed by researchers of Communities of Practice and Communities of Interest who documented how self-emerging groups initiated by people sharing common interests in certain topics grew (Wenger & Snyder, 2000) by studying their interactions in online environments (Kimble, Hildreth, & Wright, 2000). The term "Communities of Practice" was coined just over a decade ago by Lave and Wenger (1991) who described it as:

> *...a set of relations among persons, activity and world over time and in relation with other tangential and overlapping Communities of Practice (...) in such a community, a newcomer learns from old-timers by being*

> *allowed to participate in certain tasks that relate to the practice of the community. Over time the newcomer moves from peripheral to full participation (p.98)*

In their view, the learning that takes place is not narrow and situated where examples of practice are imitated. They discuss a complex phenomenon they coined "Legitimate Peripheral Participation" (p.98) whose three components are intimately interconnected and take on different perspectives when paired differently: legitimation and participation together characterize the typical ways of belonging to a specific community, and peripherality and participation together refer to position and identity in the social world. One important distinction between Communities of Practice and other groups is that they emerge informally in a self-organising manner, hence can include a wide range of practices as radically different as non-alcoholism and midwifery. The Community of Practice framework includes three levels of analysis: legitimation, peripherality and participation. Legitimation includes analysis of power and authority and how certain actions and individuals become recognised as representing the Community of Practice. Peripherality involves the degree of engagement with the community as an integration process. Participation takes into account the different roles played by the community members. Learning, however, is the central underlying principle of Communities of Practice (Wenger, 1998). Williams and Cothrel (2000) investigated contemporary technological developments and proposed the Internet as an emerging and potent platform, offering a wider range of networking

possibilities. For instance, proponents of online collaboration reckon that online channels decrease the tyranny of previous barriers of time, distance and in some instances, status (Williams & Cothrel, 2000). This is why the development of online tools for groups has boosted the spread of online groups of different types in an effort to share knowledge across geographic boundaries (Kimble et al., 2000).

The Social network concept is useful in understanding why people collaborate in virtual communities and how information is shared. A social network represents a set of individuals and the relationships between them. Hanneman (2002) summarised the properties of social networks with three main variables: degree of an actor (place of an actor in the network), degree centrality (power of an actor assessed as how many other actors are directly connected to that actor) and cliques (small building blocks of larger networks, focussing on closely connected subgroups). The computer supported social networks concept in its strict sense only includes sets of relationships that are supported through computer environments, e.g., chat, news, and e-mail (Wellman, Salaff, Dimitrova, Garton, & Haythornwaite, 1996).

One well known social network analysis was carried out by Granovetter (1973) who demonstrated that people share information with others who are part of their social network. Granovetter went on to categorise ties between elements of the network as "strong" or "weak" (according to the amount of time and energy

invested in maintaining the tie, the emotional levels involved and the level of reciprocity expected to occur within the interpersonal relationship, amongst others). He showed that, in certain cases, for instance job finding, weak ties were more effective than the strong ones. Granovetter explained this through the reaching abilities of the social networks: networks of weak ties are more diverse and numerous than networks of strong ties, because people associated in strong ties would necessarily have similar connections. In the context of job searching, for instance, the people associated most strongly with the job searcher are likely to know of the same job opportunities as the job searcher. This showed that strong ties, rather than weak ones, would be less useful than weak ties with people having access to different information about job opportunities. Weak ties, hence, allow for information and resources to circulate further (Granovetter, 1983). Haythornthwaite's analysis (2001) of social networks and media use further focused on the strength of the interpersonal ties between communicators and posited that changes in media impact differentially on weak and strong tie networks.

In summary, it has been shown in the previous sections that virtual organisational and community settings have different practices. It follows that the respective online groups they foster have very different aims. Groups based in the work environment need to accomplish given tasks and leadership in the workplace is often predetermined through the organisation structure and role distribution. Social groups forming online, on the other hand, may need to invest more energy

in defining their identity and their leadership or emergence mechanisms are not necessarily comparable to that of workgroups. The online community research field partly informed the second research question of the present research ("What do participants perceive to be factors that enable and constrain online collaboration"). Results from this field stress that, central to online community development is the ability of the community moderators to enhance participation through fulfilling participants' needs to identify with a group and experience a sense of belonging. Groups stemming in the different conditions as described will have different ways and reasons to connect to other participants and take part in the social networks involved. In the third instance, that of self-selected participants forming an online group around certain professional interests – that are neither purely social nor part of a work commitment, there is a need for empirical investigation. Research here should serve to determine how participants' perceptions of factors that enable and constrain online collaboration play out in their online interaction and how this is reflected on the online experiences of participants.

2.2.3 Barriers and enablers of online collaboration

The following section addresses a number of issues identified as significant in online interaction and online group development and that can potentially act as either enabling or inhibiting depending on how they were addressed by the architects of the online groups. As the building blocks of online interaction are shaped by the individual needs of the participants, it is important to understand

how these building blocks enable collaborative online interaction which, in turn, enables the various groups or the participants' organisations, to achieve their collective aims. In particular, there is a need to consider whether participants would report different enablers and constraints of online collaboration stemming from their various viewpoints. Would the perspectives of workers having to collaborate online as part of their assigned tasks be different to that of online students collaborating as part of school assignments or to that of online community members that chose to join of their own accord?

Barriers to online collaborations have been extensively documented. In the context of Computer Mediated Collaborative Workgroups research, time and trust are two of the identified main obstacles to online interaction. Time constraints or information overload (Rafaeli et al., 2004) also affect the more passive participants. DeSanctis and Monge (1998) reviewed trust inhibiting effects, concluded these effects seriously endanger the success of online interaction and challenged researchers to address the issue of trust building online. Ardichvili, Page and Wentling (2002) mention other work-related factors that act as constraining factors to online collaboration, such as fear of loosing face, fear to mislead a colleague by giving wrong information and the need for getting managers' approval to share knowledge because of security issues or hierarchical structures. They report, however, not finding support for the hypothesis that people hoard information to keep an advantage over colleagues. On the question of 'why collaborate virtually?' much of the research emphasised the power of

individual positive outcomes when knowledge is shared on topics discussed that matched their personal or practice interests. There remain, however, many unanswered questions. The concept of "motivation", for instance, when mentioned, is used in the context of whether people want to participate in collaborative activity or not, as a 'yes/no' phenomenon, instead of a topic that needs to be investigated in depth. Klein and Kleinhanns (2003), for instance quote a virtual team member as saying:

> *...most people just think from one day to the next, and they lean back and ask themselves, "In the long run, what does this do for me?" (p. 388)*

Klein and Kleinhanns, however, have not gone on to investigate the types of internal answers people produce to this question - empirical information crucial to the understanding of the phenomenon as a whole.

Overcoming constraints to online collaboration has been researched in the motivational context of collaborative activities in three main domains: the learning environment, the social domain with research on online communities and the work environment. Motivation of participants to contribute online is a major topic for online learning researchers. In learning environments, skilful moderators are seen as major actors to enhance learners' motivation and facilitate trust development (Berge & Collins, 1995; Campbell, 1999). Whilst the students' investment towards obtaining a degree is clear, their motivation to invest in participation in online assignments has been reported as directly proportional to

the assignments' weight in the final grade (Salmon, 1999). The students' choice over participation is located somewhere in the complex interplay between having chosen to study and the obligation to complete assignments. Moreover, research has also shown that the online learning experience is dependent on the interaction of the learner with the system (Nielsen, 2000). As such, interface designers invest much effort in designing learning online environments that also have a motivating effect on learners (Preece, Rogers, & Sharp, 2002).

Stepping out of the learning environment and into that of social online communities, a different set of motivations is described. Kollock and Smith investigated novel social patterns and events such as "value-added cooperation" or inspiration and purpose found in the "Gift Economy" concept adapted for cyberspace (Kollock & Smith, 1996; Smith & Kollock, 1999). They identified several forms of motivation underlying participation in online communities, concluding that motivations are either based on some form of altruism or self-interest and that these work according to a model of shifting economies of public good working toward increasing the public good. First they identified anticipated reciprocity, that is, participants contribute in the hope that in the future they will receive information that is useful to them. The amount of individual offerings thus contributes to the increase in public good. The second motivation they detail is about the contributor's reputation. Their motivation may be enhanced when contributions are acknowledged and recorded. Two other motivations Smith and Kollock mention are oriented towards the community itself - the need expressed

in the community and the attachment that individuals have for certain communities that motivates them to contribute.

The Microsoft Social Computing Group developed this field of research, further outlining how trust development enhanced users' experience of community belonging and interpersonal communication (Jensen, Farnham, Drucker, & Kollock, 2000; Kollock, 1999). Furthermore, the manner in which participants in virtual teams develop trust affects online collaboration (Iacono & Weisband, 1997; Rocco, 1998). Ardichvili, Page and Wentling (2002) mention other work-related factors that enable online collaboration such as moral obligation toward company or profession to contribute, establishing oneself as an expert or 'giving back'.

Motivational factors may play a somewhat different part in the workplace environment. Some workgroups have been established that rely on online communication to fulfil purposes beyond simple communication and information centralising – for example, project managing, with a clearly defined collective outcome (Kock, McQueen, & Scott, 1997). In order to achieve their work goal, the community needs to master large quantities of information as well as generate new collective knowledge. In such cases, only those participants driving the online interaction process have truly chosen to participate, and in this sense the participants' motivation is an issue that project managers must take into account (Morreale, Spitzberg, & Barge, 2001). The interaction environment has also been

shown to have significant impact on business outcomes. While the face-to-face communication mode has traditionally been preferential to conduct business, elements of online communication have gained importance in the past decades (Galimberti, Ignazi, Vercesi, & Riva, 2001). Indeed, one of business most common modes of computer mediated communication is the email system (Markus, 1994). In a dyadic situation, email is suitable, but sending multiple electronic documents does not necessarily clearly benefit group interaction.

Reviewing communicative motivation conceptualisations, Zorn (1993) defined motivation to communicate as "what sets in motion our communicative efforts, directs us toward specific strategies, and impels us to continue" (p. 517). Evaluating goal-setting, expectancy and self-efficacy theories, Zorn proposed to conceptualise communicative goals as clear indications of communicative motivation and test goal-based frameworks to research it. He proposed, for instance, to research the perceived value of communicative tasks as impacting on motivation and performance level. The perceived value of online collaboration hence needs to be researched both on a group level - how the group articulated and processed perceived barriers and enabling factors - and on an individual level - what motivated individuals to adopt and play specific roles in the online discussion. Another motivation theory that can shed light on the question of what drives people to contribute to online discussions, is the self-concept theory, informed by three streams of research: self efficacy (Bandura, 1982, 1986), social identity (Stryker, 1986) and self-presentation theories (Schlenker, 1985). This

theory is deep-rooted in the concept of the self and related to the concept of affiliation. It states that individuals behave according to what matters to their reference group, in order to gain legitimacy and power and support their self image as efficacious individuals. Translated in terms of online groups, this explains how certain individuals invest much time in elaborating certain answers, with impressive amounts of detail and are willing to help others learn by imparting some of their knowledge as in Reingold's (1993) description of the WELL community members postings. The measurement of perceived value of communicative tasks, however, necessitates a complex interpretive approach. Extractions of such data must be made in interaction with the subjects themselves. Therefore, the gathering of data through questionnaires only may not measure the phenomenon at hand sufficiently. The subjects need to construct the meaning of their interactions rather than have the reality of the researcher imposed on their ideas (Gioia, Thomas, Clark, & Chittipeddi, 1994). Combining mental and active processes to form a conceptual construct requires an ability to capture the individual processes in depth, the combined processes, and the movement between the two. One way to understand individuals' perspectives about their role is through their narrative, and this is a valuable contribution to the understanding of how knowledge workers construct some of their interactions Greenberg (1995).

Evaluation of perceived value for collaboration may gain from the studies of 'Intensional networks' (Nardi, Whittaker, & Schwarz, 2002). In this view, knowledge workers are, on the one hand dependant on cohort (whether from same

company or other organisational forms) and on the other hand, required to cope with inefficiencies and lack of consistency in their companies' networks. In addition, this population is also facing major uncertainties about their future as employees. In order to face increasing uncertainty levels, many knowledge workers have reached the conclusion they must not depend solely on 'people' structures and networks created by their companies, but rather develop their own 'Intensional networks'. Nardi, Whittaker, & Schwarz (2002) coined the term "Intensional networks" as the 'ego-centered' networks people build on by one for themselves and studied why people subscribe to particular networks. Theorists of Intensional networks surmise that to manage new work situations, knowledge workers are opting toward a more proactive attitude in building their own networks (as opposed to their companies') one contact at a time.

> *Although Intensional Networks are ego-centered, portions of any individual network overlap with portions of others' networks, so they do not have the "one-off" character that the notion of an ego-centered network might suggest. Within professions and activity systems, networks overlap, giving a sense of connection to workers even under the conditions of flux that characterize today's economy. Intensional Networks are extended through the networks of others... One of the most important resources we share with each other is*

> *access to those in our social networks. (Nardi, Whittaker, & Schwarz, 2002, p.239)*

Intensional theorists (Nardi, Whittaker, Isaacs et al., 2002) are contemplating the study of online tools to build these networks. Answers to the motivational question posed earlier may come from the study of Intensional networks as to how knowledge workers perceive the added value of online fora to extend their networks to distances never possible before in face to face networks. Much of social network analysis has been carried out with quantitative methods: mapping techniques and tools to analyse substantial mailing lists logs developed provided a solid body of "macro knowledge" (Contractor, Zink, & Chan, 1998; Garton, Haythornthwaite, & Wellman, 1997; Wasserman & Faust, 1994; Wellman et al., 1996). Social networks theories have addressed matters of choice as the direction and intent behind network development. The researchers who coined the term of Intensional networks, however, did not address whether such networks could be developed through online interaction (Nardi, Whittaker, & Schwarz, 2002). Though many of the participants in Nardi's studies were knowledge workers, the studies did not actually examine how they used the internet or online communication to build their Intensional networks. This gap needs to be addressed to verify the impact of participants' perceptions of whether building intensional networks online is feasible. This would add qualitative insights to this body of research such as actors' motivations and the beliefs about networking that underlie their activities in this domain. Description of "Intensional networks" can illuminate the stories of individuals engaging in collaborative activities possibly

providing tentative direction to address research question three ("How did online leaders and lurkers differ in deconstructing their online experiences?"). Such endeavour would explore a potentially very broad field, studying the extent to which online communication tools, very new in the history of human interaction, possibly facilitate novel opportunities for collaboration and networking in the current innovation climate. Small groups developing into larger online networks could offer the opportunity for nationwide and international projects to emerge.

Individual needs of online participants have been studied extensively. These needs point to the emotional domain and researchers have attempted to describe and explain how these emotional needs are fulfilled. There is much research describing how members of online communities give and receive support through online means of communication (Cothrel, 2000). One fundamental optimizing factor concerns the needs fulfilled by participation in online communities. The most popular online social communities fulfil obvious strong needs such as the affiliation need, thus strengthening signs of belonging to specific groups, such as family, relatives, or classmates. Communication, information gathering and dissemination are the main purposes for these communities' existence and indeed form the bulk of their activities (Cothrel, 2000).

More research needs to be carried out to explore what needs are being fulfilled by participation in online Communities of Practice. Are these similar to early conceptualisations such as the needs to connect, share, belong, and thrive

described by early psychological research (Hall & Lindzey, 1957; Murray, 1938) or have contemporary technological developments resulted in different, yet to be described phenomena? Once exclusively researched by social scientists, these parameters are currently being investigated by Information and Communication Technology researchers as well (Nonaka, 1991). Information and Communication Technology practitioners, who had typically excluded social scientists, recently started collaborative research with ethnographers or anthropologists (Suchman, 2000). Examples of these would be the corporate giants such as Microsoft, Xerox and Lotus. The multidisciplinary Social Computing Group at Microsoft Research outlines the importance a group such as Microsoft places on qualifying users' experience of community belonging and interpersonal communication (Jensen, Farnham, Drucker, & Kollock, 2000; Kollock, 1999).

Blanchard and Markus (2002) studied Microsoft Network (MSN) online communities and concluded that the sense of community was essentially supported by three social processes: (1) giving and receiving support, (2) identity formation and process of identifications and (3) trust building. Preece (1999) showed that it is not only information exchange that happens in online communities but also important human emotional interaction such as empathy. This research investigated, for instance, the relationship between empathy, predictability and trust and techniques to support online trust and empathy building. Hence, when such needs were fulfilled online, this became one

characteristic of the online group. Preece coined the concept 'empathic community' to depict communities which display high empathy levels (1998).

In conclusion, the constraining and enabling factors of online collaboration reported by online communities members generally fall into two categories: intrapersonal and interactional. Amongst the identified intrapersonal enablers were feeling of belonging, empathy, trust, altruistic motivation to contribute, information and visibility benefits. Interactional enablers stemmed out of the relationships established online and included a sense of community, identification with the group and reward from activities that can be done in collaboration. Hence, the needs of online participants are important to study to complement information obtained at group level.

There is a dearth of knowledge, however, in the context of self-selected online groups of professional types. Data need to be gathered in-depth, as in interviews, to reach their subjective experiential and motivational levels. Research is needed on how self-selected participants perceive the value of communicative tasks' impacts on their motivation and performance level. Furthermore, the place of the individual within the broader context of the group was outlined also in the way the different social networks that individuals belong to come into play in various life situations. The roles played by weak and strong ties, for instance in job finding situations, point to different levels of interactions in complex webs of social situations. Developing this point further, the question arises as to whether online

environments could support activity aimed at extending one's professional network – and whether self-selected participants' perceptions of enablers or constrains of online collaboration and reasoning for participation change with their level of collaboration.

2.3 Online roles

As described above, organisational discourse about competition shifted to encompass collaboration with preferred partners. The section below will discuss what is known about how such shifts operate at the individual level. Do individuals merely change their focus - or are more profound changes needed to collaborate? How do individuals explain their adoption of particular online roles over others? Information technology is progressing at a much faster speed than our comprehension of its role in social, behavioural and organisational dimensions of knowledge creation and application. While humans have developed and nurtured collaboration patterns in many domains throughout the centuries, business competition rather than collaboration patterns have been traditionally encouraged in the old economy, as noted earlier. Organisations develop safeguards and collaboration models through new concepts such as alliances and partnerships ('it is our alliance against all the others') and instruct their staff, in varying degrees to collaborate with certain others (Gee, 2000). This is particularly relevant in the innovation business environment where intellectual property is construed as needing protecting, rather than sharing. Change mechanisms,

however, take time to elaborate and process (White, 1991) and so the question as to what is the motivation to contribute online needs to be addressed.

2.3.1 Virtual leaders: a new breed?

The eighties saw a flurry of research describing opposite trends as to the characteristics of online media for communication (Kiesler, 1997). These often related to skills needed to lead in the online environment. As seen earlier, conflicting results were reported as to the ability of computer mediated communication channels to support meaningful interaction (Wellman, Quan-Haase, Witte, & Hampton, 2001). In line with the focus of this research, the following section of the literature review will show how researchers turned their attention to 'people factors' after technical issues started to be addressed. At this point, studies on the people leading online groups originated and questions about the impact of 'virtual leaders' were formulated.

The first stream of research emphasised online media as lean (Daft & Lengel, 1986; Feenberg, 1989; Hiltz, 1995) and unable to support complex communication processes. In partial support of this view, Maznevski and Chudoba (2000) concluded, after studying three global teams for nearly two years, that face to face meetings early on in distributed teams strengthen bonds between team members. The use of virtual channels for communication may, for instance, encourage leaders to be more task-focussed than people-focussed (Sussman & Sproull, 1999).A second stream of research showed, on the other hand, that lateral

communication (rather through transactional exchange and network relationships than through hierarchy) was at work in virtual teams (Hinds & Kiesler, 1995; McGuire, Kiesler, & Siegel, 1987; Siegel, Dubrovsky, Kiesler, & McGuire, 1986; Strauss, 1997). DeSanctis and Monge (1998) concluded from this empirical evidence that electronic means can support boundary-crossing communication even among culturally or functionally diverse members of virtual groups.

Research findings outlined the role of certain figures (for instance managers, group owners, facilitators) as critical in their ability to direct their actions towards shaping communication patterns in future organisations (DeSanctis & Monge, 1998). Apart from communication genres evolving on their own (Yates & Orlikowski, 1999). DeSanctis and Monge (1998) emphasised the role of managers in the 'virtual' organisation in building trust and mutual understanding and reinforcing online group cohesion to improve virtual group functioning. Similarly, pilot research shows that virtual leaders promote communication patterns, encouraging dialogue and building trust (Van der Smagt, 2000). This reinforces the findings discussed above, relating to the importance of a climate of trust conducive to communication.

Recent research (Butler, Sproull, Kiesler, & Kraut, forthcoming) outlines the additional responsibilities that owners, administrators or hosts of online groups have over people in leadership positions in real world groups by stressing that "technical responsibility in online groups goes hand in hand with social

responsibility" (p.26). These authors conclude that in order to increase social participation in online groups, formal online leaders must work to increase social benefits and relationships that members gain from group participation.

Studying the emergence of leaders in virtual teams and their email use patterns, Yoo and Alavi (2002) concluded that contemporary leaders need to master the art of online communication if they are to extend their sphere of influence in their organisations. This is a serious issue to consider as most management development programs emphasise rather conventional communication modes and little, if at all, emphasis is placed on computer mediated communication. Perhaps this issue should be one that leadership development programmes can identify as priority. Special curricula would need to be developed to treat in depth the subject of computer mediated communication mastery in order for potential leaders to be able to emerge and become accepted as such.

This field of enquiry has been addressed through studies on virtual team facilitators by Pauleen and Yoong (2001a) who researched facilitators of virtual team crossing boundaries of time, space and culture. These studies were part of a larger programme involving training facilitators who enrolled in a virtual facilitation programme and were followed as they facilitated the virtual teams. They described the virtual facilitators' use of information and communication technology to build effective work relationships amongst virtual team members. Pauleen and Yoong (2001b) also emphasised the role of training to help virtual

facilitators gain the necessary experience and understanding to work in various online and offline environments. Expanding on earlier results, they outlined relationship building as the key social process at work in virtual team facilitation and concluded that their Action Research design promoted learning and reflection for the virtual facilitators (Pauleen & Yoong, 2004). These results support previous findings that emphasise the quality of online facilitation as a potential enabling factor, with the group leadership and its skill at online communication under study (Durnell Cramton & Orvis, 2003; James & Rykert, 1998; Klein & Kleinhanns, 2003). The latter view the role of the facilitator as maintaining the social dynamics of the discussion and as moderating contents to increase and encourage online participation, and its connection to leadership (Gibson & Manuel, 2003).

In a study where MBA participants were asked to form virtual teams (Lewis Tyran et al., 2003), trust appears to act as a mediating variable for team performance. While the authors found at first no relationship between emergent leadership and team performance, after isolating the trust variable, the teams that performed better had either an emergent leader who was trusted to perform the task at hand or there was a high trust levels among team members. Team members described emergent leaders as displaying the ability to inspire them. Leaders' communication abilities were important, but most important were the emergent leaders' skills at conveying their ideas and inspiration through the written medium, since emails were the primary communication mode for the teams.

Hence, the electronic medium for the virtual collaboration did appear to make a difference in the type of self-selected leaders ("the characteristics of electronic media used in a virtual team setting may influence the type of leader who emerges" p. 189). The authors conclusions reinforce earlier findings (Jarvenpaa & Leidner, 1999) that trust and virtual effectiveness are intimately connected. Interestingly, Lewis Tyran, Tyran and Shepherd (2003) make recommendation to aspiring emerging virtual leaders that are similar to the recommendations made by Schindler and Thomas (1993) to aspiring online facilitators – foster an online climate of trust and model trustworthiness. Studying self-selected emerging online leaders and comparing their experiences to those of nominated facilitators would be an extension of this research.

Characteristics of both leaders and lurkers of a business-sponsored online community were addressed by Blanchard and Markus' study on the sense of virtual community (2002). Leaders were defined as active posters and lurkers as readers only. Leaders reported greater feelings of obligation to the virtual community as a whole than the general participant or lurker population. One leader characterised her feeling as a need to "give back" to a group that had contributed so much to her (p.6). As an overall conclusion, Blanchard and Markus (2002) reported that participants' sense of community fluctuated with the level of their involvement within the community and the perceived benefits from participation and contribution. The benefits from participation in the virtual community were characterised as informational and emotional. Informational

support was received when participants asked for specific questions on their topics of interests and received information as an answer. Participants also reported exchanging emotional support in an ongoing manner. There is a dearth of literature describing the experiences and motivation of leaders and their perceptions of the advantages to participating in online groups (Avolio, Kahai, & Dodge, 2000). Little is known about virtual leaders, or 'e-leaders' as coined by Avolio and Kahai (2003) and most of the literature addresses virtual leaders within pre-existing teams (Alavi & Yoo, 1997; Yoo & Alavi, 1996). Even more recent studies of emerging virtual leadership did not explore with their emergent leaders what were their experiences at leading through online channels nor whether they had had previous experiences at leading in different types of environments (Lewis Tyran et al., 2003).

While it has been shown that in real world environments, that is non-virtual ones, team performance and team members' satisfaction are positively influenced by leadership (Bass, 1990; Hackman, 1990), theories of virtual leadership, are in their infancy. Of interest for further research, for instance, on the topic of online collaboration, are participants' beliefs about benefits that develop during participation in online collaborative environments. This will shed some light on how to set the online participation process in motion or encourage initial participation – even when possible benefits are only likely to occur in the longer term. Additionally, information about individuals who self-selected as leaders of a group that interacted online, as opposed to having been placed in a "leading"

position from the start, would be of value to both researchers of the mechanisms at work in online group development and to online leaders. As the body of knowledge emerges about virtual leaders, the capture of their experiences and motivation for taking up such roles will be of great interest to leadership development programme designers and to architects of online collaborative environments.

2.3.2 Lurkers: virtually not there

Little is also known about lurkers' online experiences and their motivation to read but not post online comments. The paucity of knowledge about this group is principally because by being 'absent' from online discussions, they are, by definition, difficult to collect data from or observe. This is particularly evident within certain research models – those using posting analysis as their principal data source. Contrasting with the view of lurking as a means of learning about the community and a significant step for some to becoming integral parts of it, some view lurking as "free-riding" and use of the common good without contribution in return, particularly when their theoretical standpoint is one of the gift economy (Kollock & Smith, 1996). Such a conception is part of the aforementioned paradigm that considers a sense of community developing only as a result of active participation, an extension of the aforementioned paradigm of "more participation is better". This view of silent participants is increasingly challenged, with arguments such as: how come online communities survive or thrive in view of such widespread "free-riding" phenomena? In answer, Wellman and Guila

(1999) propose a different view of 'free-riding lurking' as less detrimental than in face-to-face situations because not as easily observed.

Preece and colleagues have carried out a body of research on lurkers and how they are seen in virtual communities and other group settings (Nonnecke & Preece, 2000, 2001). Preece (2000) views the study of lurkers as potentially shedding significant light on issues of usability and sociability of online behaviour. As such, taxonomy of lurkers and their reasons for lurking have been under study, mostly using data logging techniques (quantitative measures of participation coupled with interviews or surveys) and ethnographic or case studies. Using combinations of these methods, Nonnecke and Preece (2001) draw a gratification model and conclude that lurking meets members' personal and information needs and that lurkers actually develop strategies as to their online investment (to manage the information and make decisions as to read or not certain threads or posting from certain individuals). Other reasons for lurking, such as the effect of persistence on online communication (Nonnecke & Preece, 2000), and viewing lurkers' context as filters to public participation (Nonnecke & Preece, 2000). Preece and Nonnecke (2001) also report that lurking levels in some communities are lower than in others, this is particularly clear in communities where members offer emotional support to each other or in smaller communities, that many lurkers report a sense of belonging to the communities they belong to. They conclude that lurking is a result of a strategic choice on the part of the lurkers and quote a

number of reasons that lurkers have given for their decision to lurk: reasons for lurking range from personal to work related reasons.

By contrast, Blanchard and Markus (2002) report that lurkers did not seem to form close relationships online unlike other participants. Their research on the sense of virtual community set out to answer two main questions. Firstly they asked whether a sense of community similar to that in offline settings could occur in virtual settings, and following this, they asked how such sense of community would be maintained. The results outlined that a sense of virtual community did indeed emerge from participants enacting sets of "community-like behaviours and processes" (p.8). In Blanchard and Markus' view, it is vital to understand how such processes emerge and are maintained. There is no guarantee, however, that a sense of virtual community will emerge out of virtual exchange: this will happen, in the authors' opinion only if participants perceive a benefit to their participation in the online environment. Rafaeli, Gilad and Soroka (2004), however, compare lurkers to non active political participants using quantitative analysis of a social communication network. Their research showed that ongoing involvement with the online community eventually leads to lurkers starting to post, enhancing the positive influence of familiarity. This, in turn, increases the social capital of the online community.

In summary, the emerging knowledge articulated by Preece and colleagues showed that lurkers were not as passive as originally depicted (Nonnecke &

Preece, 1999). Additionally, since most online community citizens are lurkers at one time or another, gathering more information about lurkers' thoughts and motivation for their levels of participation or on how to encourage them to voice their opinions is crucial. Since virtual community members' perceived benefits are so crucial to their online participation levels (Blanchard & Markus, 2002), there is a need to expand the focus of enquiry about these benefits. Clearly once participants are engaged, apparent benefits from their activity is likely to reinforce ongoing participation. There is, however, a gap in the literature on the topic of online collaboration as to what sets the process in motion and which types of beliefs exist prior to participation to online groups that could encourage initial participation – even when possible benefits are only likely to occur in the longer term. This surfaces the question of what methods are required to understand what such benefits might be from participants' perspectives and whether such perceptions vary with online participation levels.

2.4 Technology and people interplay: Actor-networks

Actor-Network Theory (ANT) is able to provide a unique lens through which to study innovation networks and their development. ANT focuses on the processes through which collective projects are carried out, describing short segments of a longer term process as they differentially affect the development of the whole project. ANT views the heterogeneous make up of actor-networks (from social and technical material) as a central factor in their sustainability (Joerges & Czarniawska, 1998; Latour, 1991). In contrast to innovation diffusion models

which focus on the characteristics of the innovation itself, ANT describes the emergence of socio-technical systems through the analysis of interaction patterns between participants of the network and their ways of harnessing technological and human factors to help with the process. In order to do this, ANT uses the traces (interactions, texts, exchanges) remaining while the network is being constructed. This is one reason why ANT is particularly suited to the study of innovation, which is typically made up of a complex web on small activities and interactions. The ANT framework will guide the analysis of network development in the present research. Since earlier experiences of human actors at using specific technology or software influence their current experiences it is particularly important to collect narratives relating to previous experience. This will provide background data towards answering research question three ("How do online leaders and lurkers differ in deconstructing their online experience?").

In a theoretical leap, Actor-Network Theory extended the role of agency to non-human actors as well as human ones. According to ANT, an actor is "Something that acts to which activity is granted by others. An actor is accepted to be the source of an action, regardless of its status as human or non-human" (Doolin & Lowe, 2002, p. 70). Latour (1987; 1996) for instance, extended the role of agency to actors mostly ignored until recently in social and organisational analyses. Texts record codified rules or commands such as directing, committing, authorizing or informing. Texts are electronic memory traces thus playing an active role in group interactions; they impact on or reflect the actions taken by actors. ANT analyses

extended networks constituted from agents such as humans, texts, machines or technologies and influence daily interactions within the groups under study. ANT relates to the different elements of the network with symmetry, i.e. attributing the same importance to analysis of both human and non-human activity.

Latour's original inquiry was about networking and relationships between individuals engaged in a common project. He posited that understanding the relationship between actors and their network can be done from any point of entry (as opposed to a single one) – each activity being simultaneously an outcome of interaction and its source. Callon (1986, 1994) another key developer of ANT, proposed the "sociology of translation" to study how various poles of the network, such as the scientific, technological and funding teams, were linked through 'intermediaries' which he identified as texts, technical objects and money. Examples of texts are reports, conversations, emails; examples of technical objects are computers, and examples of money intermediaries are for instance research grants.

2.4.1 Inscriptions and translations

Design is translation, according to ANT and translating is the designer's role. The iterative process whereby interests and needs of users are translated into a solution (or system) is the role of the designer. In turn, when participants adopt the technology as inscribed, they further translate the system into the contexts of their specific situation they operate from. Designers compose scenarios as programs of

action for users, making implicit or explicit assumptions about the skills needed to act and the capability of the system. In this way they define roles to be played by actors in the network. As soon as programs of actions are inscribed into a piece of technology, the technology becomes recognised as an actor offering its inscribed program of action on its users (Latour, 1991). In the context of virtual environment, the different platforms have been designed to allow for certain types of communication (synchronous and asynchronous communication, for instance, necessitate different capabilities and availabilities from users); similarly Discussion Lists and Web-based bulletin boards provide very different virtual communication experiences and support different virtual patterns of interaction. Additionally, technologies inscribe either weak/flexible or strong/inflexible programs of action for users (Hanseth & Monteiro, 1998). Hanseth and Monteiro give the example of a hammer as the former and the assembly line of Chaplin's "Modern Times" as the latter. In the current work environment, emails are strong inscriptions because of their prevalence in today's workplace, where so much communication is done by email, whereas Web-based bulletin boards are weaker from that respect, because most still require users to manually go onto the websites and check whether any new messages are received (as opposed to getting an email in one's inbox). E-mail list servers, thus, are associated with strong programs of action because so many knowledge workers are online most of the working day. Hence, the strength of a program of action in the present example is determined by a complex interplay between humans and technology in both the

prevalence of the communication medium and the ease of access from the actors' perspective.

According to Actor Network Theory, inscribing behaviour into actor-networks is how an actor might reach an objective. There are short term (i.e. to make potent decisions and raise support to implement them (in iterative stages) and long term objectives (i.e. to succeed in the design and implementation of a system).

Studying actor-networks development necessarily implies that the researcher understands how the networks gain strength and link into various other and larger networks. Networks also develop by accumulating the strength of their inscriptions, through iterative processes. Actors of the network may seek to inscribe their interest (setting up virtual communication channels) through the process of translation (trying out various software and virtual platforms). Inscriptions often turn out unsuccessful in the sense that their scenarios are not followed, the intentions of the designer not fulfilled. To increase the likelihood that an inscription may succeed, it is necessary to increase its strength. A key insight is that it is nearly impossible to know beforehand whether an inscription is strong enough to fulfil its role - it remains each time an open, empirical question that needs addressing through trials and errors. There are two ways to increase the strength of an inscription: the first is the superimposing of inscriptions, i.e. adding inscriptions from the start, rather than waiting for the trial and error process to show results, and the second one is to expand the network, in ANT terms, enrol

new actors and technologies, and look for new, as yet unused, material to inscribe scenarios into. Through the process of translation, each actor contributes its particular resources to the activity and robustness of the network.

Latour (1991) offers a concrete illustration of the mutual effects of inscriptions and translations, taken from the tourism industry. Hotels need to ensure that guests leave their room keys at the front desk while checking out. According to Actor Network Theory, they need to inscribe the desired pattern of behaviour into an actor-network and solve the question of how to inscribe it and into what. As in a typical trial and error experiment, hotel management had to test the strength of different inscriptions. This was done by creating an artefact in the form of a sign behind the counter requesting all guests to return the key when leaving to enrolling a human door-keeper actor, back to an artefact in the form of a key with a metal knob. Through incremental increases of weight of the knob, the desired behaviour was finally achieved. In ANT's terms, it is through a succession of translations, that the hotels' interests were finally inscribed into a network strong enough to create the desired behaviour from their guests.

Another way to describe "translations" is as negotiations during which actors construct definitions and meanings together and assign and receive roles in the pursuit of individual and collective objectives (Law, 1992; Singleton & Michael, 1993). Translation is successful at the point where actors accept the roles defined and attributed to them in the network (Callon, 1986). Though power relations are considered in the development of the networks, ANT avoids reifying social

relations as "shut away in black boxes" (Ormod, 1995, p.44) rather explaining how social relations are actively used to sustain the actor-networks. It is to be noted that, even if ANT takes into account power relations, elements reminiscent of critical theory, it can also be considered within an interpretive framework – as it often rejects trying to explain situation and favours describing the development of the actor-networks it studies.

2.4.2 The emergence of actor-networks

Actor Network Theory has also been recognised as well suited for Information Systems research (Tatnall & Gilding, 1999). ANT conceptualises series of events and activities as becoming linked together by a translation carried out by members of the network. Hence when using ANT methodology, researchers often seek to identify the four stages characterising actor-network development: problematisation, interressement, enrolment and mobilisation as explained below:

The initial stage of network development include actors engaging other actors through the process of "problematisation", i.e. defining a problem for which the solution lies in the expertise that the very actor-network being formed will organise (Latour 1987, 1993, 1999). Failure to engage in one of the stages can provide some indications as to why certain projects fail or succeed, such as the Information Technology projects described earlier in the introduction. In the present study, problematisation activities will be identified in interaction focusing

on innovators' isolation and difficulties to connect to an appropriate peer group, for instance.

Interressement is a set of actions performed by one or more actors to try to persuade others to identify with their goals. The activity of building alliances is one of the main ideas behind the Actor Network Theory. An alliance is built by enrolling allies into an aligned network and these 'allies' include involvement of humans as well as technologies. In this sense, technology designers and innovators also design roles for humans, such as users, support people, and anyone using technology to fulfil roles. Making the technology work includes making the human actors play the role designed for them. In the present study, interressement activities will be identified in the actions taken by innovators to rally other participants toward a common goal.

Enrolment happens with the distribution and allocation of roles in the network. This process involves the gradual emergence of the network as constituted with the intention to find the appropriate actors who will produce the specific knowledge needed, in a complex sequence of actions connected together. In the context of an online group, this would happen as the group gets interested in specific topics. At that point, actors other than the original ones would be sought after to join the group by original members thinking the new recruits can contribute. In the present study, enrolment mechanisms will be identified in role distribution amongst the actors, for instance.

Mobilisation is the end result of the enrolment process at which point actors and processes become manageable entities noticeable and usable at some official level – such as government level. This is the case, for example, with emerging groups becoming recognised by government officials as new stakeholders. In the present study, mobilisation will be identifiable in the form of government or official recognition of the network formed.

Robichaud (1998) introduced the notion of narrative networks, including both the idea that action at the organisational level necessitates the construction of a network of actors through the mobilisation of human and non-human actors (i.e. computers) in an organizing process (Callon, 1986; Latour, 1996). In addition, the network and its course of action must be mapped in a meaningful form which Robichaud (1998) argued is that of a narrative.

In summary, Actor Network Theory provides a useful framework to analyse the development of networks where people and technology interact to form an entity. The Actor-Network Theory will use analysis of a developmental type to explain the progression of the group through problematisation, interressement, enrolment and mobilisation. The principal mechanisms that will be used to account for the network development are inscriptions and translations interacting in numbers of ways: explicit scenarios will be identified for actors to use, the way these will be

inscribed and translated into the network and who inscribes them, as pointers to the leaders emerging from the group.

2.4.3 Platforms supporting online networks

Usability research on online communities outlined that both communication and collaboration needs of participants need to be taken into account (Preece, 2000). Hence, approaching research question one ("In what ways is group emergence impacted by different online discussion platforms?") inevitably involves studying how online interaction platforms support network members' communication and collaboration needs. Kapor (1996) emphasised that the choice of what platform to use for what type of online interaction brings together two worlds: that of people and that of technology. It is not just a matter of choosing the latest available technology to apply in each context because successful online interactions emerge out of the complex interplay between the two worlds. Interactive spaces have been designed to blending the worlds of virtual and face to face interaction spaces. Media spaces which are virtual representations of real workspace with office equipment such as desks, chairs or water coolers, have been created so that interaction can take place among people as if they were in the same environment (Harrison, Bly, Anderson, & Minneman, 1997). Similar recreational spaces have also been designed for online communities whose specific platform or supporting software have become synonymous to defining the community (such as MUDS, MOOs, CHATs), thus relying on technology-oriented classification elements (Preece & Maloney-Krichmar, 2003). Preece (2000) found that sociability (the

extent to which goals and roles of participants and policies shaping social interaction contribute to fulfil a community's purpose) and usability (the development of computerised systems to optimise learning and skill retention and minimise error rate) are central factors towards the success of Virtual Communities. According to her, although the study of online social interaction is a difficult endeavour, it promises to elucidate some of the subtleties of online behaviour and deliver significant information about sociability and usability (Schneiderman, 1998) which in turn affects the success of online communities. The researcher's role is to assess the community's needs and plan for sociability, for instance control and policy formulation for access, and point to the variables that are significant to online communities' development, for instance support tools, interaction dialog modes and archives. Even policies often require software support, such as in the case of access monitoring. Researchers' challenge is to interpret and use empirical results in this domain to improve designs that support sociability and usability, the point which Preece defines as the bottleneck of online community development. Technical difficulties mostly fall in the domain of inhibiting online communication. This is particular salient when new software is developed, new techniques piloted, or even new online groups emerge: much computer mediated communication research documents how technical breakdowns impair communication processes and cause frustration (Kling, 1980).

As shown in section 2.2.1, DeSanctis and Monge (1998) described a number of situations where computer-mediated collaboration was seen as a constraining

factor for the completion of a group tasks. DeSanctis and Monge, however, explained that it in the light of other empirical findings (Marshall & Novick, 1995) it was not possible to extend this model toward a more general "task-communication media" hypothesis. Rather, what transpired were indications that computer-mediated communication should be contextualised and the characteristics of various computer mediated communication situations be studied. Schlichter, Koch, & Burger (1997) point out that when certain conditions are fulfilled, for instance the software used for group communication is able to raise awareness levels on certain qualities or knowledge base of fellow workers, then group work using computerised means is very effective. Following this research trend, different platforms have been designed to foster different types of interaction (Thomsen, Straubhaar, & Bolyard, 1998). It is thus necessary to define the needs of each specific online group to determine which platform will meet these best. Research on the different platforms supporting online interaction shows they possess different attributes. Email listserves are distributed discussion lists that provide immediacy in communication – messages arrive in people's inbox and are difficult to ignore. These however may provide fertile grounds for information overload. Web-based bulletin boards platforms, on the other hand, require special effort from participants who often must log on to the bulletin board to read of the latest interaction taking place. Web-based bulletin boards however provide participants with easily searchable archives and clearer electronic 'memory' of discussions on particular topics (Raven, 2003). Hence, collaborative software can enhance or impoverish online interaction (Preece & Maloney-

Krichmar, 2003), depending on what level of interaction is sought after and what best suits participants. Aspects of the software or interactive platform such as synchronous (same time) and asynchronous (different time) modes of interaction have significant impact on the quality of the online interaction, but need to be contextualised. Teenagers, for instance, may find instant messaging very rewarding, while businesspeople may prefer asynchronous communication modes allowing them to receive and respond to message at chosen times.

Developing or choosing suitable platforms for online collaboration to occur re-focused on the question of "how to?" communicate online – a relevant question in the face of the plethora or tools which supposedly support online communication. Wenger (2001) reviewed more than eighty web-based environments for ongoing online interaction. Wenger classified different platforms according to their support of different attributes of online interactions. The platforms relevant to the present review focus on developing a sense of community, as explored earlier (Blanchard & Markus, 2002) while other platforms focus on supporting different types of online interactions, knowledge exchange, instruction, fleeting interaction and conversation such as in online asynchronous or synchronous discussions. Other platforms yet focused on project space, knowledge worker's desktop and knowledge base. Out of the four integrating principles that Wenger identified to guide the choice of platform for specific online collaboration projects, three most relevant will be described. The first principle is about the nature of the social structuring of knowledge: certain knowledge is generalised and thus need to be

accessible by the wider public while other knowledge is so specific that knowledge creating processes take place amongst small numbers of experts. The second principle is about the process of knowledge sharing which runs along a continuum of ongoing interaction and static document distribution. The third principle addresses the management of attention and the tension between long term sustainability requirements to support the online community and the short term demands on participants to contribute in an ongoing manner to develop certain ideas and take advantage of momentum. Wenger concluded that there is not one answer to the question of what is the best way to study online groups, as this differs with the aims of each group under study, and these may vary widely.

Researchers and practitioners, hence, need to integrate this information by studying the impact of different communication platforms on particular groups or in particular situations, before making decisions about communication platforms. Piloting communication platforms will enable results of earlier iterations of software experimentation to effectively impact on later group development and communication platform choice. Underlying assumptions, such as what outcomes are most desirable for collaborative online groups, need to be surfaced and examined carefully. Online community theorists, for instance, developed models whose underlying assumptions are 'more is better' or are based on 'communication plenty' models where success is measured quantitatively. Preece (2000) for example comments that communities are interested in members developing relationships to ensure their growth. Computer Mediated

Collaborative Workgroups and virtual team theorists, on the other hand, used paradigms of 'workflow and achievement of externally defined goals' to describe and evaluate online participation.

It is important to note that certain issues examined in the literature review have been described by some research as enablers and by other as constraints to online collaboration. Firstly, electronic interaction platforms – and the technical issues each brings with – can either enhance or impede collaboration (Wenger, 2001). Similarly, issues such as the lack of social cues in the realm of electronic communication has been described as detrimental for team members to formulate impression on their team mates on the one hand (Walther, 1993), but enabling for other participants. In the latter case, participants might have been discriminated against in face to face learning environments because of characteristics such as physical appearance or handicap, accent, socioeconomic background (Berge & Collins, 1995). This may signify that such issues have the potential to become positively or negatively charged – enabling or constraining – depending on the context in which they play out and that at the creation of each online group, special attention need be placed in researching their impact.

In summary, successful online interactions emerge out of the complex interplay between humans and technology. The study of online interaction in different settings - organisational, community and social - and using different communication platforms has outlined how different platforms can foster different

types of interaction. Synchronous and asynchronous modes of interaction have significant and differential impacts on the quality of the online interaction and need to be contextualised. In the business and professional environment, asynchronous discussion platforms offer more flexibility as opposed those aiming to support 'social-only' types of interactions. A gap in the extant literature concerns the mechanisms at work for self-selected groups to emerge and develop online.

Chapter 3: Method

Since the purpose of the research was to examine why people engage in varying levels of online collaboration in a self-selected group, this was reflected in the choices of method chosen to gather data and the theoretical frameworks used to analyse the data towards answering the research questions. An Action Research paradigm was chosen whereby the researcher created a virtual group and studied its development as it evolved into the "Innovators Online Network". Five iteration of the Action Research cycle were performed to follow the emergence of the online network.

A research strategy was developed to include a number of tools to analyse the data generated from the Action Research and answer the three research questions. Specifically, the research strategy was developed to answer the research questions as follows. In order to address research question one ("In what ways is group emergence impacted by different online discussion platforms?") the Actor Network Theory (ANT) was selected and network emergence described (Latour, 1987, 1991) on two different platforms. In addition, ANT provided a systematic framework with which to identify emerging leaders. In order to address research question two ("What do participants perceive to be factors that enable or constrain online collaboration?") participants' dialogues were thematically analysed (Owens, 1984). Participants' perceptions of factors that enable or constrain online collaboration were addressed through thematic analysis of all data collected, such as electronic postings and face to face meeting transcripts. In order to address research question three ("How do online leaders and lurkers differ in

deconstructing their online experience?") a narrative analysis method (Epston & White, 1989; White & Epston, 1990) was developed. Narrative analyses were used to frame descriptions of participants' experiences and identify their deeper motivational content and reflective processes. Both thematic and narrative analyses were placed within the interpretive framework.

3.1 Interpretive framework

Based on Chua (1986), Orlikowski and Baroudi (1991) defined three categories of qualitative inquiry, according to their respective underlying research epistemology: positivist, interpretive and critical. The positivist epistemology starts off from the perspective that reality exists objectively and separately from those who participate in the events being studied or the researchers who carry out the study. Positivist researchers usually aim to test theory and increase predictability as a result of research (Orlikovski & Baroudi, 1991). This viewpoint, however, presupposes that there is a unique source of "truth" and does not accommodate easily alternative viewpoints.

Critical epistemology assumes that reality is created and re-created by individuals whose ability to effect changes into this reality is limited by one or few types of domination, i.e. political, social or cultural. The role of critical research then is to highlight these constraints upon the actors by focusing on oppositions, inconsistencies and conflicts apparent in the research data. This is done with the ultimate aim to bring about emancipation from these constraints by decreasing

alienation and domination. This viewpoint, however, presupposes that participants themselves cannot easily access the reality of their condition, leaving the critical researcher to do that (Alvesson & Deetz, 2000).

Klein and Myers (1999) described interpretive research, on the other hand, as a process in which both participants and researchers are interpreters and analysts, contributing to extract the full richness out of interactions and textual material. In Klein and Myers' view, even when there is no interaction between researcher and participants, even under "pure" positivist tradition, data is not analysed in what can be considered an objective manner. Over the last decade, interpretivism has made significant contributions to qualitative research conducted into information-based organisations (Walsham, 1995).

Cheney (2000) reflected on the various developments of interpretive research streams, "from empirical distance to critical arrogance" that have shaped "what counts as research" (p.27) and how they have yielded deep understanding processes that sought to access, understand and describe organisations and the experiences of their members. In his view, the interpretive researcher not only "makes sense of social life" but also "actively constructs aspects of (it)" (p.20). Describing streams of interpretive research particularly apt at identifying key elements in organisational processes, Cheney (2000) noted that recent additions to their capacity to grasp and analyse individual and group narratives have helped them reach new sophistication levels. ("This research has struck a nice balance

between consideration of the individual experience upon entering an organisation and organizational demands and constraints"; p.30). Interpretive methodologies can shape data collection in ways that most effectively place the researcher at the heart of the research participants' world. This particular methodological potency may help the interpretive researcher reach conclusions about participants' experiences that they themselves may not be aware of.

Myers, Lee and Markus (1995) report that there has been growing interest in interpretive research methods and their application to Information Systems in recent years. Interpretive studies generally attempt to describe phenomena through the meanings that people assign to them rather than what researchers assign to them and interpretive methods of research in Information Systems are "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context" (Walsham, 1995). Interpretive research permits the interaction of actor and situation to develop (Kaplan & Maxwell, 1994). This characterization of the qualitative approach describes the research interest of this study and matches the language of Weick who sees narration in the organisation as part of social constructing (Alvarez, 2001).

The methodology for the present research is interpretive in an attempt to understand phenomena through the meaning that people assign to them, through social constructions such as language, consciousness and shared meanings

(Kaplan & Maxwell, 1994). Kaplan and Maxwell also argue that the goal of understanding a phenomenon from the point of view of the participants and its particular social and institutional context is largely lost when textual data are quantified. Interpretivists usually do not predefine dependent and independent variables; they rather generate rich descriptions for the phenomena under investigation. Weick (1995), in particular, emphasised the process of sensemaking in organisations. In this perspective, knowledge is not an entity to be transferred; rather it is created, enacted and transformed through interactive social networking patterns as part of sensemaking. Interpretive research needs to be employed to allow the subjects to represent their experience, knowledge, and action in a manner that is appropriate for their unique understanding. Gioia, Thomas, Clark & Chittipeddi (1994) provided a method for employing a grounded theory approach to provide a theoretical account with a narrative told by the actors in the study. Their method used the 'actor-observer' to tell the story of their direct interaction and experience. The limit of the 'actor-observer's' ability to provide analysis is defined by their perspective on the subject and their own knowledge of the areas under study. Therefore, it is necessary to be able to paint a broader picture of the area, in this case information systems development team work, through incorporating multiple views and narratives.

3.2 Action research

As described earlier in the thesis, the study of online groups has involved a variety of methods, where the researcher displays varying degrees of involvement with

the community under study. In the present case it was deemed appropriate that the researcher be not only actively involved from the design to the emergence of the online group, but also use a methodology flexible enough to allow for the group to evolve without pre-determined constraints. Hence the action research method was chosen. This method allowed for central elements emerging with each translation and at each action research stage to be captured and analysed.

Action Research is dedicated to the construction of new knowledge through inquiry into "real life" challenges (McKay & Marshall, 1999), such as the challenge of creating a virtual community for a target population as in the present research. Action researchers studying information systems, for example, are working to discover new ways of approaching problems in cyclical ways, testing the extent to which new learning can be applied or refined towards final goals, such as the creation or implementation of novel systems or networks. Such features make Action Research an attractive method for information systems research (Kock, 1997; McKay & Marshall, 1999). Myers (1997) noted that action research in the Social Sciences has become widely accepted as a valid method, both in collecting data and theorizing. Action research is also associated with experiential learning since both provide tools for change. Lewin's (1952) research approach, for example includes planning, fact finding, implementation and evaluation in inter-connected cycles, and has influenced the development of action research (Argyris, 1983; Kemmis & McTaggart, 1988). Lewin's approach has also influenced the development of experiential learning (Kolb, 1984). Kolb's four

stages experiential learning process include experiencing a situation, observing it in a reflective manner, developing abstractions and identifying following experimentation topics for the next iteration of the research.

Action research is defined as an iterative process with each cycle informing the following ones. It necessitates cooperation between the researcher and practitioners on the field (Lau, 1977, 1999) different to that in case study methods, since the researcher is involved in planning the very phenomenon under research. Figure 3-1, adapted from Baskerville (1999), shows the different stages of the AR cycle: diagnosing, action planning, action taking, evaluating and specifying learning. The 'double challenge' (Avison, Baskerville and Myers, 2001) of planning (action) and researching (the results of action) can be overcome in Information Systems research projects provided that issues of power and control over the project are properly balanced throughout stages of initiation, authority establishment and formalisation. Avison, Baskerville and Myers (2001) recommended in particular that explicit discussions of control structure be included in the project and that researchers and practitioners determine actively and collaboratively these control structures, such as in cases where practitioners are given "co-researcher" status (Elden and Chisholm, 1993). There are at least four differentiating factors that distinguish action research from other methodologies: Firstly, it is situational in that it studies a specific issue in its context; Secondly, it requires planning action or intervention via a spiral of defined steps. The steps involved bear similarity with the Kolb (1984) loop

principles (diagnose a problem, plan action, carry out action and evaluate learning) repeated a number of times within given research objectives. Its ultimate aims are to improving practice through self critical evaluation. The third differentiating factor is that AR is by nature collaborative, involving participants with an interest in the study. Participants work in an atmosphere of mutual understanding and consensus and decision making and common action are taken on a democratic basis. Fourthly it is participatory in that it is undertaken by participants of the enquiry. Those directly involved are equal partners in the research process and retain ownership of the study. The object of the research is the participants' own practices.

The present study involved a series of Action Research Cycles as represented in Figure 3-1 below (Susman & Evered, 1978). Susman and Evered described each iteration of the action research cycle as including five stages (1978): Diagnosing (defining a problem), action planning (considering alternative scenarios, action taking (selecting one course of action over other possible ones) and evaluating (assessing the results of the action selected).

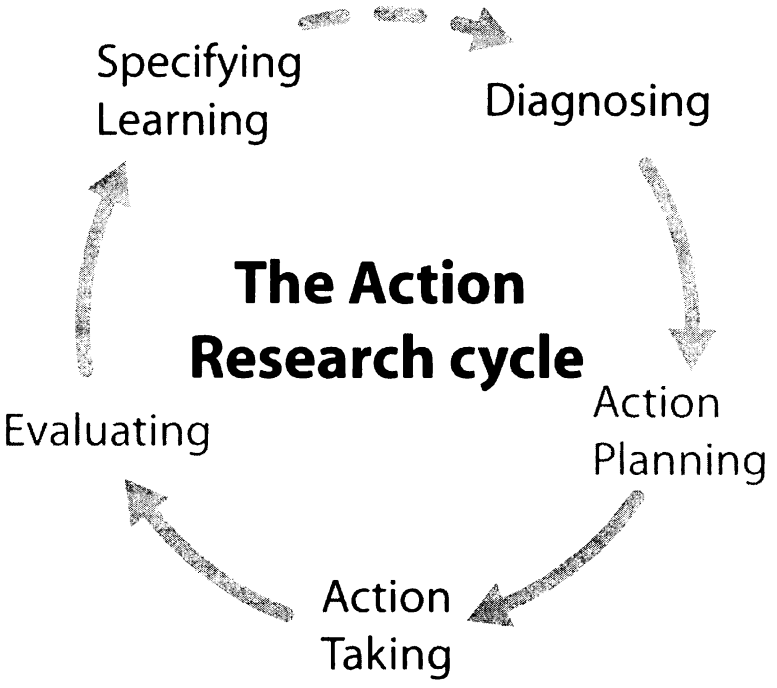

Figure 3-1: The Action Research cycle (from Susman & Evered, 1978)

Data for each iteration of the AR cycle was collected and the iteration of the AR cycle evaluated. Results thus obtained informed the planning of the following iteration of the AR cycle in a feedback process as described in Figure 3-2 below (from Kock, McQueen, & Scott, 2000).

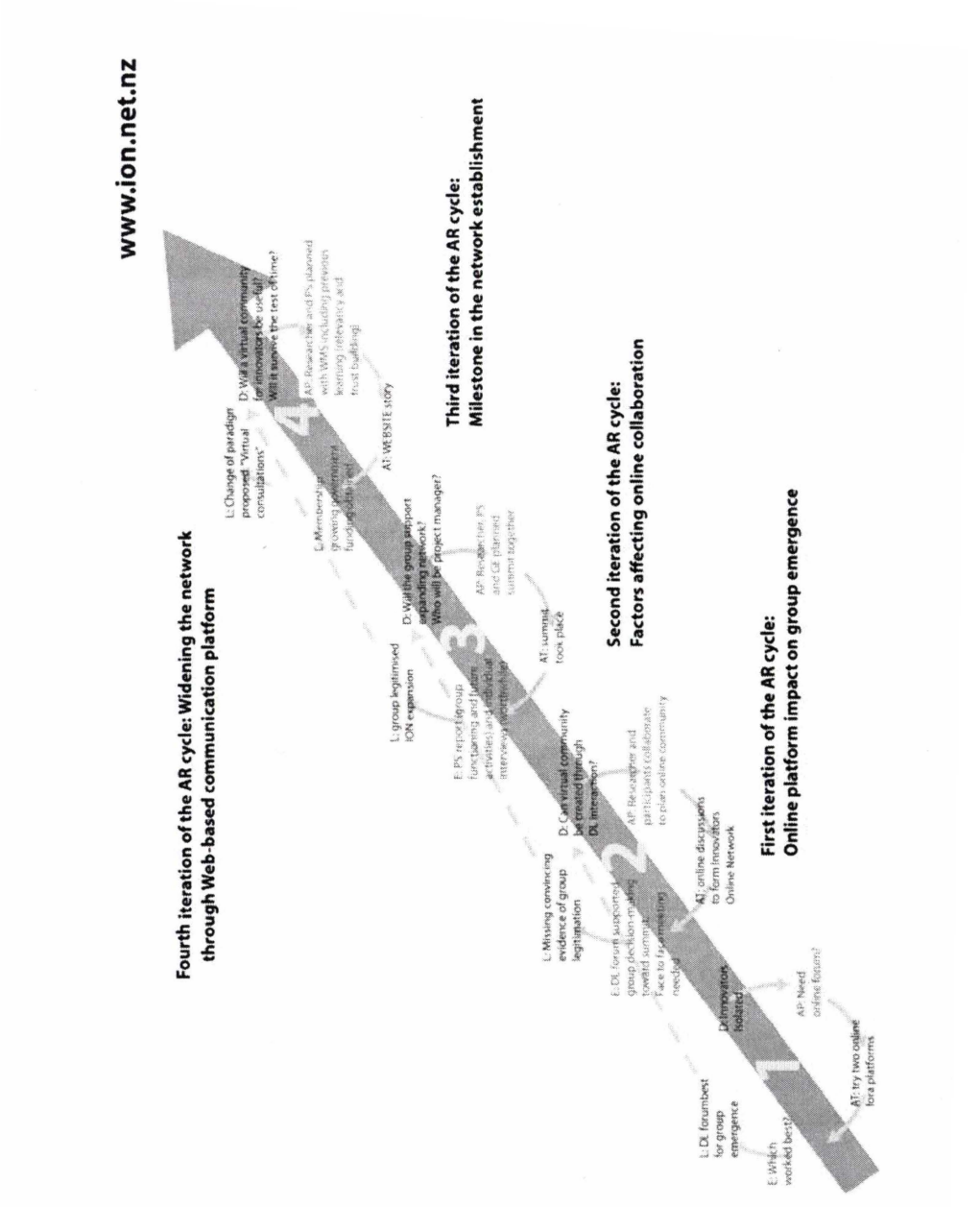

Figure 3-2: The four iterations of the AR cycles

Action cycles were carried out involving facilitating the emergence of the group in various innovation settings, so that the knowledge gained at each stage could be

directly applied in the planning of the next one. Participants' interactions were studied in different situations, e.g. face-to-face meeting followed by online forum, online forum and then face to face meeting, or combinations of the above, in a series of iterations as reported in the Results chapter. Much of the research on online lurkers has been done using quantitative or ethnographic methods (Preece & Maloney-Krichmar, 2003). Hence, while it is difficult to research lurkers in big communities, as subjects are difficult to identify and trace, the present research model permitted to do so. The research allowed for ongoing interaction with all participants of the study, including lurkers as they were known, albeit silent online. The successive iterations of the AR cycle allowed identifying and then following actors, including lurkers. In depth interviews of identified lurkers and collection of meaningful data including previous experiences with online collaboration and motivations past and present was made possible because the action research methodology lent itself to this type of inquiry. Research question one asks which platform would best support the emergence of an innovators' group online ("in what ways is group emergence impacted by different online discussion platforms in a forum of innovators?") From the literature review above, it is known that both communication and collaboration needs of participants need to be taken into account. Since the answer to this question for this particular online community is not known *a priori*, an Action Research setting is suited for it to be tested *in-situ* with the participants themselves before embarking on widespread online community development.

3.3 Data collection

The main focus in studies of actor-networks is on "following the actors". This is done by observing actors interactions and relationship building activities. Information about actors is collected through observations, the collection of inscriptions and interviews. Data collected throughout the study allowed for the collection of rich multi level information. All texts, such as electronic postings and transcripts of group face to face meetings, were collated into master data pools together with field notes taken before, during and after meetings.

3.3.1 Observing actors

Data collection towards describing the development of an actor-network involves listing actors, recording their activity patterns and the way they contribute to network development. It generally involves the collection of data to contribute to an understanding of how the network develops through the stages of problematisation, interressement, enrolment and mobilisation stages and the actors' response to the process.

In the present study, observing the actors meant collecting data relevant to understanding what different roles they each wanted to adopt during the network development. Identifying leaders was done in a variety of ways through observing the nature of their contributions. This was done through a process type of observations, often involving recording number of postings or other numerical way of representing online activity. The other way actors were observed was

through observing the content of their contribution, i.e. the way they communicated that encouraged others to follow or steered the network in particular directions. It needs to be noted, though, that even if observing the actors' behaviour sometimes involved collecting frequencies for their postings or comparing posting frequencies on different online platforms, this was still done within a general interpretive framework. Identifying online leaders needed to draw from as many data sources as possible. On the one hand, leaders could be identified "in retrospect" as those having most contributed to the network development and those, as it happened eventually, who would take the network through its next organisational development phase involving wider societal recognition. On the other hand, leaders' identification during earlier stages of the network development relied on "coarser" criteria – the number of contributions and the way contributions were made.

3.3.2 Recording inscriptions

Recorded inscriptions are materials in variable forms (texts but also images or databases) central to the construction of knowledge and essential to enable action at a distance, because they can travel over time (Latour and Woolgar, 1991). In the context of the present study, inscriptions play a central role. Likewise, Preece and colleagues (Preece et al., 2002) note that discourse analyses in online groups (distributed e-mail discussion lists or bulletin boards) are valid and useful data to understand online participants' perspectives. Online postings ("computer-based

artefacts" according to the ANT), face to face conversations and individual interviews were thus recorded.

3.3.3. Interviewing actors

In addition to the above, two types of interviews were carried out that lasted up to one hour each. The first type of interviews was carried out to collect participants' narratives on their online experiences and motivation to choose an online role. Specifics of the interviewing process are described in the procedure and in the planning and action taking of the fourth iteration of the AR cycle sections. Narrative interviews also involved setting up an ongoing dialogue with participants where the description of unique outcomes and re-authoring processes could be refined over several exchanges (Bird, 2000). The second type of interviews were follow up interviews with six participants to refine or confirm the researcher's writing and interpretation of their experiences and of the emergence of the online group. Participants were asked to read over preliminary reports including interpretations and analysis of the data. Participants discussed this material verbally or sent back written comments. The four participants whose narratives are detailed in vignettes later on in the narrative result section were part of the groups that underwent follow up interviews. Follow up interviews were carried out to collect participants' feedback as to whether they agreed or disagreed with the researcher's summaries of the descriptions of their experiences and whether additional data should be included in final analyses. The researcher was particularly interested in their descriptions about how they felt during their online

experiences, and their reactions to events happening as a result of their participation levels. The collection of additional feedback interviews is consistent with two of Klein and Myers' seven principles for interpretive research. The first is the principle of multiple interpretations (1999) whereby researchers are expected to actively look for different perspectives on the same events, e.g. the face to face meetings. The second principle applied here is the principle of dialogical reasoning requiring the researcher to be sensitive to potential inconsistencies between his or her theoretical preconceptions, in this case who the researcher identified as leaders, and actual findings, in this case whether the identified leaders thought of themselves as assuming leadership positions.

Interviews in general are a common method for gathering information from various participants in qualitative research (Myers, 1997). However, it is not uncommon for researchers to omit specifying what interviewing method they use. Interview settings can set the way for simple recall of specific situations. This fosters a mode of interview which is 'detached' or 'objective' so as to minimise influence exerted on the data collection process. Unsurprisingly, such approaches often relate to the data collected in a positivist manner, attempting with methods such as content analysis, for example, to find most commonly voiced issues, thus often relating to highly qualitative material in a quantitative manner. Barry (1994) questions such method, arguing that what is lost is precisely what qualitative framework tries to capture – the richness of the material thus collected (Barry, 1996). Barry and Elmes (1997) show how novel development of narrative

concepts and models from the therapeutic field can assist conducting research in organisations. Narrative interviewers, thus, encourage interviewees to engage in reflective processes during the interview, asking them to go beyond memory or information retrieval into analysis of their behaviours (Bird, 2000). Using narrative methods of data collection adds valuable and unique elements to the information thus collated. In addition, narrative approaches offer both a framework with which to carry out interpretive research, and tools with which to understand how individuals make sense of situations whose boundaries are not clearly defined, so in that sense, they are a likely alternative for the search of Sensemaking data (Boje, 1991; Weick, 1995). Porac and associates (Porac & Thomas, 1994; Porac, Thomas, Wilson, Paton, & Kanfer, 1995) for instance, have employed narrative techniques, gathering data from field interviews, to build an actor centered approach to data collection in the area of industry competition. This is consistent with Klein and Myers' principle of interaction between the researchers and the subjects (1999) which views data as socially constructed through the interaction between researchers and individuals who participate in research.

Data collection style for narrative interviews does not typically involve pre-set questions to be asked (White & Epston, 1990). Rather a set of starting questions is drawn (that place the interview in context, in this case, of research on virtual collaboration) and the interviewee is encouraged to bring up those contents that are most meaningful to them. In this sense, the interviewer must internalise what

in the process of narrative interviewing will allow for the surfacing of new material. Accordingly, White and Epston's (1990) key narrative constructs are "dominant narratives", "unique outcomes" and "re-authoring" episodes. These are the elements the interviewer would look for during an interview. Dominant narratives are those which surface most easily during the interview, because they are most used by interviewees to explain particular problems or situations. Unique outcomes are specific instances where the explanation held in the dominant narrative does not hold, that is they contradict the dominant narratives. They are far less frequent than the dominant ones, hence mostly ignored as explanation for solutions of problems. This is the challenge of the interviewer: to surface unique outcomes – which are sources of future change within each person. In the case of a group of innovators interacting online, this translates into collecting narratives about the quality of participants' experience with online interaction including examples of successes or failures encountered in the process (dominant stories) as well as unique outcomes that may lead to the process of re-authoring the narratives. Narrative practitioners then set off "re-authoring processes" (using unique outcomes as novel elements in the interviewee's life that can help begin a new course of action for the interviewee. For example, a dominant story might include disappointments with previous experiences at virtual communication, unique outcomes might involve a novel virtual experience contradicting the interviewee's previous resignation with failure at virtual communication and re-authoring processes might use the one successful experience to construct a possible future success at virtual collaboration. Though unique outcomes have

been part of the interviewees' past, most would have attributed little value to them, because they were inconsistent with the dominant story. Placing this in context of the aforementioned 'quantitative' treatment of 'qualitative' experience, this meant that individuals did not attribute much importance to events that contradicted the dominant story because there had not been enough of them against the overwhelming number of problem occurrences. Such conceptualisation, however, in the narrative perspective, only serves to reinforce a problematic status quo – that individuals are controlled by their problem rather than able to control them. These three specific data items, i.e. dominant narratives, unique outcomes and re-authoring episodes, will also be the main units of the later analysis.

As part of a set of interviewing skills, the interviewer must practice and master the skill of encouraging the production of "unique outcomes". During the interview, narrative practitioners research their clients' stories until they are able to identify those unique outcomes, 'zoom in' on the very instances where the status quo was challenged, albeit temporarily, and construct a series of questions around the unique outcomes destined to shake the clients' faith in the dominant story. Narrative therapists would, at this point, encourage clients to verbalize thoughts, intentions, and consciousness and elaborate on feelings, reasoning and strength elements that did allow them to conquer the problem at that particular event, empowering clients to produce more such (desirable) events. What is then constructed, together with the client, is a picture of the latter having successfully

challenged the problem in a process coined 're-authoring' by White and Epston (1991) where the dominant version is gradually replaced by the alternative one of success over the initial problems. This forms the basis for the material to be later analysed. Narrative interview data collection method, hence, complements ANT methodology and adds the individual dimension to the latter's group dimension.

3.4 Data analysis

The study of the actor-network involves two levels of analysis. The first level of analysis consists of the enactment of organisational activities, in which actors built relations and associations with each other. The second level of analysis addresses the representation of these activities and relations in narrative "texts" (Taylor, Groleau, Heaton, & Van Every, 2001). Studying technological implementations in organisations from a communication perspective, Taylor et al. studied each level of structure (individual, group and organisation) and considered that the interplay between them can either facilitate or hinder organisational outcomes. Elaborating communication-specific models for computerisation, they noted that at each level language plays a significant, albeit different, role. Since the main vehicle to understand these processes as Taylor et al. (2001) note is language, then a methodology that collects and analyses texts and dialogues is ideal for the present study. The following will describe the two analysis methods used to investigate online texts and individual face to face interviews. Thematic analysis was used in this research to investigate printed texts of online

discussions, whereas narrative analysis was used to investigate contents that came up during in-depth interviews.

3.4.1 Thematic analysis

Owen (1984) published his first study using interpretive themes in the field of interpersonal communication and the specific context of relational communication. His original study established that interpretive themes were a useful way of understanding how people perceived dimensions of relationships. He showed how themes thus collected were useful in capturing relationship development, relationship types and the relationship definition process. In a later study, Owen (1985) formalised his original approach into a conceptual framework that linked relational themes and metaphors. He argued that this new framework was going to provide researchers with an insight into the very basic elements that constitute relationships. In his view, the "goal was to develop a way of viewing phenomena, a "descriptive framework" for understanding concepts perhaps unreachable through usual sampling procedures and quantitative analyses" (p. 10).

Such thematic analysis (Owen, 1984) uncovers themes shared between different participants or different parts of one participant's discourse by observing recurrence of threads of meaning, repetition of keywords, phrases or sentences and the emphasis applied in a text or narrative. Thematic analysis also implies noticing what is absent from the narrative. Message content is the main focus in

thematic analysis and the aim of the analysis is to identify issues through the speaker's lens or point of view.

Owen's original thematic framework is very much relevant to organise and analyse perceptions of interviewees in a variety of interpretive research settings and has been used by a number of contemporary researchers to analyse perceptions such as salespeople perceptions of motivational communication (Zorn & Ruccio, 1998), older people's perceptions of computing (Richardson, Weaver, & Zorn, 2004) and retailers' perceived value of manufacturer's brands (Glynn, Motion, & Brodie, 2003).

In the context of the present research, thematic analysis was used to categorise and qualify elements of perceived online relational factors in order to answer the second research question about how participants perceived barriers and enabling factors to online collaboration. Thematic analyses of participants' contributions during face to face and virtual consultations delved deeper in some themes that were reported in the previous iteration of the AR cycle. Themes were grouped according to main themes and sub-themes emerging from the dialogues. The result of this iterative process provided a profile of information and commentary that was of priority to participants in the fora. All online interactions were transcribed. Electronic postings totalled 243 single space pages and were indexed by the researcher according to the list of topics that were addressed in the contributions. Transcripts of all online interaction were assembled. A collection of

all online postings were collated chronologically into electronic documents to allow following the conversation in a linear process, as opposed to clicking in and out of emails in an inbox.

One hour follow up interviews were carried out with six participants to read over interview transcripts and explain how themes were identified. This procedure followed Zorn and Ruccio's approach that "any thematic analysis is itself a social construction, an interpretation by the researchers and influenced by their experiences" (1998). Initial thematic categorisation was presented to interviewees and the interpretations and analyses of the researcher were further refined during follow up interviews (Zorn & Ruccio, 1998). Participants' feedback was sought on the themes that were identified. They mostly felt the conclusions tentatively reached "resonated" with them. In the few cases where participants felt they wanted to clarify or explain a point further, the information was recorded and incorporated to the final report.

3.4.2 Narrative analysis

Narrative methodologies, rooted in postodernism, are based on the social constructionist position that we are language beings. A basic assumption among most narrative theorists is that people's lives are heavily influenced by the stories they tell about themselves. As Tomm (1989) emphasised, people not only "story" their lives as a way to confer meaning to their experience, but also act in them in ways that either liberates or constrains them.

In their seminal work on narrative interviews, White and Epston propose an analysis method for the authoring of alternative stories (1990). In their view, the contents emerging initially out of an interview refer to the interviewee's 'dominant' story – the one they are used to producing, almost in a reactive way. White and Epston proposed to transcend this original level as a means of producing change in the psychotherapeutic context, by guiding their clients through a process of re-authoring – through which desired changes could take place. Labov (1981) adds another dimension to this process by pointing out that events that are most reportable are those events that are less common than any other in the narrative and have the greatest effect upon the needs and desires of the participants in the narrative. Barry (91, 97) focuses on issues that have high levels of self-identification, where narrators would give subjective weighing by the way they narrated and so describes how actors narrativise their experience. Hence, analysis attempts to not only report events but also outline which would be more desirable from their perspective.

Narratives of people undergoing similar experiences may be combined to produce templates for collective experience. Mishler (1999) demonstrated how narrative analyses of interviews led to the production of multiple thematic layers that interconnect to represent stories of interviewees, one of these thematic layers being embedded in the research process itself (a "craft or skilled practice"; p. 162) within the qualitative "subgenre" of narrative analysis. This makes the narrative

analysis method compatible with the thematic approach, used for the analysis of online postings, in that they have in common themes to focus on. It also sets the narrative analysis as a natural extension of the thematic analysis, as it will also look at those themes which are not the most salient ones, but are imbued in significance by their bearer.

In conclusion, since narratives are valuable data collection and analysis methods there are pertinent advantages in using a narrative framework to reach a deep understanding of why participants would choose to enact certain roles online. In particular, this analysis method would assist in the production of meaningful material to answer research question three ("How did online leaders and lurkers differ in deconstructing their online experience?"). Such analysis method would also help give a voice to those marginalised voices in the virtual environment - such as lurkers for instance (Preece, 2003).

Narrative analysis was used to explore the contents of the in depth interviews. Since narrative interviews were conducted to collect the type of units of analysis described above, narrative analysis. The data thus collected is then organised into the three subheadings of dominant narrative, unique outcomes and re-authoring episodes and shared with interviewees to check that they do capture and reflect their perspective.

3.5 Procedure

The research aspect of the project was emphasised at all times, and participants were well aware of it. A number of messages (introductory and follow up messages) were sent to participants outlining the research aspect, together with the pragmatic aspect, of the virtual group formation, in addition to the documentation required by the ethics committee of the researcher's University. In addition, the Home page URL of the research project (www.mngt.waikato.ac.nz/virtualnetwork which is different to that of the Innovators' Online Network www.ion.net.nz) was cited in all correspondence. The Web-page of the research project was updated with relevant information, including a complaint procedure, and contained a copy of the research aims as outlined in the ethical application obtained at the outset of the research. The following five iterations of the Action Research cycle emerged from the study. Data collected throughout all iterations of the AR cycle contributed towards answering the research questions:

3.5.1 First iteration of the AR cycle: Online platform impact on group emergence

This iteration compared two online conversations of multidisciplinary experts that shared their views on the potential contribution of a virtual group of innovators. Fifty four participants who agreed to contribute were randomly assigned to one of two virtual environments: an email listserve, that is an email-based system delivering emails in participants' inboxes in real time (ListServer®), and a Web-

based bulletin board environment where discussions were recorded (Webcrossing®).

The first research question was: "In what ways is group emergence impacted by different online discussion platforms?" In order to address this question, two different virtual environments for innovators to participate in were created and activity on each platform traced. In order to answer the first research question as to the impact of different virtual platforms on group emergence, the ANT concepts of inscriptions and translations were used. In the present case, translation is the design process or the scenario for how two platforms will be used to support groups interacting online. Inscriptions refer to how the researcher planned the groups to interact and how some roles were made available for the participants to take, such as online project coordinator and facilitator for the face to face summit. As such, the researcher laid out the programmes of action for users within each of the existing systems and user choice of action and online behaviour would form the data to answer research question one.

3.5.2 Second iteration of the AR cycle: Factors affecting online collaboration

This iteration was a natural extension of the previous one. At the outset of the first iteration of the AR cycle, the email listserve participants spontaneously decided to carry on their online conversation beyond the boundaries of the original study. They decided to form the Innovators' Online Network (ION), discussed its

mission online, organised one face to face meeting and planned its inaugural summit, their second face to face event. Their online conversations were recorded by way of the aforementioned email listserve.

The second research question was "What do participants perceive to be factors that enable or constrain online collaboration? In order to address this question, a number of discussions in a number of settings involving innovators were facilitated. Online postings were analysed through thematic analysis (Owen, 1984) to address research question two as to how the participants perceived barriers and enabling factors to online collaboration.

3.5.3 Third iteration of the AR cycle: Milestone in the network establishment

The third iteration of the AR cycle was a two day weekend retreat that took place at the business location of one of the Innovators Online Network's members. Twelve participants of the previous online conversation met to formalise the group's structure and way forward. Their face to face conversations were recorded and transcripts analysed through thematic analysis (Owen, 1984) contributing to answering research question two. In addition, all participants who had specified at the outset that they could be contacted for further investigation were asked to participate in the in-depth interview process. Twenty one individual interviews, face to face or telephoned were carried out within two weeks of the summit. The interviewees were nine individuals who had partaken in the face to face summit

and 12 virtual group members who did not participate in the summit. Interviews addressed participants' impression of the process collected narratives describing their online experiences and the motivation underlying their level of participation in the online network.

The third research question was: "How did online leaders and lurkers describe the online experiences underlying their differing participation level?" This question was answered through analysis of individual interviews and based upon participation levels identified at the first research question level. This second type of text-based material, interview transcripts, was analysed through narrative analysis (White & Epston, 1990) to answer research question three as to how participants deconstructed their online experiences and what motivated their participation levels.

Start up questions:

1. Tell me some stories about the way you usually make new business contacts?
2. Can you give me some examples of how your contacts can help you solve a problem you have never encountered before?
3. Can you give me some stories of how your business contacts helped you carry out a difficult task?
4. If you need help with a commercialisation problem, who do you consult with?
5. Why did you not participate in the virtual consultation group? (or: why did you participate only … times?)

6. What in your opinion inhibit or enhance virtual fora activity?

7. What about that experience (first and second iterations of the AR cycle) encouraged/discouraged you to participate?

8. Do you participate in any organised networking forum? Why?

3.5.4 Fourth iteration of the AR cycle: Widening the network through Web-based communication platform

As part of the implementation of the third iteration of the AR cycle decisions, a virtual forum (Webforum®) was set up and co-moderated to facilitate online community building and ongoing communication. The process leading to the group choosing another online platform to widen the network contributed more data towards answering research question one. The process leading to expanding the network was documented first as "tracing the network development" (follow up on the first one and recording frequencies of contributions, development graph and milestones) and documenting the process of online group formation. Data collected were messages posted in the forum as well as interviews with the online administrator.

The next five chapters report the results of the study. Each chapter will describe and illustrate one iteration of the AR cycle following the AR cycle internal structure. Each chapter will first include an overview then, whenever relevant, the Actor-network analysis for the data collected at this iteration, followed by the five steps of the AR cycle: diagnosing, action planning, action taking, evaluating and

specifying learning. The section on 'specifying learning' will include answers to or toward the appropriate research questions.

Chapter 4: First iteration of the AR cycle - Online platform impact on group emergence

This chapter describes the first iteration of the AR cycle during which participants interacted in two computer-mediated communication platforms. The groups' activities consisted of a wide-range consultation with experts about the feasibility to launch an online community for New Zealand innovators. From the actor-network perspective, this was the problematisation stage that marked the onset of the network.

4.1 Overview

The first iteration of the AR cycle lasted for two months, of which the last six weeks were taken up by the initial online consultations. In the diagnosing step of the AR cycle, preliminary consultations with experts and innovators brought to the surface interest about the topic and a need for wider consultation. At the end of the diagnosing step, research question one: "In what ways is group emergence impacted by different online discussion platforms?" was formulated. In the action planning step, the preliminary online consultations were scheduled and two platforms to support the discussions were chosen: a listserve and a web-based bulletin board. In the action taking step, a total of 54 multidisciplinary experts and innovators shared their views on the potential contribution of an online group of innovators. In the evaluation step, an actor-network analysis was initiated to follow the network's growth and a description of activity on both platforms was reported. The specifying learning step showed that participation in either online discussion fora was better at securing later online participation than verbal

commitment alone (virtual interaction acted as an enabler in itself). In addition, the email listserve environment allowed for five individuals to engage significantly and develop high interactivity levels; more messages were generated through the email listserve than through the Web-based bulletin board environment and members of the email listserve went on to create the subsequent Innovators Online Network. The specifying learning step provided data towards answering the first research question, indicating that this particular set of innovators elected an email listserve platform over a Web-based bulletin board one as an online collaboration platform for their group's formation. This iteration of the AR cycle also provided some data to begin identifying online leaders towards answering research question three.

4.2 Diagnosing

In July 2001, the researcher contacted a total of 97 individuals who were either involved in the innovation field or experts in a field related to business networking and virtual business communities. These included academics, business people and end users. These contacts were asked to what extent they thought an online community would be useful for New Zealand innovators to exchange ideas about commercialising innovation or setting up new enterprises. Most of the experts consulted were positive about the idea. The results of this diagnosing process showed that most people consulted were in agreement that innovators very often operate in isolation. For example one innovator said, "An

innovator can feel much more affinity with a person dealing in a similar field to him/her than his/her next door neighbour" (Anthony). Five people only thought it would not be a good idea. Example quotes include: "I only do business in a face to face setting" and "Internet is a waste of time for my employees and they are not allowed to access it apart from email" (Jane and Mitchel). Following the publication of an article describing the research in the business section of a national newspaper (Collins, 2001), 24 other people contacted the researcher and were short-listed as potential participants. There followed a process of discussions, either online (97 messages), by phone (25 calls) or in face to face meeting (2 meetings) to find out to what extent these potential participants were suited or interested in participating in a six-week virtual consultation.

4.3 Action Planning

There is a wide range of virtual platforms available for online collaborations, but given also that email is so prevalent in the current work environment, it became clear that some email-based communication system should be compared to one other form of online forum. The second communication platform was selected for its user friendliness and relatively easy accessibility. Another selection criterion was that users' systems would not limit their access so there needed to be little graphics or processes slowing down access to the web-based page (Wenger, 2001). The two platforms that were selected were the email listserve platform Majordomo®, a listserve that organises email distribution and is administered

through a Website, and the Web-based bulletin board platform, the WebCrossing® software application. The email listserve software (www.majordomo.com) is a software program which automates the management of Internet mailing lists. It centralises email messages and participants receive an incoming message from their email provider in the form they are used to and can reply to each message in their usual manner. Webcrossing® (www.webxing.com) was the software routinely used by the researcher's university for its online classroom electronic discussion groups (fig. 4-1 and 4-2). WebCrossing® allows for postings to be listed in a near-conversation manner, with pictures of the participants. This choice was made in an attempt to take trust building and sociability factors into consideration early on (Preece, 2000).

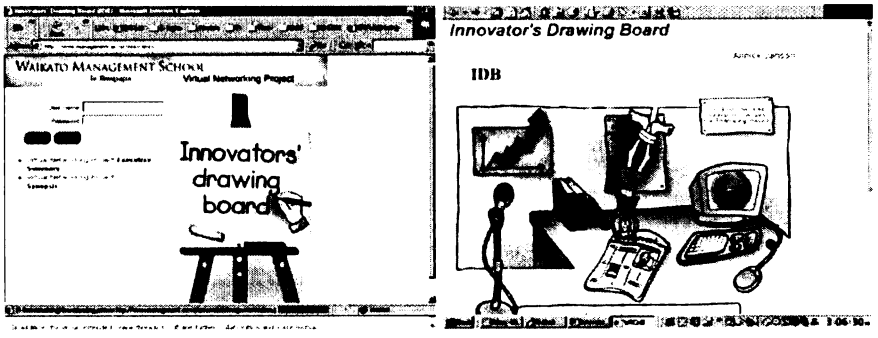

Figure 4-1: The Web-based welcome screens

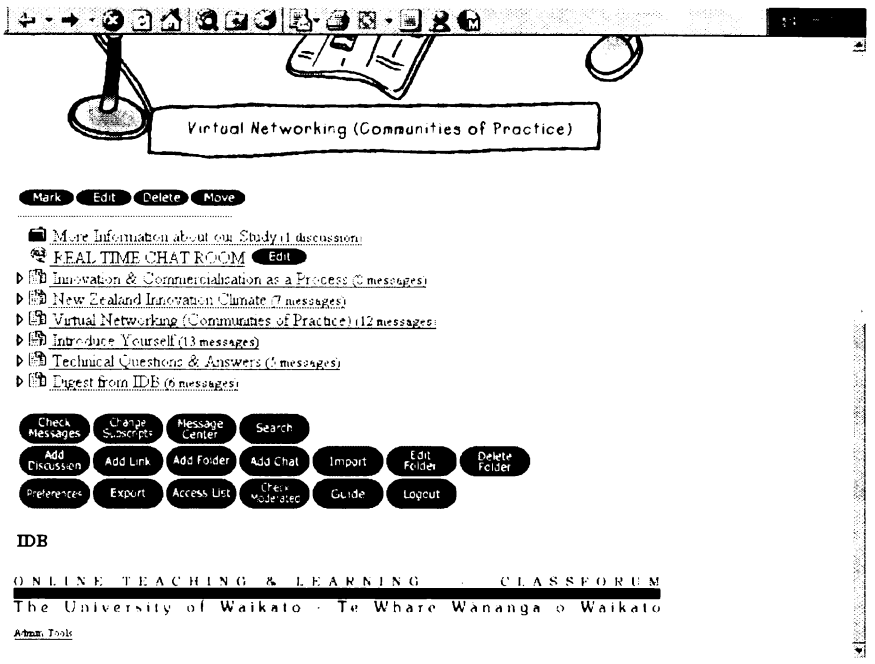

Figure 4 2: Web-based second level screen with different discussion topics display

Figure 4-1 shows the login screens for Webcrossing® and Figure 4-2 shows the level below where participants could choose to go into any discussion of their choice. This software allowed for easy display of past and present messages and easy access to the group's 'electronic memory' or their common past experiences as recorded in the discussions (Janson, 2002; Janson, Howard, & Shoenberger-Orgad, 2004). The software was described as user-friendly in a comprehensive survey of online platforms (Wenger, 2001). Wenger also noted that users could easily add discussion topics to support extension of current discussions.

4.4 Action Taking

All experts and innovators contacted up to this point were invited to participate in the forum. In total 54 subjects agreed. They were randomly assigned to one of the two online consultation groups. The online consultation project was named the Innovators' Drawing Board. Participants were reached through a) direct request, b) referrals and c) self referral from participants who read about the study in the media. Potential participants were also pointed to the Project's Webpage www.mngt.waikato.ac.nz/virtualnetworking) where they could register general interest. An email describing the study, the questions to be answered and the time commitment involved was sent to 70 potential participants (Appendix A) and only those who replied to the email, thus registering their interest and intention to participate were included in the study. Furthermore, two weeks later, a follow up email was sent asking them to formulate some possible sub-topics of particular interest to them (See Appendix B). Appendix C lists the synopsis of contributions welcoming participants by name that was sent 12 days after the beginning of the consultation and a second two weeks later. Appendix C also lists concluding message was sent at the end of the consultation period, offering to send to interested participants the complete report of findings from the research.

The Web-based bulletin board IDBforum's discussions were stored on the Web (www.mngt.waikato.ac.nz/innovators). Each discussion topic ("Introduce Yourself", "Innovation and Commercialisation as a process", "The New Zealand

Innovation Climate") was a series of chronological or threaded messages. Participants were able to download their picture on the site and so contributions follow each other, simulating a 'real life' conversation (albeit in written form) between participants. Messages were pushed in participants' inboxes in the form of digests that were emailed each morning and participants could reply back by email. The two online consultations were held for a total of six weeks and facilitated by the researcher. Participants were pointed to the appropriate means to send their contributions. The facilitator attempted to balance her interventions and postings so as to encourage participants to contribute.

4.5 Evaluating

Evaluating this iteration of the AR cycle was done with two research questions in mind. Research question one addressed the issue of the online environment in which a group collaborates and research question three involved identifying leaders in the online environment. Evaluation data towards answering the first research question was collected in two different ways: descriptions of posting frequencies on each online platform and comments of participants of each online platform. This data is presented in the "Tracing the networks" section 4.5.1 below. Evaluation data toward answering research question three aimed to identify leading actors by recording their early commitments to contribute, and by tracing their online involvement. This data is presented in the "Tracing actors' involvement" section 4.5.2.

4.5.1 Tracing the networks

During the emergence of the actor-network, two platforms were used that supported computer-mediated collaboration. In ANT terms, the construction of the "socio-technical" system can be done by examining traces of network activity and processes. The two platforms supported differential participation as described below.

Network activity and participation levels data collected on both online fora can be summarised as in Table 4-1 below.

	Actors (N)	Participated at least once	Inscriptions Units
Web-based bulletin board	27	18	38
Email listserve	27	17	72
Totals	54	35	110

Table 4-1: Participation rates (excluding moderator's postings)

Table 4-1 shows that 35 participants, i.e. those who posted at least once, generated a total of 110 messages over the six weeks of the online consultation. A total of 38

messages (or inscription units in ANT terms) were recorded on the Web-based bulletin board and a total of 72 messages on the email listserve. The Web-based bulletin board platform registered a total of 18 participants, and the email listserve platform a total of 17 participants. Though a total of 54 participants registered interest to contribute (by responding to the original email sent to them) only 35 engaged at least minimally, by posting an introduction, or more. This left 19 participants who either never actually logged on or sent an email explaining that they were unable to participate or that they preferred to observe rather than actively participate.

Additional evidence of differential group engagement comes from the fact that it is participants from the email discussion list who proposed to carry on with the idea to spread the reach of their original group as a follow up to this iteration of the AR cycle. Evaluation of this first iteration of the AR cycle showed that, under these conditions, participants operating in one of the two platforms (email listserve) chose to increase their original involvement and help form the "Innovators Online Network". This did not happen with participants who engaged through the Web-based bulletin board platform. Participants posted in the group they belong to, and not in both environments, hence this research makes no attempt to compare between the online platforms. Since there were two different groups interacting through two different online platforms, the two groups were not compared directly. The results reported in the thesis simply describe the fact that

participants of one online environment took upon themselves to carry on with building a virtual network, whilst participants of the second online environment did not. It is important to emphasise that there is no generalisation implied here about one online environment being better or superior.

Though participants in the Web-based bulletin board commented that it offered an "electronic memory" advantage in offering discussion texts online to be consulted at any time, it did not seem to take precedence, at this early stage of the process, over the advantages offered by the email listserve. The advantages of the email listserve were described with words such as "flexibility" and "immediacy" as well as "allowing for more spontaneous interaction", because messages were received in real time in participants' e-mail inboxes.

> *I find the convenience of having the list deliver messages right in my inbox great. I would not be able to read the messages otherwise or participate so much (Pierre)*

It is possible that the Web-based bulletin board discouraged the easy flow of communication, since participants had to log in on the special webpage each time they wanted to contribute. Although the bulletin board included an "email" feature whereby email digests were to be sent to participants, the feature eventually had to be turned off because it created technical problems to users.

> *I just cannot be bothered checking every day on the forum to see if someone has responded to my message – this "should do" gets buried under the "must do" daily tasks (Anthony)*

4.5.2 Tracing actors' involvement

A different way to trace actors' involvement in the network is to go beyond initial online introductions and examine how postings were distributed over time and what their contents were. The first iteration of the AR cycle allowed for the extraction from the field of specific data pertaining to actor identification. In order to identify the actors, participants were listed and their participation levels recorded. This allowed for the beginning of their involvement categorisation and differentiation between leaders, lurkers and other participants. This was only the first set of data collected to differentiate between actors. The remaining iterations of the AR cycle allowed for data of other nature, such as specific contents or forms of speech, to be extracted from the field.

As participants moved from introductions and getting to know each other, they started to identify common purposes. Fifty four messages included reference to a collective "we", "our group" or "us" indicating that a sense of community was emerging. Leaders' messages could be traced back to this early stage and scrutinised. These messages stood out, but not necessarily in quantity. Compared

to the group's average number of postings, leaders' posted only 10%-20% more. Rather, leaders' messages contained elements of action embedded in opinion statements repeatedly including action, for instance including expressions such as "let's..." Their messages also contained explicit ideas to generate actions with concrete results:

> *(The postings indicate) a lot of enthusiasm for some form of online network (for our group). I have looked into the technical side of (starting an online community website) and it would be relatively simple to attach an online forum (...). I would be happy to organise the technical development and manage the site, if some of the other members of the pilot group would help to lobby for a modest amount of sponsorship. It would also require some volunteering to share the responsibilities of moderating the 'sub fora' (...) we could get it up and running in a few days. (William)*

Action generation was coupled with consultative figures of speech, e.g. "how about...?", "should we...?", intertwined with proposals for going forward where the leaders offered their services, expertise or action taking such as:

> *Let's look at the issues involving me act as session facilitator. How about Will undertaking agenda and set*

up tasks, while I concentrate on contents for our sessions? (Etienne)

These messages seem to engage other participants into responding as a result of their structure. A question, for instance, is a trigger for other participants to relate to by posting answers. This was reinforced by the number of open questions posed by these participants. These processes seem to carry the discussion to new and more meaningful levels.

Data presented in Table 4-2 show frequencies of postings for each platform. This type of data begins to inform our analysis about the roles that actors took under different platforms. Inscriptions in the two platforms were quite different and allowed for different styles of interaction, though there seems to have been little difference between the numbers of participants who engaged at all in the two platforms. Out of the participants in the email listserve platform, however, four leaders emerged who took up significant roles in the network spread and enrolment process (for instance signed off funding proposals and letters to officials).

Posting frequencies	No posts	Intros only	2	3	4	5	6	7	8	9	10	11	At least one post	Totals
Web-based bulletin board	9	8	5	2	1	2	.	.	.	.	.	.	18	27
Email listserve	10	7	2	.	3	.	1	.	.	.	1	3	17	27
Totals	19	15	7	2	4	2	1	.	.	.	1	3	35	54

Table 4-2: Posting frequencies in each category (excluding moderator's postings)

The numbers inside Table 4-2 represent participants in each category. While there were no quantitative comparisons and analyses drawn between the platforms, it appeared that, after initial posting activity, participants in the Web-based bulletin board environment did not engage in sustained conversations (two participants posted five messages each and all the others less, as shown in Table 4-2). When the moderator posted concluding comments, activity on the Web-based bulletin board ceased. Email listserve participants, on the other hand, posted slightly fewer posts (in the one to six messages category) but four participants engaged in sustained conversations (each posting between ten to eleven messages, as shown in Table 4-2). From the actor-network perspective, the program of action inscribed by the researcher into the two platforms was only 'successful' on the listserve one. The later was the most successful at generating momentum for the actor-network.

In actor-network terms, the listserve participants adopted the listserve technology as inscribed, while the Web-based Bulletin Board did not. It should be noted that is by no means implied superiority of one platform over another – rather this is a description of how these specific participants decided to carry out their interests in forming a virtual network and what platform they decided to use at what stage in their network development.

Leaders also differed from other participants in early signalling of their commitment. Another form of leader engagement was recorded early on when potential participants were contacted before the start of the discussions and asked to respond with some themes they were interested in investigating. Their responses were recorded as 'early response" and partial commitment to participate later. The message sent to the 97 potential participants informed them about the dates that the online groups were to take place and asked what themes they would like to discuss on the fora. Twelve participants sent early responses. Out of these 12, only five posted later meaningful contributions on the online discussions and four of these took on what later qualified as leading roles.

4.5.3 Actor-network problematisation stage

This part of the evaluation took into account the contents of the messages. It is a subset of the messages from the thematic analysis at the next iteration. The present subset dealt with one of the discussion topics: "Do innovators need an

online collaboration platform?' The remaining messages dealing with the participants' perceptions of factors that enable or constrain online collaboration will be analysed in the next chapter. Including the former subset of messages at this point of the results chapter helps describing the actor-network stage under study.

The first iteration of the AR cycle coincided with the first stage of innovation development referred to as "problematisation" (Callon, 1994; Latour, 1987). As actors started the lengthy enrolment process, they looked for others to partake in the network development. One way they did so is by "problematising" the issue under scrutiny. In this case the actors "problematised" the issue as lack of effective communication means for innovators. In doing so they created a sense of urgency as clearly articulated by one participant, Anthony, favouring the development of the very project they were involved in.

> *Teaching people commercialisation skills should be our top priority. What we need are mechanisms – such as virtual communication projects as this one – through which this can be achieved most effectively. It is not urgent; it is an emergency if we want to make any difference in the country's wealth creation efforts (Anthony)*

Problematisation occurred in the early stages of the first iteration of the AR cycle as actors engaged others by defining a problem for which the solution offered is being shaped as the very actor-network being formed. A more in-depth description of specific contents of postings will be given in later parts of the Results sections.

4.6 Specifying learning

The first iteration of the AR cycle provided a forum for a group of people who met online to get to know each other, in a professional context, while discussing topics of personal significance. The first iteration of the AR cycle of the action research used two platforms supporting computer mediated collaboration to answer the question "In what ways is group emergence impacted by different online discussion platforms?" The way ANT focuses on the processes through which collective projects are carried out is by describing short segments of a longer term process as they differentially affect the development of the whole project. As reported in the computer-mediated interaction literature, some participants engaged more than others (a significant proportion of the original pool of subjects did not engage at all) and the former continued in the following cycles of this study.

The first iteration of the AR cycle involved following the actors and identifying the stages of network emergence. The findings also describe how a self-selected

group created a provisional online environment thus preparing to develop the arguments for extending it. The first iterative cycle of the Action Research offered some account of the specific impact that different technologies had in providing a forum for a group of people who met online, to get to know each other, in a professional context, while discussing topics of personal significance. From this perspective, roles and competencies were delegated to components of the socio-technical network and, as pointed by ANT, technology became an actor in the network as programs of action were inscribed into pieces of technology. In ANT terminology, future uses of the technology as "inscribed" in the two platforms were presented to the actors. Similarly, possible future uses of the network were proposed by choosing these two specific platforms. Since one of the two scenarios for the users' roles failed and users did not use the Web-based bulletin board platform to expand an emerging network, the scenario had to be re-translated. This was expressed in the choice of the email listserve only as a platform for the next iteration of the AR cycle. Email listserve participants formed and strengthened online relationships that they refused to dismantle after the six weeks originally planned for the length of the online discussions.

In the present context, the email listserve environment supported initial group thrust (first iteration of the AR cycle). Data from the second iteration of the AR cycle will also show how the listserve environment supported trust building activities throughout this iteration of the AR cycle. This could be due to the

immediacy of the medium (messages arrive in one's inbox and cannot be easily ignored as opposed to participants forgetting to check for new activity on the Web-based bulletin board where an online discussion takes place). While the latter included participant's pictures, supposedly a trust enhancing factor, approaching the face to face situation, participants so engaged did not elect to carry on their online activity as the other group did. Participants having engaged through the email listserve, on the other hand, did commit to continue and expand their online collaboration. Some did comment on the effectiveness of messages arriving in their inbox as scenarios they wished to carry on.

The first iteration of the AR cycle also provided a start for data collection towards answering research question three ("How do online leaders and lurkers differ in deconstructing their online experience?"). The actor-network framework allowed to trace actors' involvement and to follow those participants who engaged more than others and continued with the following iterations of this study. Some of these early active participants went on to be formally recognised as the group leaders and the results of their interviews will be reported with the third iteration of the AR cycle.

As the researcher went on to plan the second iteration of the AR cycle, knowledge acquired during the first iteration of the AR cycle was naturally built on. This happened first by choosing to carry on the group's discussions in the email

listserve forum and secondly supporting participants to reach out and start enrolling, through interressement activities, two individuals that had shown interest in the idea of creating an online forum for innovators while participating in the other (Web-based bulletin board) forum. These two participants were invited to partake in the next iteration of the AR cycle.

As Baskerville notes (1998), one of action research methodology characteristics is that it allows for researchers and practitioners to work together. In the present research, as the leaders grew in commitment to the group, they began to take more part in the planning processes. An important part of the learning at this stage related to how to optimise the newly formed collaboration between researcher and these upcoming leaders toward obtaining best results for the research.

At the outset of the first iteration, some individuals elected not to carry on, at times posting thank you messages and explaining the group did not suit their original intent for joining and wishing success to the venture that was emerging. Hence the group that carried on to the second iteration of the AR cycle two was configured slightly differently to either of the original groups. It was formed from individuals who had self selected and who agreed on the basic principle that they wanted to initiate together an innovators' network.

Chapter 5: Second iteration of the AR cycle - factors affecting online collaboration

This chapter describes the second iteration of the AR cycle, which evaluated the participants' perceptions of the factor that affect online collaboration. During this iteration of the AR cycle, online discussions took place on the platform that had been chosen in the first iteration. From the actor-network perspective, this was the interressement where actors persuade others to act together towards the pursuit of a common goal.

5.1 Overview

The second iteration of the AR cycle lasted for 36 weeks. The diagnosing step started while the initial online consultations were being concluded and resulted in the formulation of the second research question: "What do participants perceive to be factors that enable or constrain online collaboration?" In the action planning step, the researcher and one participant decided to carry on the online discussions using the listserve. In the action taking step, the online discussions were carried out about what the participants perceived to be factors that would enable or constrain online collaboration and postings were collated for transcription. In the evaluation step, thematic analyses of participants' contributions during face to face and virtual consultations delved more deeply in some themes that were reported in the previous iteration of the AR cycle.

In total eight main themes and twelve subthemes emerged from discussion analyses. The themes can be further differentiated according to participants'

perceptions (their 'translation" in ANT terms) of how they would act as inhibiting or enabling. The three main themes that emerged as barriers to collaboration were time constraints, irrelevance and online trust and the six main themes that emerged as enabling factors for online collaboration were networking (beliefs about networking and the value of networking activity), aspirations, community belonging, communication channels, decision making and building online trust. The specifying learning step outlined how inhibiting factors first identified (time, irrelevance and trust) were overcome through emphasis on relevancy and trust building activities. Enabling factors were concerned with characteristics of networking, personal and organisational aspirations as well as characteristics of virtual communication (community identity/sense of belonging, communication channel, building online trust and a novel interressement – "virtual networking"). "Virtual networking", defined as the intent to make and use new business contacts via online communication channels, emerged as a significant interressement activity especially in the light of the leveraging value of online group participation.

5.2 Diagnosing

As closure for the first iteration of the AR cycle took place, it seemed that a significant level of involvement had been generated and that participants in both virtual environments were supportive of the creation of an online community for innovators. Participants were asking questions such as, "How would such a self-

selected group manage to survive possible dwindling interest into the creation of the online community itself?" This was addressed in the second iteration of the AR cycle.

5.3 Action planning

Within half an hour of the researcher posting in each of the two groups the last message announcing the imminent termination of the online discussion and thanking participants for their contributions, a message was posted on the email listserve. This message was sent by Bill asking if there was a possibility to carry on the online group and offering to project manage the creation of the online community working as co-facilitator with the researcher. The researcher and Bill carried out telephone discussions followed up by emails as to how to best harness the group's willingness to help innovators by providing a forum for them to interact online. Results of the previous iteration of the AR cycle had hinted that the email listserve would be an appropriate vehicle for online preliminary discussions. Bill proposed to facilitate an online group discussion about what platform participants wished to use. First week discussions included ideas on this topic and the researcher demonstrating to the group the features of the Web-based bulleting board. At the end of this discussion, a consensus was reached about the advantage of the listserve supporting results from the first iteration of the AR cycle. The group's reasoning was that emails provided more 'real time' interaction than a solution involving them having to periodically check a Web-

based bulletin board. The group elected the email listserve platform for its follow up activities.

5.4 Action taking

As noted in section 4.6, the group started their second rounds of online discussions in a slightly different configuration than at the first iteration of the AR cycle. It was formed by individuals who had self selected and who agreed on the basic principles of initiating together an innovators' network. The second iteration of the AR cycle represented their online discussions as to the factors they perceived as inhibiting or enabling on their way to create such a network, while the following iterations provided the environment to start building the network based on learning that had been specified during previous iterations of the AR cycle. The second iteration of the AR cycle lasted for 36 weeks. A third set of data was collected on perceived inhibiting or enabling factors of online collaboration collected during a face to face conversation during a meeting in the researcher's university that took place in the fifth week of the study.

5.5 Evaluating

Online postings that contained data pertaining to research question two were collected during the first iteration of the AR cycle. Online discussions during this iteration addressed the question in the context of the imminent formal initiation of an online innovators network. For clarity's sake, both sets of data (from online

and face to face discussions) were joined and analysis reported below. Results of the second iteration of the AR cycle were evaluated as follows:

5.5.1 Thematic analysis

Evaluation of the second iteration of the AR cycle shows that this iteration provided some answers as to possible ways forward for the group, in identifying and overcoming inhibiting factors and building on enabling factors. The themes that emerged from the thematic analysis are described in greater detail below. Themes were grouped according to main themes and sub-themes emerging from the dialogues. The result of this iterative process provided a profile of information and commentary that was of priority to participants in the fora.

5.5.2 Translations of barriers to online collaboration

Table 5-1 below (inspired from Zorn & Ruccio, 1998) presents the results of the thematic analysis for barriers to online collaboration as perceived by participants. The table describes themes, subthemes, definitions and sample quotes from each major theme.

Time constraints		The time limitations to participate in online groups	There's just so much stuff that comes to you through the internet these days – I don't have the time to sit and go through the masses of information of long list messages if they come too often – in fact, when I start reading too many of them, I **know** I am procrastinating on finishing some other task! (Lianne)
Irrelevance		The extent to which online contributions were relevant to participants	Actually it is not so much **purely** a matter of lack of time – I would read intensely those messages that are relevant to me – those who address the very issues I am interested in! If I always find time for those, this is not only a time issue – it is a **relevance** issue (Anthony)
Online trust	Evaluating online trust	The extent to which one could trust other online participants	How do you figure out whether you can trust someone you have never met – someone you don't know. They are just typing messages they may not mean. I find it hard to work out sometimes (Kelly)
Online trust	Lack of visual cues	The characterisation of online trust problem as missing visual cues	Trusting in online groups is particularly hard because one cannot **see** others – one cannot see if they are uneasy in their chair or look at you confidently when they make a comment (William)

Table 5-1: Participants' perceived barriers to online collaboration

As described in Table 5-1, translations of barriers to online collaboration emerged into three main themes: time constraints, irrelevance and online trust. Postings

containing reference to time restrictions were communicated by the actors in a total of 38 messages recorded on the Web-based bulletin board and a total of 72 messages on the email listserve throughout the first and second iterations of the AR cycle. At the outset of the discussions, participants agreed that time constraints were magnified when relevancy was low, but later discussions highlighted that when relevancy was high, participants readily invested more energy in participating, even if they had to look through quantities of material. Hence, the 'time constraint' factor needs to be redefined as an 'irrelevance' factor. Trust inhibitors were also viewed as surmountable with some interactions proving highly rewarding and with some queries being sometimes answered within minutes, saving considerable resources. These results offer support for previously documented findings pointing to time constraints (sifting through large amounts of information) and trust (difficulty to engage in meaningful relationship without minimum knowledge of participants) as negatively influencing participation levels. Participants felt that in order to engage in long term contributions on a virtual forum there needs to be a mechanism that allows for the development of trust between participants. Hence the challenge of open online environments is how to deal with the trust issues. "How do you meet the trust challenge?" (William).

Several participants mentioned that they had at their disposal limited time to go through quantities of email messages, let alone reply to them. Time is a crucial

variable and general discussions (including Web-based ones) can be inefficient or "time wasters" (Natalie). Time is also an issue when one needs to go through a large number of messages... but "having the emails stream in one's inbox is handy ... as opposed to having to log on a special website to follow an online discussion (Tristan). Meaningful communication as far as these participants were concerned implied that the contents of the conversations are highly relevant to each participant. A number of participants showed concern that the relevance factor impacts negatively on participants' motivation to participate (Anthony).

Where a virtual community's main activity has been defined as displaying information on Web pages and carrying out public discussion fora online, the time constraints and trust factor seriously inhibit the emergence of the online community and virtual collaboration. Participants, however, started questioning this original conception and widening possibilities to include other mental models for virtual collaboration. "How can we use known obstacles such as trust, motivation and time limitations to participate in online communities to make it work for our purposes?"(Bill) As part of developing a new approach, there is a need to elaborate a model that can "reach people through their Email client. An Email client is what I and many other people are familiar with – I never check Newsgroup, despite the enormous number of interesting groups out there" (Lianne).

Hence, inhibiting factors were reported as time constraints and trust for computer-mediated collaborators, in the absence of the usual clues that face to face interaction provides. More in-depth analysis showed, however, that both of these could be alleviated. Time constraints decreased in power when the relevancy of the material discussed online increased (i.e. the more interested people were in the online discussion, the more relevant the topics were to their business, the easier it was for them to make time for it). On the other hand participants who started off as complete strangers with moderate initial levels of trust for each other reported that it was possible to build trust levels over time as it happened for this group through online discussions that developed and as other offline contacts started forming. Developing online trust became a topic in the enabling factors and will be included in the next part of the analysis.

5.5.3 Translations of enabling factors: "virtual connection"

Table 5-2 below presents the results of the thematic analysis for enabling factors as perceived by participants. The table describes subthemes, definitions and sample quotes from each major theme.

Theme	Subtheme	Definition	Sample quote
Networking	Benefits of networking	Building and maintaining a network of business contacts	Business networking is an essential part of business – we need other people to reach further than our own networks. Cultivating networks that will take you to the places you need to go is an art that is mastered by those who have reached the highest business achievements (Etienne).
Networking	Networking mode	Online collaboration has advantages compared to face to face collaboration	Until recently, face to face situations were the main stage for networking situations. Telephone calls are difficult to place here – in a way there are not face to face situations (…) Now we can interact online and get to know a person, their advice, their reactions to others, before deciding whether we want to develop the business relation and – why not – partner in joint ventures (William).
Networking	Online roles	Online roles participants choose, (e.g. leader vs. lurker) influence their networking ability	It is up to each participant to decide what role they want to play online as this will affect the value added they get from their connections… and the amount of networking they will do (Job)

Theme	Subtheme	Definition	Sample quote
Aspirations	Business success	The value attributed to online participation as contributing to business success	Online collaboration is a huge factor of business success – you can ask a question and receive an answer within minutes, which can save heaps of money (Woody).
Aspirations	Social entrepreneurship	Participation in the Virtual Network in order to contribute to a positive cause	I guess I can call myself a 'Social Entrepreneur' as a life choice. (...) the Innovators Online Network gave me a golden opportunity to achieve a dream of contribution (Etienne).
Community belonging	Individual perspective	The sense of being part of a group of like-minded people	Even when I was snowed under the online network provided opportunity to spend a few minutes and interact with colleagues to ask a question or contribute by giving others ideas.... That is just the time I can spare. This online network is a great idea – the support of the group might give me the confidence and energy to carry on – and perhaps raise the funding that will make it possible (Lianne).
Community belonging	Community identity	Defining the characteristics of the community	It is important we define ourselves and our goals so that other innovators can join the group. Who are we and what do we stand for – this is what needs to be formulated (Sunny).

Theme	Subtheme	Definition	Sample quote
Communication channels		Communicating online as one means of communication	We need to get used to online communication as the internet is here to stay and getting proficient at online exchanges is an important part of getting ready for the future (Dan).
Storytelling		Sharing stories of virtual networking where online communication resulted in tangible benefit	I posted a request online and within minutes had the critical business information I needed from trusted source – my online network (Woody). (Developed in the construction of the archetypal story section of the fourth iteration of the AR cycle)
Building online trust		Using the online medium to carry out activities that help others trust us	What can be done to alleviate online trust issues? Perhaps concentrate of activities that build online trust – keep our word when we say we are going to do something and build the "trust credit" that we have (Anthony)

Table 5 2: Participants' perceived enabling factors to online collaboration

The first theme extracted from the data was the 'networking' theme. Participants pointed to some very tangible enablers of computer mediated channels of communication such as the benefits of building and maintaining a network of

contacts, as exemplified by comments from the 'benefits of networking' subtheme. Participants perceived that computer mediated communication may become an essential addition to conventional communication as in the conventional investment place it is difficult for high tech inventors to make valuable contacts: "Cold calls often get you off on the wrong footing, so you need referrals from your own circle of business relations" (Natalie). The upcoming opening of the local technology incubator was perceived as a prime opportunity to develop and support an organised platform/forum to optimise business networking.

> *The (virtual community around the) park will provide some legitimisation for smaller businesses or start-ups adding its reputation and credibility to help making strong business contacts. A virtual networking model can be developed as a welcome first, tangible step for the long awaited local technology incubator (Lianne)*

Other uses of online collaboration were discussed as part of understanding the commercialisation path in the field of practice of each participant. Building an efficient innovation to commercialisation path implies "asking the right question to get the right answer" (Etienne), "get the right inventor to the suitable investor" (Woody), all "at the right time". Such a skill may be even more crucial in the online environment, against obstacles of time constraints and trust development.

Timing plays a crucial role is in the unbalanced way investors come into contact with investment opportunities. One investor, for instance, felt he mostly got presented with the "flaky" ideas – those that have gotten rejected by others before. He concluded:

> *There is more investment money in New Zealand than projects to invest in, but one great difficulty that investors encounter is finding suitable projects to invest in, thus reinforcing the need to direct information to targeted individuals (Woody)*

Inventors encounter similar difficulties to connect with the right people: At first they typically "keep their ideas to themselves" and hold secrecy till patents taken out (Bernice). This could be one reason why accessing the few "public" funding schemes can be a "life draining" and isolating experience for them (William). Accessing an "online community or network of investors" where they could collaborate online and exchange information may make it easier for participants to access available funding sources (Anthony). Another businessperson expressed his need to manage his online networks as follows:

> *As the CEO of my company, I am often in a position of needing very specific information... I need a sensible mechanism to enhance the networks I have already and those that others have already built. I need a mechanism*

> *by which I can sift the large amounts of information often emailed to me, operate some automated searching activity (for some additional information perhaps), match opportunity and potential takers and finally activate my existing networks to connect these parties (Anthony)*

Hence networking modes, the second subtheme of the networking theme dealt also with the advantages of online collaboration as opposed to offline collaboration only.

The second theme addressed was 'aspirations' of the participants and how participants could use virtual collaboration to meet specific business needs. One subtheme of the aspiration theme was 'business success'. Where a computer-mediated communication channel could make a significant value-added contribution was described as those instances where an online message could act as catalyst for the initiation of face to face contact or as timely activation of existing contacts from a distance.

> *An online connection is a good starting point, or quick exchange of information – an ongoing business relationship needs other face to face contact to keep up the momentum (Tristan).*

The second subtheme for the aspiration theme concerned wider definitions of success than personal business success and examples of these were collated to form the 'social entrepreneurship' subtheme. As described in the analysis section on the first iteration of the AR cycle, leaders were active in helping shape the community's identity and foster sense of belonging amongst participants. Some participants even specified how the emerging functioning virtual community would "fill the gaps of a lacking local network". "A virtual connection with likeminded people has been a source of both comfort and inspiration" (Robin). Finding the right kind of local mentorship has been a struggle for me. "Many, many thanks to people in the pilot group, like Etienne, have offered advice and support". I look forward to meeting him in person. "An online community of thinkers (...) could act as a catalyst for accelerating new and smart NZ businesses trying to make their way in the world."

'Community belonging' was the third theme outline by the thematic analysis. Online contributions concerned with the activity of defining the community belonging subthemes, individual perspective and community identity, generated a significant proportion of introductory messages, as described in the first iteration of the AR cycle. It was also noted before that some participants limited their active participation to this original one. There was no additional data, at this stage, on why this was so, apart from some material from lurkers' interviews. This material will be presented together with the relevant interview analyses. The

second part of community identity activity focused around defining personal interests and looking for commonalities. One such idea was expressed by William as: "Etienne and myself quickly identified some common interests" and by Etienne as "there is something we have in common here". Another participant mentioned in his introduction (Harvey) that he would like to identify commonalities with other participants, but thereafter (when this did not happen) unsubscribed himself from the list. Hence a feeling of common purpose was perceived as a necessary condition for a community, whether interacting online or face to face, to exist.

The fourth theme extracted from the data was 'communication channels' and discussions focussed around how the internet offered more options to communicate. Participants felt this would be used by proficient networkers, namely people who are already working to optimise their relationships with others to fulfil their aims to widen their social or professional connections. The important point that was elaborated upon by participants was how crucial training in online communication development was and was going to become an even more differentiation factor for future knowledge workers. Participants felt online communication was an area currently left out of professional training in spite of its value to the development of business networks. Computer-mediated collaboration was described as unique in extending existing conventional networks. Stories of virtual networking constituted the fifth theme extracted from

the data. Participants described how what they would have carried out face to face in recent past could now be carried out or started online:

> *I was fascinated by how essential networks are for getting things done. I talked to someone who recommended I talk to someone who joined our board who recommended someone who got us a meeting with a guy in NBCi who he had done a deal with in the past. This is a key reason we managed to do a major deal in the US. Today most of the relationship can be built virtually (Cris)*

Participants sharing online parts of their business stories seemed to be an important part of their experience. Each in turn described their own success stories about the impact of virtual networking and then collated these into a larger 'archetypal' story at the fourth iteration of the AR cycle as reported later.

The sixth theme extracted from the data was about 'building online trust'. Embedded within discussions around common goals and group task were comments about more attributes of a functioning virtual community: should it be an open or closed (elite) network? Participants who engaged in "problem-solving" with each other during their online participation qualified the free sharing of information as highly valuable. One key aspect of trust-building is to be open and

not keep information and Intellectual Property to oneself, even if one "got burnt" in past experiences: "share it and the trust you put in others will someday come back to you – karma"? (Justin) This participant goes on explaining he returned to his home country with the vision to help New Zealand achieve its economic goals of growth by bringing here top North American CEOs and contacts from his previous career who have expressed "delight" at the idea of visiting New Zealand. He plans to use his sea-side property as a retreat for some important business deals to be secured through "constructive dialogues" between local companies and North American investors. "New Zealand companies need to get better informed as to their competition on the world stage, access to information – also through business networks – is the key to success" (Justin). Another participant noted that open networks were the hallmark of the internet last decade, but some commercialisation agents have fostered the development of closed networks: we should develop a model that builds on the potential of open network and the willingness of some people to share their knowledge (Anthony). The social entrepreneurship subtheme will be analysed in depth with the leaders' narrative section in the third iteration of the AR cycle.

Another area where computer-mediated collaboration was perceived as particularly helpful related to building online trust between interested parties. One specific example of this concerns building online trust between innovators, on the

one hand, and investors and finance officials, on the other. One participant described in her words the particular type of energy needed to lead start-ups:

> *(Innovators)... and finance people speak radically different languages: some people are skilled at "translating" (mediating? trust building?) during a dialogue between them, thus providing a "safe energy space" for their interactions to come to fruition. Though the mediator's role is not often public or obvious, clear communication messages between these two parties play a crucial role in trust-building between parties (Kelly).*

One participant felt that it was the innovators and inventors that need to be educated to the advantages of getting external capital: "Inventors need to accept that they need outside capital". A virtual network or platform can accomplish this, because the trust would be built between the inventors themselves and such peer-group would offer a natural environment for sharing stories of how external investment made a significant contribution to the commercialisation of their idea (Woody). Hence, a functioning virtual peer-group would help prevent or remedy communication breakdowns and facilitate trust building activities.

5.5.4 Actor-network Interressement stage

Optimising factors discussed by participants as they brainstormed possible ways to circumvent these obstacles were factors that enhance virtual communication for business ends (or as the term emerged during the conversations "active virtual networking"). As participants defined the group and their common aims they identified and discussed "virtual networking" as a potential benefit of online collaboration. Hence, when the added value was articulated, group belonging and participation was seen as beneficial to participants. This is further explained in the wider context of the Actor Network Theory as how actors enacted the network activity. Interressement is a series of actions executed by one or more actors to try and persuade others (as described in action planning below) to identify with a common goal. As a nucleus of interested innovators formulated their first ideas about forming the Innovators' Online Network, they turned to other, potential like-minded or complementary individuals and started enrolment processes with them. It should be noted that the email listserve contributions doubled in the first six weeks of the second iteration of the AR cycle as compared to the same period of total duration of the first iteration of the AR cycle following the "official" end of the study. Amongst discussions that took place online, an estimate of 70% of the contents were about reinforcing one another in the opinion that participants could help with the problem identified that innovators were isolated and might subscribe to an online community if there was one created for them. The other

30% of the messages were about describing themselves, their businesses and more general conversation.

As part of actors interressement activities seven of the list server participants organised a small but well attended (10 participants) face to face meeting that took place in the researcher's university. At this meeting, participants got to strengthen the relationships that had formed online. Participants also summarised the main arguments brought forward up to that point and formalised two decisions: a) hold the next face to face meeting at the business location of one participant, to show support for and assist this member's planned venture to use "active networking strategy" to match potential new venture capital operators and local companies looking for foreign investment and b) carry out the online group after the "official" end of the study. The projects were led by seven individuals (five out of them who sustained contributions in the email listserve) who organised resources to activate and fund the continuation of the online discussions.

Out of the networking theme and its subthemes, what emerged as a major interressement issue was defining the "active virtual networking" phenomenon so coined by one leader (William) and described below. 'Active virtual networking' includes elements of the enabling factors described above with the addition of the intent of the participants to purposely and actively seek to enlarge their network of business connections for the benefit of achieving better results in their business.

One significant added value of an online networking mechanism was exemplified shortly after Woody joined the online group. Another participant was actively looking for a New Zealander to act as business contact in Singapore and Woody was able to instantly recommend a very able former colleague of his. The recommendation made online led to successful transactions for the participant who later recognised this had resulted in large saving in time and money for his company. "In these instances, electronic mail is an efficient tool to activate already established world-wide contacts" (Bill)

"Active virtual networking" was defined by one participant as:

> *A process and line of logic that seeks to enable value to flow from creative source to market destination as simply and frictionless as possible. It goes something like this:*
> *1) Determine value proposition for 'deal/ project' - what does the 'owner' want to achieve?*
> *2) Where is the market opportunity?*
> *3) Who has the power in the relevant target market?*
> *4) How do you get to the power?*
> *5) Make online 'contact'*
> *6) Establish agreed, reliable and trusted communication context going forward*

7) Build dialogue based around executing value proposition (Bernice)

One place where a targeting mechanism is vital is in "filling the chasm between Sales and Marketing", which is, according to one participant, not well addressed in today's innovation scene. He described how his previous US-based company was filling precisely this niche and how "one has to have contacts in remote parts and have the ability to activate online networks in order to make things happen" (Justin). Other participants described the need for innovators to make targeted business contacts that will add value to their development and commercialisation efforts. One participant so described the development and aims of online targeted business contact-making activity:

> *The world is full of vast quantities of information and a key way we filter it is to get information from people we know and trust. Confidentiality is a key part of the real world networking process (...) when finding out about things in your social network efficiently, for example people looking for staff, looking for someone to help with marketing, looking to invest etc... The issue with previous attempts at online networking tools is that there is not enough incentive to get people to participate (or) solve specific problems for people. As we have found if you are*

motivated (e.g. looking for a job or trying to find staff)

then you will use it and build your network (Cris)

This participant went on affirming that, to be effective, 'active virtual networking' needs to be as closely aligned to real world networks as possible. Hence, participants invested time and care in building online the case for 'active online networking' as a significant interressement challenge.

5.6 Specifying learning

The fact reported earlier that email listserve contributions doubled in the first six weeks of the second iteration of the AR cycle (as compared to the same period of total duration of the first iteration of the AR cycle) following the "official" end of the study confirms that the group engaged in the process. This can be understood as the group "taking ownership" of the project and a confirmation for the following action research iterations that these self-selected participants could act as partner/practitioners to work with the researcher.

The second iteration of the AR cycle was concerned with the human factors at work during the formation of the Innovators' Online Network. At first, inhibiting factors discussed included time constraints, irrelevancy and the difficulty of establishing online trust. Further discussions, however, showed these inhibiting factors could be overcome, through emphasis on relevancy and trust building

activities. This uncovering of new meaning was made possible through an online discussion, an indication in itself as to the potential for online debate to reach meaningful depth.

Enhancing factors included characteristics of networking, personal and organisational aspirations as well as characteristics of virtual communication (community identity/sense of belonging, communication channel, building online trust and a novel interressement – "virtual networking"). Hence, the problems surfacing at this stage concerned the ways in which "virtual networking" was perceived to be value adding at the individual level, in addition to the group level clarified above. In order to do this, a interviews were planned at a later stage to investigate individual experiences and motivations of participants. Additionally, an important learning at this stage concerned the way inhibiting factors discussed at first (time constraints and the difficulty to establish online trust) were later reconsidered as discussions showed they could be overcome. Since participants identified emphasis on relevancy and trust building activities as crucial in overcoming inhibitors to online communication, this was taken into consideration in the next iterations of the AR cycle. Special emphasis was placed into high relevancy online discussion activities from the comments of online participants and into offering new streams of discussion when old ones seemed to wane. Trust building opportunities were also offered to participants in the way of dedicated online spaces to showcase their work and build credibility.

This iteration, however, did not provide sufficient information on some of the more "personal" elements at work, such as what would secure ongoing commitment of online participants themselves.

Chapter 6: Third iteration of the AR cycle - milestone in the network establishment

This chapter describes the third iteration of the AR cycle. Participants met for the inaugural summit of the Innovators Online Network that was formally created and this marked a milestone in the network establishment. From the actor-network perspective, this was the continuation of the enrolment process that had started happening overlapping with the previous stage, and during which participants identify the roles they play within the network. One leader helped diagnose, and another joined in to plan this iteration of the AR cycle. The third iteration of the AR cycle allowed for leadership internal legitimation from the group of its followers.

6.1 Overview

The third iteration of the AR cycle lasted for two days at a retreat where participants met – most for the first time face to face. It contributed data on participants' perceptions of factors that could enable online collaboration, towards answering research question two, and data on how the group legitimised their leaders, as background data towards answering research question three. In the diagnosing step, one of the most active participants wanted to get the group to sanction his leadership. In the action planning step, the group identified possible scenarios for the Innovators Online Network way forward. In the action taking step, the group met at the retreat and agreed to act upon one of the scenarios. The group agreed on the strategy to overcome the factors identified as enabling and

constraining the establishment of the online collaboration channel. In the evaluation step, dialogues outlined the decisions taken at the summit toward future administration, networking, publicity, network growth through strategic alliances, sustainability of the network's business model, E-forum as a voice and platform for interaction with other participants and networks, project championing, future events and core group members' communications. The specifying learning step outlined the importance of face to face meetings during online network establishment and contact with a European network was established. Learning from this iteration took place through in-depth interviews of the participants.

6.2 Diagnosing

Previous to the summit, five of the participants were most active online, however it was diagnosed that the online network needed an identified project manager to pull it forward. William was one of the participants to take on leadership. He had proposed to be one of the project managers however receiving legitimation from group members online did not suffice to him. The fact that the 12 participants agreed to meet for a weekend summit demonstrated that the group's shared William's concerns about legitimation being given only online and were prepared to act to strengthen the process they had started. William was instrumental in organising the summit meeting where most participants met face to face for the first time. Others confirmed online they would be involved "on demand" and

offered further expertise to assist William organise the summit. This was a first step in delineating the amount of online/offline involvement of each participant thereafter. The summit would answer the question as to whether the group was prepared to give the final go ahead for the official creation of the Innovators Online Network.

6.3 Action planning

At the planning stage of the third iteration of the AR cycle, possible scenarios developed from participants' contributions were articulated. These scenarios were related to earlier identified barriers or enablers of online collaboration and were proposed as partial solutions to barriers or enablers optimisation. Principally, the scenarios revolved around the channels through which effort should be focused, namely online or face to face, and over how best to prepare for mobilisation of the next network development stage.

6.3.1 Scenario 1: Concentrate on Web based activities

6.3.1.1 Build closed (elite) networks for business purposes – exchanging ideas and contacts

Closed (elite) networks have safety face-value and could deal with the obstacle of trust and supposedly of time constraints: members register, in so doing show a minimal level of involvement, ongoing involvement would contribute to online trust building and the closed environment gives a feeling of exclusiveness where

special trust relations develop. It was recognised that two major efforts were being carried out in New Zealand in this direction. They were at various stages of development as the Innovators Online Network was forming and its members followed their development with interest, joining efforts in researching some of the networking protocols that they will put in place for their members wherever possible. Since the project's intention from the start was to avoid duplication of efforts, it seemed this part of future scenarios was well covered.

6.3.1.2 Develop an enhanced computer-mediated mechanism driving through "active networks" the right information to the right people

There were at the time the research was carried out, two communities which felt critically mismatched: innovators complained accessing public funding was difficult, or kept their ideas secret at great personal prices and investors, very interested in finding out about promising projects who found it very challenging. Was this problem a "communication breakdown" as implied above or a more crucial problem with negative consequences of losses of opportunities for both groups? Elucidating this question was not the scope of this study but the issue remained crucial for New Zealand economic growth. Investigating into a technology allowing "matching" individuals of both groups efficiently seemed a significant scope for study at this point in time. Since general discussions are not efficient use of time, as pointed out during the second iteration of the AR cycle, there is a need to develop relevancy indicators for participants to feel actively

involved. The wider implications of online communication included some consideration of the more general protocols for human communication during engagement in networking.

The wider framework for the proposed next stage to be carried out (investigation into successful active business networking protocols) was directed at informing the next stage of the project in one direction that has not been explored yet: the development of a model for "Advanced Human Networking" protocols (Anthony). These protocols would expand from basic data on the protocols of human networking, such as trust management, and develop the software applications to be used in conjunction with the computer-mediated communication technology.

Participants were in overwhelming agreement that some action was crucially needed to help match two types of players: inventors or companies looking to access investors' help and investors searching for novel opportunities. As broadband technology would soon allow video streaming, with potential positive impact on trust building provided by the added visual information, New Zealand innovators and entrepreneurs would soon be able to make significant progress in bridging the distance from their markets obstacle. The timing for developing a model for "Advanced Human Networking", planning research into the software applications to capitalise on the virtual technology and test its effectiveness

seemed appropriate and a number of the Innovator Online Network members took upon themselves to write proposals to seek funding sources for such project.

6.3.1.3 Build an online community with various discussion streams

A public web-based environment, such as a Website or web-based discussions, faces the same challenges that time - to browse and participate - and trust building constraints present. Sustainability of the online community would be the major issue as outlined by the literature available, as matching participants' specific interests meant developing numerous discussion groups, incurring large human resource in moderating and maintaining the fora. One group of participants decided to follow this path, defining itself as a facilitation forum for initiating new ventures. This seemed best suited for users-led and user-defined projects as each group can follow the same process, define its own community and target specific tasks highly relevant to their population.

6.3.2 Scenario 2: Use a face to face meeting to crystallise the network

Out of the online discussions, it soon emerged that people wanted to crystallise their effort and publicise the efforts of the Innovators Online Network. It was proposed to organise a face to face summit for the online network members. This proposal was well received and answers as to those who could participate were posted through the email listserve. It was the latter scenario that was eventually

adopted, as participants outlined there was a relatively simple concrete step that could become the basis for action on the other three at a later stage.

Another action planning item was put through the group decision-process about the meeting location. One participant suggested that the summit take place at the business location of one member's lodge destined to host retreats for IT companies. Other participants agreed readily as a manifestation of their support for the new venture.

6.4 Action taking

Online discussions from the second iteration also included postings about whether participants who lived abroad could attend the summit: indeed one participant came from Europe and one from the Middle East. The latter (Etienne) also proposed his facilitation skills to the group that was going to meet face to face. Upon receipt of grateful acknowledgements, he proceeded to gather some information online, in new threads that grew to occupy most of the online interactions at the time. A detailed account of this online experience is presented in the third iteration of the AR cycle as Etienne describes this was the first time he had conducted such session online. Culminating this process was the mission statement that was negotiated online, constructed over some 600 e-mails and that read:

ION is a synergistic community of individuals and their professional networks which streamlines access to people, knowledge and capital, accelerating New Zealand's innovators towards business success.

To organise the summit, the researcher, William and Etienne prepared materials suitable to engage participants on a different type of interaction to provide a basis for the network's future development and next step forward. This was done by preparing a "workbook" containing short biographies of the participants and planning a meeting schedule. The two days included a combination of activities such as visioning, planning and reflecting to shape the future of the Innovators Online Network. Intertwined with activities concerning the development of the Innovators Online Network were sessions during which four of the participants presented their business plans to the group. The aim of the latter activity was to facilitate tapping into the collective ideas and networks of the participants in a trial run of an "active networking model" on themselves. Twelve participants attended the weekend long meeting which was unanimously declared a milestone in the group's development.

6.5 Evaluating

Evaluation of the third iteration of the AR cycle was done on two levels: First the process was analysed through the ANT conceptual framework, as part of the

enrolment process. Secondly written artefacts were collated of participants' ratings of the strength of the process and verified through a document circulated amongst group members, an artefact in ANT terms, and summarising its outcomes.

6.5.1 Artefact analysis

The two types of artefacts that are relevant for this stage of the analysis are a written document and pictures. The written document was drawn at the end of the summit and sent to all the online network members and the pictures were put online as part of a wider dialogue about the network with other online networks.

6.5.1.1 Written artefacts

In the individual interviews, there was a wide consensus amongst all 12 participants that the summit had been a significant step forward. The enrolment processes described contributed to reviewing past events and consolidate future strength for the group, further contributing to participants' feelings that the group's effort was bearing fruit. The outcomes of this summit were summarised in writing, and circulated by email to the core group summarising eight of the summits' outcomes as follows:

1. Administration: as described in the ANT enrolment section below.

2. Networking: as described in the ANT enrolment section below.

3. Publicity: At the time the summit took place, there were already ten publications relating the Innovators Online Network's activities. They were listed on the research site URL (www.mngt.waikato.ac.nz/virtualnetworking) and used as examples of the network gaining in legitimacy.

4. Strategic alliances: as described in the ANT enrolment section below.

5. Business Model: At the time, the Innovators Online Network was reliant largely on volunteered labour from its members and technical assistance from the researcher's technical team. There were also offers of sponsorship in kind being made by patent attorneys who had offered the Innovators Online Network some help and were being considered. The sponsor offered to provide trademark and other intellectual property protection as well as incorporate the Innovators Online Network as a not for profit body. In return the Innovators Online Network would provide a link from its site to theirs, a chance to host an intellectual property forum as well as first refusal on other opportunities as they arise. The Innovators Online Network was then engaged in negotiating with top government bodies at executive level to identify means of financial long term viability of the model.

6. eForum: Development of features on the site continued. At the time, the Innovators Online Network had 120 members, was expected to add an improved profiling system on the website and was discussing how to incorporate the new logo into the site. Electronic fora were planned for the next few months, involving a new guest forum every month. Actors saw as these development as offering the network a potential future source of revenue.

7. Project championing: There was some agreement that the Innovators Online Network should collectively assist one of the ventures presented to obtain funding and formal plans of action involving various actors were drawn.

8. Future mobilisation plans such as live innovation showcase and venture capital matchmaking events were also discussed also as government officials were showing interest in developing a common 'expo'. Even at this early stage, there was reasonable indication that a national Innovation Showcase would involve the Innovators Online Network at its highest level.

6.5.5.2 Pictorial artefacts

ION members posted on another virtual discussion group (at www.knowledgeboard.com) questions about network development. An online dialogue followed that included visual artefacts summarising the answers of the members of the other network. The visual artefacts are described below. An

earlier primitive graph proposed at the outset of the Innovators Online Network summit (Figure 6-1 below) was developed online together with KnowledgeBoard participants. The list on the right handside of the picture was added by a KnowledgeBoard participant (McRae, 2001). This artefact represents a unique superimposition of a new set of inscriptions, the text box on the right side of the picture onto an older one, the original picture. The added comments helped the group develop ideas for mobilisation to happen at the stage of the actor-network development and were subsequently adopted and referred to in their dialogues.

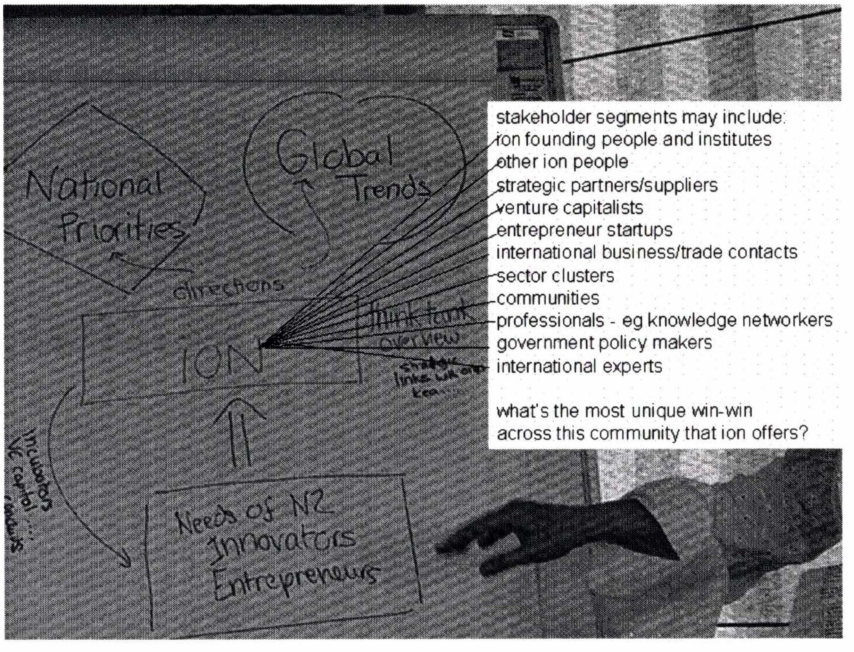

Figure 6-1: The Innovators Online Network early model proposed at the summit

This participant also posted the following tentative model (Figure 6-2), which in his view could be a representation of future direction taken by the Innovators Online Network (McRae, 2001).

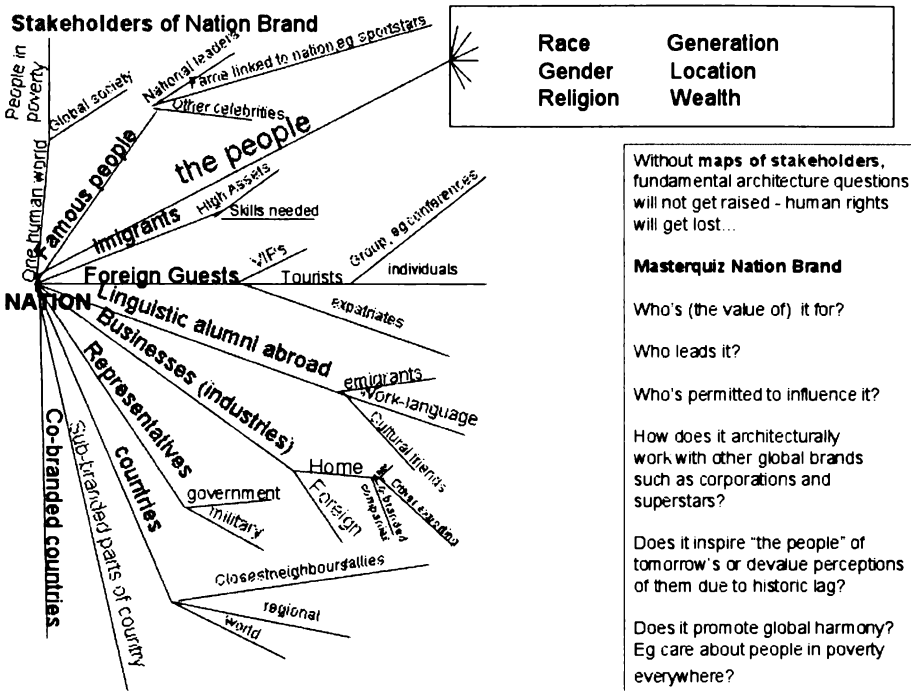

Figure 6-2: Proposed network reach by the KnowledgeBoard member

The above artefacts were graphic representations of how the online network could reach out into deeper networks and rise to the next level of network development – the mobilisation level at which legitimation is obtained from official and government organisations. In such matters, contributors to the KnowledgeBoard network had specific prior experience to contribute. These suggestions, however,

did not develop into a full partnership. In William's words "we need to focus on how we are going to reach out, not only on who to target. Naturally the human makeup of the network is important, but at this stage we need to make sure the electronic system supports our goals, and this is what I want to concentrate on right now". Consideration of the above artefacts is nevertheless important in understanding how the actor-network gains strength. Central to ANT is the accumulation of the strength of inscriptions, so that this kind of connection of the Innovators Online Network with other, larger, networks, such as KnowledgeBoard is an important element in accumulating strength and increasing sustainability (Joerges & Czarniawska, 1998; Latour, 1991).

6.5.2 Interviews

Analyses of actors' narratives also offer the possibility to delve more in depth and build on the quantitative information collected in the second iteration of the AR cycle, transcending previously known main themes to uncover in-depth material, such as actors' 'interressements' mechanisms described by Actor Network Theory. The stories of four focal actors will be presented more in-depth (two of "lurker" and two of leader categories). Their dominant narratives described their preferred ways of establishing and maintaining contacts, participation patterns in other networks and their online experience during participation in the Innovators Online Network group. Results so organised allow for the additional narrative analysis elements to emerge: narratives relating specifically to their experience

with the Innovators Online Network indicated whether or not the participant experienced unique outcomes with respect to their online collaboration experience and whether or not this was conducive to initiating re-authoring processes.

6.5.2.1 Lurkers' narratives

The narrative analyses for two lurker participants are presented below:

6.5.2.1.1 Vignette 1: Tristan's 'Silent commitment'

Tristan is an executive with a large energy company. He has a scientific training and professional background in a niche domain of energy development.

6.5.2.1.1.1 Dominant narrative on collaborative activities

Tristan's preferred ways of establishing and maintaining contacts are coloured by his belief and trust in face to face networking. He does not see a value in interacting online as an extension of his face to face networking activity. He uses his contacts for gathering information and finding experts in certain areas when he needs to subcontract them as part of his work as a manager.

> *If I need to find a competent consultant, I would exclusively ask my contacts – I ONLY trust the word of someone I know, someone I have collaborated with, someone whose opinion I value. I do not find it useful to*

look for specialists by placing an advertisement in the paper, for instance.

Trust development is essential as a basis for collaboration:

I don't know how to overcome the problem of innovators being essentially isolated individuals in the country. It is hard to build trust online only, a combination of face to face meetings and online activity perhaps... you've got to be able to see the people whom you need to engage with. Perhaps the introduction of video technology will help increase trust in online business situations.

Tristan views his participation in other networks as extremely central to the success of innovation ventures.

Networks in our company are not official – it is people connected to each other, so there are informal (yet durable and trustable) channels that we would use for specific issues. No one has written a manual about it, it is just information we pass verbally to each other! For instance if we need a specific permit from the authorities, we turn to certain people in the organisation who have already developed a relationship with the officials in

question and thus have valuable knowledge about how to best approach new issues.

He participates in a variety of face to face activities and seminars with the aim of making useful contacts, but describes meetings such as the Chamber of Commerce events as "poor networking events".

You meet many people but only about 5% develop into a more substantial – out of these maybe 10-15% can engage in further dialogue. So these activities may provide a good source of information, but they are not efficient in terms of getting to know those people that will make a difference to me.

6.5.2.1.1.2 Unique outcomes and re-authoring processes

Tristan was, at first, reluctant to participate online in the Innovators Online Network's activities but surprised all others by showing up at both face to face meetings. He defined his position as "online reluctance to post coupled with offline keenness to contribute".

I was very interested in the discussions that were happening online, even if I did not post myself. I felt more comfortable to talk at the two face to face meetings that we had, though I was a little apprehensive at how people

would relate to someone who had been silent online – I was interested and felt committed to the group – just not online. I know if there had been video connections, I would have spoken out.

Unique outcome: his feeling was that he had made good contacts from where to carry on with his habitual face to face patterns, so there was some experience of unique outcome but not strong enough to engender re-authoring processes.

6.5.2.1.2 Vignette 2: Solomon - 'The sounds of silence'

Solomon is an Information Technology knowledge worker living offshore. His narrative is one of an individual under great organisational pressure. The company he works with is ambivalent about collaboration in general and virtual collaboration specifically. Workers receive informal gratification for keeping information to themselves - and sometimes negative sanctions for sharing. Interactions containing knowledge exchange and carried over in the virtual environment are even more problematic as "emails can get anywhere, they are not safe". Solomon resents the ambiguous messages and the legitimation for lack of communication from his organisation. This is contrary to good work practices, in his opinion, particularly in Information Technology when there have been traditions of help and collaboration over technological issues.

The company says "let's collaborate internally and share problem solving over an intranet system" but on the other hand "clients who have paid to have a solution developed own it so that if a new solution needs to be developed for another client with a similar problem – be it. What top managers are not saying, but we all know they are thinking it, is that the time charged again is more gain for the company. They tell us the clients want it this way, but I don't believe they actually asked the clients – why not charge again if you get away with it? There are huge ethical issues at play here.

6.5.2.1.2.1 Dominant narrative on collaborative activities

Solomon's preferred ways of establishing and maintaining contacts are varied but relationship building is not part of his job description as such. Solomon feels comfortable in both face to face and computer-methods of establishing contact, but added that, in the company, he is not the one making contact with clients. The contacts he thus makes online or face to face are either purely of a social nature, or there are professional requests for help to solve specific technical problems.

...in this case, you may need to reciprocate. Giving or receiving help with technical problem depends on who makes the request and where they are in the

organisational hierarchy compared to you: if it is someone higher than you, you have to help.

When asked about participation in other networks, Solomon replied that on a personal level (belief system) he does not "believe in networking" at all: he produces emphatic accounts of the counterproductivity of networking as part of a professional activity.

In the past, what we call "networking" has not worked for me. Maybe because I am too shy, I do not know. But there is also the problem of the time it takes to develop relationship, I find this excruciating... and who says the particular person you spend energy talking to is the one that can offer you a job or a better pay?

I have visited a few online communities but never participate; mostly I look at what other people write. Where I find the virtual channels useful is when I have technical queries – I know where to go and get answers back within hours – this is fantastic. This is where I find online fora most useful, where people with homogenous professional backgrounds have similar issues.

6.5.2.1.2.2 Unique outcomes and re-authoring processes

No unique outcome was detected from Solomon's perspective. He admitted to reading the messages but not posting. This seemed quite strongly related to the aforementioned organisational patterns reinforced by his company: from his perspective, not only is there no incentive for sharing information, but there also is no clear justification on an organisational level for collaboration with individuals outside the company and co-workers alike. Hence, Solomon did not change his original opinion about the low value that virtual collaboration offered to him.

6.5.2.2 Leaders' narratives

The narrative analyses of two leaders are presented below:

6.5.2.2.1 Vignette 3: ET(ienne) 'call home'

Etienne is a New Zealand expatriate who has been living offshore for about two decades. He first lived in North America where he established a consultancy and training business. He currently lives in the Middle East working for a multinational company.

6.5.2.2.1.1 Dominant narrative on collaborative activities

Etienne's preferred ways of establishing and maintaining contacts are varied as he enjoys the activity of making new contacts. Etienne is an active face to face networker. He reports making contact easily with individuals of a wide cultural

and social range and relates many incidents where his cultural awareness served to achieve his professional aims. The knowledge he gained there, he wishes to share with his fellow group members.

Etienne has participated, over the years, in a number of other networks, mostly face to face ones.

> *Organised networks are limited in what they have to offer me, rather I build my own. I believe I can systematically market myself then build on to the next contacts from this basis. I can start "cold" and build step by step the network that will suit my needs, helping others along the way. Being able to help others is crucially important for me, it is not something I do with specific intensions in mind – I just like to help. In the USA too, there is lots of altruism. Since we so rely on people, it is important to build trust before anything else. If I need to find something out, I ask people in my network.*

Since he moved to the Middle East he has actively tried to organise networking activities, particularly of New Zealand expatriates but with no success:

> *I tried to organise meetings of Kiwi friends and colleagues many times but nothing doing – the idea were*

met with very little interest- I am still puzzled as to why this was so. So I was left feeling alone and isolated. These feelings were made worse as I miss New Zealand a lot and wanted to offer my knowledge to help with its current wealth creation efforts.

Hence, Etienne's definition of his problem in the area of online collaboration is that he had not experienced it before, and though had a strong wish to extend his network, did not know what was to be expected from activity in the Innovators Online Network. Feeling extremely culturally isolated, he had been actively searching for, and so far failing, to keep ongoing contacts with fellow innovators.

6.5.2.2.1.2 Unique outcomes and re-authoring processes

Etienne's participation in the Innovators Online Network was a significant event in his professional life. He speaks about how important it was for him to be able to communicate and feel connected to New Zealand, in spite of the distance.

Here I sit, surrounded by a secrecy shroud in a seedy internet café to be in touch with my mates – much is closed around here because of the Ramadan, and there is no chance of being served any alcohol of course, but the thrill of being in touch with you in Cyberspace comes close to that of sitting together having a couple of beers.

He reports the online communication has allowed him to experience some new usefulness as he contributed to his home country's business success by offering the international business process knowledge he had accumulated and that was relevant to the Innovators Online Network's actions. He was delighted to be able to connect with innovators from his home country as an opportunity to share his knowledge: "I guess I can call myself a "social entrepreneur" as a life choice". Etienne offered his facilitation skills to the group and was thrilled to be accepted as such. In the process he experienced gifts for online facilitation he did not know he had, in addition to the face to face facilitation expertise, and felt fortunate to be able to develop these new skills. He spent many hours contributing, designing activities and compiling results to post online as to the group's progress. In his case, activity started from a distant location had local repercussions. He reported his leadership of the Innovators Online Network as a significant life experience.

> *It was absolutely great to be able to participate in the Innovators Online Network from anywhere in the world! I would NEVER have been able to feel so involved if it hadn't been for the virtual channels. In return the Innovators Online Network gave me a golden opportunity to achieve a dream of contribution.*

This experience also proved valuable to him on a more personal level: he plans to return to his home country one day and the Innovators Online Network is a good opportunity to start building networks toward this major life change.

6.5.2.2.2 Vignette 4: William - 'Act global, rise local'

William is the managing director of a home-based business in Knowledge Management. William belongs to a Small and Medium Enterprise task group of an Information and Communication Technology cluster and also sits on the executive committee of that body.

6.5.2.2.2.1 Dominant narrative on collaborative activities

William preferred ways of establishing and maintaining professional contacts had traditionally been through face to face meetings, which he followed up with emails. William is enthusiastic about participating in other networks and about the positive power of face to face networking:

> *Active participation in a business cluster got me into places I would never have had access before. Once on the steering committee, I had access to 120 people and up to 50 small home-based consultants.*

Simultaneously though, William also experiences a high level of frustration about the leveraging power of the networks he has participated in so far and feels they do not reach far enough to be able to assist his business endeavours.

6.5.2.2.2.2 Unique outcomes and re-authoring processes

William's participation in the Innovators Online Network marked a turning point in his perception of himself as a professional and as a leader: William reports initially using the Innovators Online Network online forum as a vehicle for local profile rising. His experience with the Innovators Online Network assisted build confidence in online fora. He disclosed how his activity as a rising leader, based on his desire to contribute to the Innovators Online Network expertise in Knowledge Management was in turn beneficial to his other business activities, allowing him to widen his face to face network considerably, and increase his influence circle by gaining acceptance of higher governmental officials. William was invited to present at a national conference, led by a government office, and report on the activities of the Innovators Online Network. He has been also invited or selected by other conference organisers on the basis of the expertise gained with the Innovators Online Network. In this case, activity started locally spread in reach to national levels.

William also reported personal benefits from his connection with the Innovators Online Network. The emergence of the network coincided with a major personal

life change and William found significant amounts of "comradery" and emotional support amongst fellow members.

> *Naturally some of this communication was going on offline. Though I had never met some of these people face to face, I could openly share with them some very personal parts of my life and gain substantial support from the relationship – someone was there, someone cared and I cared in return. This exemplifies what we hoped to create with the Innovators Online Network, and I know we have because I hear about such happenings, albeit sporadically because there is no organised feedback channel yet. People get to know each other online through the network and we do not expect them to only interact on the Web, because that is not how business is done. But the Innovators Online Network does offer a fantastic virtual meeting place of like-minded innovators.*

William identified participation in the Innovators Online Network as a unique outcome that added value to his business endeavours. Part of his re-authoring process included statements such as:

I had lots of ideas on how to lead the group but it only dawned on me slowly that I could take on the direction of the online network. I had tried to set up online groups in previous settings before, including my own business website, but could not gather momentum. This time was different, each little success led to the next one, people responded well to my leadership, in ways that even surprised me. In retrospect, I am glad I put in the extra effort! There is more intellectual property in the Innovators Online Network meetings than in all other cluster meetings I have participated in recently.

6.5.3 Actor-network enrolment process

Key actors were recognised and legitimised by the group. It was agreed that one participant (William) would continue to administer the Innovators Online Network, deal with membership enquiries and spearhead the network development. William was also proposed to oversee the website with technical assistance from the researcher's technical team. William was one of the proponents for the summit and had clearly explained in online postings that in his opinion the network needed to identify a spokesperson to interact with other organisations. Interaction with other organisations included the networking area and this was the second area in which roles were discussed. Activity through the

website was showing promising signs of potential linkages that were held up as illustrating the potential of Innovators Online Network. Links with other government officials and offices were being forged and reported to the group at the Summit. Some members of these organisations and others were already approaching participants in the Innovators Online Network and showing interest in collaborating in some common tasks. This was seen as encouraging given that publicity had been limited.

A third component of the interaction between the online network and other organisation was the strategy that the network should adopt in prioritising which other organisations to approach and form strategic alliances with. Initial contacts with nationwide networks took place. There was common agreement that the target audiences of some of the groups were highly compatible and mutual interressement were evoked at the summit that would eventually impact on mobilisation. Other interest groups need access to grassroots New Zealand. Conversely the Innovators Online Network needed access to this interest group's offshore knowledge networks. Joint press releases were issued with these groups. Three out of the nine action points from group dialogues - administration, networking and growing the network through alliances - were concerned with components of the enrolment processes that ANT identifies as part of the actor-network formation. What is expected to occur at the enrolment stage is that actors allocate roles to each other or get allocated roles by others. In this case, roles

related to group functioning, as described below, were distributed in the following areas.

Interaction with elements external to the network brought about discussion about what would the differentiating factors be for actors that were part of the original core group as opposed to newly enrolled actors. Core members agreed that the original online interaction listserve platform (iteration one and two of the AR cycle) would be used for core group members' communication and that the new Website would also include special areas for them. The membership whiteboard was such a space. Innovators Online Network's "Gold Members" were invited to go to this area on the site and profile themselves or their business ventures for greater visibility. Individual evaluations carried out at the end of the face to face meeting in a group setting and also during individual interviews are presented below.

6.6 Specifying learning

Learning was generated in three ways during the iteration. The three ways in which this happened are as follows. Firstly, the process of leadership emergence as it happened through the online medium and described throughout the thesis is recounted. Secondly the contribution of the face to face dimension to the process of network formation under study is described. Thirdly, the process of learning through extending the network reach is reported.

Identifying leaders in a group is a complex endeavour and a multi-level data collection method is needed. The number of postings, the postings contents, participants' actions and legitimation activities all contributed to reaching the decision of who was a leader for the online group. In addition, the factual evidence of which participants actually took over the facilitation of the Online Innovators Network and carried it through to the state at which data collection and follow up stopped pointed to and verified in retrospect who could be considered a leader for the group.

6.6.2 The inevitability of face to face consultation

Participants to the online discussion once again fell into two groups: those who wanted to go forward and those who were not committed enough either to the group or to the idea of the online network. In addition, this iteration of the AR cycle showed that, at least in some circumstances, there is no replacement for face to face contact. Following the summit, and after obtaining face to face stamp of approval and legitimation from core participants, the Innovators Online Network's activities increased dramatically and the online network made significant strides.

6.6.3 A little help from our online community

Part of the enrolment processes included connecting the Innovators Online Network with another virtual network (the European Community KnowledgeBoard) and discussing with some of their members the direction to

take in the light of Innovators Online Network's accomplishments so far. Consistent with the online nature of the network, the questions asked by members were put up for virtual discussion group (at www.knowledgeboard.com) and the topic discussed by world experts on virtual innovation networks. This was significant to members of the Innovators Online Network as they felt part of a more global community of peers and had access to vital knowledge as to previous successes and failures of others who had gone through similar experiences. The latter's contributions, however, were later dropped by group participants who felt there was too much emphasis on human agency and disregard for technological agency. This supports earlier findings (Rose & Truex, 2000) that "outcomes are emergent from the interaction of both forms of agency (human and technology), not from one alone" (p.30).

The third iteration of the AR cycle focused on dialogues and interacting modes that foster the construction of collective and individual meaning. De Veerdt (1999) emphasised how through dialog new "ways to mean" can unfold. Dialogue also contains an exploration dimension. This showed how the group discovers the meaning that it creates by talking. At the same time, this summit marked the group's endorsement of the two leaders that had emerged throughout the previous iterations of the AR cycle. These focal actors had received both the legitimation to facilitate the online process leading to the summit (Etienne) and the leadership of the way forward for the Innovators Online Network (William). Callon (1986b)

describes how this process is likely to happen at this time in the translation process. Callon explains that the attribution of a leadership or spokesperson role to legitimately represent the network is a necessary event to facilitate the latter's growth. There were no other participant that competed with these two focal actors on the aforementioned roles in an observable way. There were other focal actors that offered help in their domain of expertise but these two actors were, for all intents and purposes, legitimised by the group voting to accept their offer to lead the network to the summit and thereafter. This is consistent with views of leadership as facilitating network processes (Pedler, Burgoyne, & Boydell, 2003).

In order to build on the body of knowledge acquired during the first and second iterations of the AR cycle, the third iteration had been planned to find out how actors actually set out to target potential members and engage in enrolment processes. The third iteration of the AR cycle did not lead to a research question as such – rather it added to the research objectives by providing additional critical information as far as identifying the focal actors. Iteration one and two of the AR cycle established who they lurkers were and hinted at which participants might emerge as leaders. The data pointing to the latter was based not only on the quantity of messages they posted but also on some qualitative characteristics of their messages. The third iteration provided different data as to leaders' identification through group approval and legitimation. The next chapter will

describe how in depth information was needed on the actors' motivations to commit and contribute to the process.

6.6.3 Lessons from interview analysis

This part of the research described the experiences and motivations at work for online participants. It describes the virtual leaders of this group as social entrepreneurs planning to increase social capital for their country. This aim will be further pursued by building an online communication platform during the fourth iteration of the AR cycle when the website becomes operative. The third iteration of the AR cycle needed to address a number of issues. The first issue, in actor-network terms was how to reach more people and widen the network to prepare for the next iteration of the AR cycle. The second issue was how to find ways to reach the lurkers, and share with them some of the stories and unique outcomes that others have experienced. Reaching the lurkers needed be done through understanding their online experience better. In the present research, through the lurkers in-depth descriptions of their experiences, two novel barriers to online collaboration were uncovered. Tristan described his experience as: "silent commitment", i.e. shyness to interact online coupled with high motivation to interact with the group offline. A lurker in the full sense of the word, having followed intently what was said online, Tristan did show by coming to two face to face meetings that he was keen to contribute to the group. He also indicated potential ideas that may encouraged him to post online indicating that had there

been an additional visual component, such as a video conference, he would have found it easier to engage online as well.

The other barrier to online collaboration was described by Solomon, as an organisational one and coined "the sounds of silence": this related to an organisation's double message to their staff that, on the one hand online collaboration of this type was positive, and on the other, that they were not allowed to share knowledge in collaborative environments, even with colleagues from the same organisation. Hence, of the two novel barriers to online collaboration, one was of individual nature and the other of organisational nature.

The third issue was concerned with understanding the online experience and motivations of the leaders. The findings showed that some individuals who were wanting to contribute to a cause had previously attempted to do so using face to face communication means but had failed to rise as leaders. Their current experience leading the online group, on the other hand, was perceived by them and evaluated by their 'followers' as positive and so it caused significant change in their professional lives. From the researchers' perspective, knowing the personal motivations associated with the social entrepreneurship contents was important in forming and planning ahead a 'win-win' partnership with the practitioners involved in the research. Added to our findings from the first two iterations of the AR cycle that participants essentially reflected on their

participation as a desire to find out if an online tool had the potential to assist them in their 'virtual networking' efforts, this teaches that efforts to raise awareness about the potential of 'virtual networking'.

The combination of narrative interviewing followed by the narrative analysis proved to make a valuable contribution to the research. Narrative interviewing provided a potent method to collect new data, and narrative analysis provided rich material that allowed for a deeper understanding. The areas identified by the participants as significant to them were a) their motivations for taking up the roles they did and b) identifiable changes in their online experiences compared to earlier experiences. The interview process allowed for reflection on their past experiences and their connection to their present experimentation with online collaboration. Thus, this analysis allowed formulating the following in answer to research question three.

Leaders and lurkers reported different motivations both in content and process. Leaders' decisions to participate were motivated by (a) an interest in making personal contributions to their country, and (b) the opportunity to raise profile locally. Leaders reported uncovering abilities in virtual facilitation and leadership novel to them. Active participants reported virtual interaction to have been value-adding by extending their networks. Leaders, finally, reported strong unique outcomes and were able to engage in re-authoring processes. During these

processes they addressed the significance of particular unique outcomes and establish new meaning countering their previous experiences with similar situations and technologies. Lurkers were divided in their "belief in" the effectiveness of networking in professional settings with some describing 'Active passive' participation (reluctance to participate online contrasting high face-to-face involvement levels). Lurkers have mostly been considered in the literature (Nonnecke & Preece, 2001) as passive onlookers; the present results showed how some can be 'silently' involved. This data is also useful in detailing motivational themes of virtual leaders for a self-selected group working on an issue that only indirect bearing on their own success, since the development of an online forum for innovators was thought to directly benefit the population of innovators in the New Zealand environment.

Silent onlookers were also divided on their perceptions of the added value of networking. Two types of belief were expressed, some who 'believed in' the effectiveness of networking in professional settings and others who did not, as summarised in the cases below. Some participants described feelings coined 'active passivity', i.e. reluctance to participate online contrasting high face-to-face involvement levels. Some re-framing took place on a smaller scale than leaders, e.g. value adding perception of virtual networking, but no re-authoring processes as such emerged from the interviews. Some participants retained their dominant stories: lurkers experienced difficulties getting out of their dominant stories and

thus did not experience the unique outcomes necessary to initiate re-authoring processes.

The narrative framework is (in addition to an effective data collection and analysis method as described before) also a change method because re-authoring provides a framework for and a basis from which a new narrative can emerge. How these new individual narratives can be organised into a collective narrative will be examined in next chapter. This is important in light of the findings on lurkers, who displayed a relatively high interest in the contents of the online activity. Narratives of success can hopefully start showing the lurkers the advantages of online collaboration.

Chapter 7: Fourth iteration of the AR cycle - widening the network

This chapter describes the fourth iteration of the AR cycle during which the virtual communication platform was expanded to reach out the wider public of innovators. From the ANT perspective, this marks the mobilisation stage where the network becomes recognised by other groups and people in the wider community and gains official legitimacy.

7.1 Overview

The fourth iteration of the AR cycle lasted for twelve months after the decision to expand the virtual communication platform. The diagnosing step resulted in the question of whether there would be sufficient uptake of membership from innovators interested in virtual networking and collaboration. In the action planning step, the researcher and emerged leaders of the Innovators Online Network reviewed some virtual platforms and together with the web services of the researcher's university established a domain and designed the website. In the action taking step, the Innovators Online Network expanded its scope to a full size Website. In the evaluation step, the Website growth in membership was monitored. In addition, stories of participants' uses of the virtual collaboration were further collected from the postings on the discussion areas of the Website. The specifying learning step included additional data towards answering the first research question ("In what ways is group emergence impacted by different online discussion platforms?"). At this point in network development, participants

elected a different platform than the one chosen for the second iteration of the AR cycle. Learning also relates to the participants reflecting together on the lessons learned from the online interactions and how to best convey to the wider network of participants how virtual networking can help them achieve business and professional results.

7.2 Diagnosing

Once the need met by creating an online network was established and the commitment of a small group of people to lead the process secured, the question remained "if you create it, will they come?" Wider participation of national and international innovators was to be qualified during the fourth iteration of the AR cycle and the need to research the stories that were being posted online about their successes with online collaboration.

7.3 Action planning

Planning the Web-based community was done by the researcher and the identified leaders, together with the Web team of the researcher's University. Different versions and prototypes were tried that inscribed different roles and communication modes into the design of the online community. The fourth iteration of the AR cycle included the review of four prototype versions before agreement was reached amongst participants that the online community would encompass the various elements identified in previous iterations. Relevance was a major issue and efforts were made to gather topics of relevance for the target

population before launching specific discussion themes. Relevance was also approached by setting the Website in XML thus enabling content management of the site and easy updating of contents. While access to the forum was totally public, posting on the forum required registration. The project manager attributed differential access rights according to the participants' level of participation, namely active contributors got promoted to higher status. Planning for trust building has proven a challenge as participants were not unanimous in providing full contact details while registering and some even provided pseudonyms. An additional action planning task was to collate online postings containing elements of online collaboration success examples.

7.4 Action taking and actor-network mobilisation stage

The launching of the Innovators Online Network's Website coincided with the release of a research report on entrepreneurship (Frederick & Carswell, 2001) and organisers of the website were asked to host online discussions on topics of relevance to the research report. Accordingly, some publicising of the online events was carried out, in partner websites and bookmarks with the Innovators Online Network URL were distributed at contemporary conferences.

Following acceptance and legitimation from group members, focal actors continued to seek legitimation from government officials. The Innovators Online Network group now offers a nationwide ongoing virtual communication forum with a growing membership and is located at: www.ion.net.nz. Activities

organised and planned by the group facilitating new projects included online fora, online mentoring events and applications for funding. The Innovators Online Network has shown that it can support nationwide communication channels through its website. The network's major challenge has been to maintain continuity in effort/interest and participation. According to the conventional understanding of online community functioning, the Innovators Online Network took two years to the milestone. Since inhibitors to the long-term success of such endeavour, relate to the ability of the group to sustain and fund ongoing interaction, success of the Innovators Online Network in obtaining such funding puts it in a good position to extend the network: repeated meetings with public servant and engagement with government bodies have finally produced the desired result of recognition and funding. Obtaining the Enterprise Skills and Activity funding was a definite sign of recognition at the highest level.

Hence the mobilisation stage unfolded as a result of the enrolment process - started at the previous stages - when official bodies accepted the existence of the Innovators Online Network and took it into account at higher levels, such as government level.

7.5 Evaluation

Two types of data were used to evaluate this iteration of the AR cycle: some graphic description of online community activity as well as follow up stories from members reporting on the value added of the forum in their business life. The

latter built on the thematic analysis that was reported with the second iteration of the AR cycle.

7.5.1 Widening the network online

Tracing the network activity showed that Website activity and posting numbers grew slowly but steadily. Figure 7-1 shows that the number of postings increasingly grew after a "critical period" (Markus, 1990) at the onset of the online activity. A "critical" period for an online group has been defined as the time where participation builds enough to ensure ongoing activity. Too few members at the onset of an online group will not generate enough activity to keep the group going and growing and online groups failing to grow fast enough at this early stage may wane. While at the network onset it is expected that few members will be posting most messages (as in Figure 7-1, first three months) this state cannot continue for too long and the group must rapidly build critical mass. This is because two few new messages will not hold the interest of existing members.

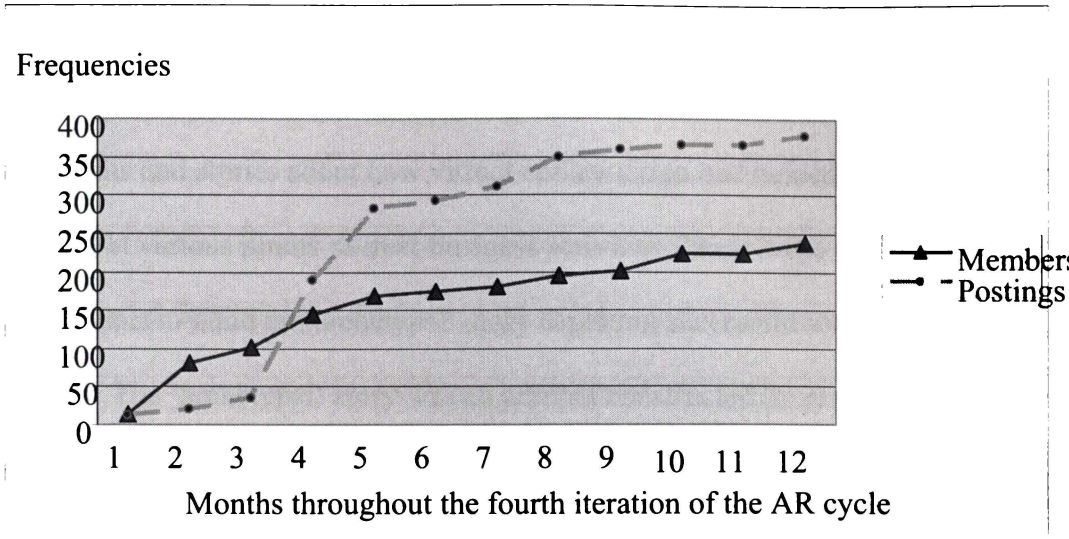

Figure 7-1: Ratio of postings and membership throughout the fourth iteration of the AR cycle

On the whole, membership of the online community grew to 231 members, 369 postings in 41 fora with ratios of posting and membership on an increasing trend (over 12 months). Three months into the fourth iteration of the AR cycle, the Innovators Online Network was asked to provide an online forum for a government led initiative encouraging high growth in Information Technology companies and membership grew to include another 120 members overnight. Tracing network activity over time, allowed constructing the representation of members' numbers and posting numbers as shown in Figure 7-1.

7.5.2 Construction of an 'archetypal' success story

Intertwined with contributions about the development of the group were comments and stories about how virtual collaboration had helped participants in the past at various points of their business activities. These were used by participants to build an 'archetypal' story depicting successful virtual networking activity. The 'archetypal' story was an artefact constructed by participants as a synopsis of potential advantages to engaging in virtual networking and as such did not claim to report a true happening but to represent what might be one. The archetypal story was constructed around some of the 'unique outcomes' collected. The archetypal story was organized according to the nature of the contribution and the point at which the virtual collaboration has made a difference in the networking process. Once the main themes had been identified, the unifying principle of the archetypal story to help other innovators see the benefit of virtual collaboration was used by the leaders in their 'public relation' activities, including publication on their website.

The participants themselves identified some of these main themes which they named and accentuated the last letters of the category when it rhymed with the name they had given their group - ION. This process was further refined during the data analysis stage at which the researcher formulated definitions for the themes and collated all such stories and sample quotes. The development of a group-specific language has been reported before in research on virtual teams that

showed that such teams create their own vocabulary or cultural metaphors as part of their relationship and trust development (Pauleen & Yoong, 2001b).

The virtual networking storyline theme and the different subthemes, definitions and sample activities that emerged are described in Table 7-1 below.

Main theme	Subthemes	Definition	Example of activity
Virtual networking storyline	MediatION	A group member acts as mediator for another	A group member mediated between a local university and the staff training section for one of the major oil companies. As a result, the company purchased a locally developed language programme followed by a subsequent purchase one year later. The university has now been invited by the foreign government to develop additional proposals for the provision of post-graduate academic programmes.
Virtual networking storyline	Members' collaboratION	Members collaborate toward a common goal	Two group members collaborated on a unique consultancy proposal to attract the interest of several government ministries and garnered a conference speaking invitation.
Virtual networking storyline	Offer of expert help	One group member offers his/her expertise to another group member	An offshore based group member offered a free hotdesking and business support service for any other member company that need to hub sales and support from this particular location as a gateway for new exports into Asia. This occurred as a result of one group member providing another member with contact details of an industry association useful for their marketing efforts offshore. Later, An expatriate group member, CFO for a

Main theme	Subthemes	Definition	Example of activity
			North American technology company with particular expertise in that domain, offered to rewrite the business plan of the member company to assist with marketing and capital-raising in that market.
Virtual networking storyline	IntroductIONs	One group member introduces a business opportunity to another	At least four well-connected group members offered to provide introductions to other members in respect of approaching venture capital firms offshore. In one case, within 30 minutes of posting the query online, one member company seeking directors for an Asian subsidiary company received the name of a trusted local national – thus saving significant resources.

Table 7-1: The virtual networking storyline description as a prototype online collaboration

In the examples reported in Table 7-1, participants reported online collaboration as an efficient tool to activate already established world-wide contacts and perceived added value to their networking efforts, from early stages of a business relationship to advanced stages of closing deals.

Qualitative material from the first and second iterations of the AR cycle provided stories of how online collaboration added value for the participants of the Innovators' Network. These stories were also published on the group's website. The stories were structured around the 'unique outcomes' that mattered most to the participants. These reflected the value of online collaboration, the nature of the contribution and the point at which the virtual collaboration has made a difference

in the networking process. The archetypal story functioned as a unifying principle to help other innovators see the benefit of virtual collaboration. The archetypal story was frequently referred to by the leaders online.

7.6 Specifying learning

In the 'big picture', the members of the Innovators Online Network group built (first iteration of the AR cycle), deconstructed (second iteration of the AR cycle) and re-built (second to third iterations of the AR cycle) a network, which they then expanded (fourth iteration of the AR cycle onwards). Actors selected technologies as allies or strategic partners at the different iterations of the AR cycle. Their general strategy involved finding and testing the appropriate technology for each stage of the network development, and thereafter endowed the allied technology as a powerful actor by socially constructing it as the best choice as standard. At this stage in the research process, it became possible to complete a fuller answer to the first research question about choices of online platforms. The data collected throughout this research shows that participants elected different online platforms, for different technological advantages at different stages of the network development.

At the third iteration of the AR cycle, participants' first challenge was to build their online network beyond the 'critical mass' milestone. The critical mass concept (Markus, 1990; Morris & Ogan, 1996) was defined as the number of people needed for an online community to be viable and to attract others. Critical

mass is a concept used to interpret online interactions (Ackerman & Starr, 1995) and success and failure (Rice, Grant, Schmitz, & Torobin, 1990). Preece and Maloney Krishmar (2003) however note that it is important to carry out critical mass evaluations for each online community. In their view, critical mass is hard to evaluate before the online community is launched. This is because participation adequate for some communities may not be for others as expectations may differ with community type. Hence, such evaluation is a necessary step to learn about online collaboration in each and every group starting online. The first three months registered little, albeit slowly mounting, activity then the group grew rapidly between their three-month and their five-month milestone.

This is, in action, part of the building process of the intensional network of the Innovators Online Network entity (ANT theory gives a 'voice' to a network made up of people and technology). Furthermore, as the various 'action' narratives were collected, this allowed the construction of an 'archetypal' story. This story represented a blueprint of the building of intensional links followed by the successful activation of the link: hence it presents not a story as it has been told, but builds on the knowledge accumulated on the activation of the intensional link toward the result of a business act. The continuum (introduction, offers of expert help, collaborations and closure) forms an archetypal story that can be used to explain (to sceptics such as the lurker participants) what the benefits of virtual networking are (as opposed to giving them a hypothetical vision in the future). In

this sense narrative method can be used as its best – as a change producing methodology (White, 1991).

Action Research analysis in this case would also look at earlier scenarios and their fates. In the present case, scenarios 1, 2 and 3 of the action planning stage were followed: alliances were made with the two 'closed' networks organisers and some projects are under way and future collaboration discussed (Scenario 1), a research proposal was put through for funding with the Research Consortia but it was not successful and a re-draft of the proposal was in progress (Scenario 2). Finally the Innovators Online Network is building a virtual communication infrastructure with help and recognition from a government body (Scenario 3). At first planning for trust building was not fully successful (some participants did not provide full contact details while registering or signed contributions with pseudonyms). Later postings, however tend to include more real names with contact details, stretching the possibilities of the online forum to become a networking tool in its own right.

Chapter 8: Discussion

The following chapter will extrapolate from answers to the research questions, using and extending core concepts of the theories reviewed. The chapter will expand on the literature review and build a proposed model integrating the findings into the Actor-Network Theory theoretical framework. The model represents the rise of virtual self selected leaders in this online environment to describe how online activity can contribute to social capital building. Firstly, leaders' role in 'virtualising' ANT processes will be examined, secondly the different ways leaders and lurkers re-authored narratives will be refined and finally the Intensional networking theory will be expanded.

8.1 Summary of the findings

The Results chapter described the data analysis done in order to answer the research questions as summarised in Table 8-1 below:

Answering the research questions		
AR cycles	Research question addressed or partially addressed	Overview of answers to the RQs
First iteration of the AR cycle: Online platform impact on group emergence	RQ1: "In what ways is group emergence impacted by different online discussion platforms?"	The email listserve platform translation was enrolled by focal actors to grow the network in its initial stages.
	Some data collected on early identification of leaders (towards answering RQ1)	The online contributions of the future group leaders were recorded and qualified.
Second and third iteration of the AR cycle: Factors affecting online collaboration and milestone in the network establishment	RQ2: ""What do participants perceive to be factors that enable or constrain online collaboration?"	Barriers to online collaboration first identified (time, irrelevance and trust) can be overcome through emphasis on relevance and trust building activities. Enabling factors were networking, aspirations, community belonging, communication channel, storytelling about virtual networking and building online trust. An enabling factor new to participants was reported: "Virtual networking" (the opportunity to make and use new business contacts online) was described as a value-adding property of online group participation.
	Some data collected on leaders' identification (towards answering RQ3)	The group legitimised its leaders in the face to face summit. These focal actors then carried on as the group's official spokespeople as well as stirring the network's direction.
	RQ3: "How did online leaders and lurkers describe the online experiences	Leaders' decisions to participate were (a) interest in making personal contributions to their country, and (b) the opportunity to raise profile locally. Leaders reported uncovering

Answering the research questions		
AR cycles	Research question addressed or partially addressed	Overview of answers to the RQs
	underlying their differing participation levels?	abilities in online facilitation and leadership novel to them. Active participants reported online interaction to have been value-adding by extending their networks. Lurkers were divided in their "belief in" the effectiveness of networking in professional settings with some describing experiencing 'silent commitment' to the group. This was expressed by their reluctance to participate online contrasting with some high face-to-face involvement levels.
Fourth iteration of the AR cycle: Widening the virtual communication platform	RQ1: "In what ways is group emergence impacted by different online discussion platforms?"	Participants decided to re-translate the scenario previously adopted with the email listserve platform. Focal actors enrolled a different translation (the Web-based one) to widen the network beyond its initial stages.

Table 8-1: Overview of the research questions and results

Connections between different iterations of the AR cycle are summarised below, showing how the different iterations combine to answer the research questions.

8.2 Answering the Research Questions

The following section will describe how the three research questions posed in this research were answered. Research question one was: "In what ways is group emergence impacted by different online discussion platforms?" The first iteration of the AR cycle provided the data to answer research question one. Inscriptions from the email listserve platform were found to be stronger than the Web-based

bulletin board ones in acting as a catalyst for the online innovators group. This was shown through the fact that more messages were generated through the email listserve than through the Web-based bulletin board environment in the first iteration of the AR cycle. Following this, participants of the former germinated the idea to create the Innovators Online Forum and all but two participants of the subsequent group came from the email listserve environment. The email listserve environment allowed for five individuals to engage significantly and develop high interactivity levels – this was further developed in the later iterations of the AR cycle, in analyses about virtual leaders. The strength of the inscription in the listserve was further supported by results in the second iteration of the AR cycle when online messages doubled as compared to the first iteration.

Answering research question one involved tracing sociotechnical networks through different online platforms and their cycles of translation. Clearly, different platforms offer varying advantages to different actors for various stages of network formation. The answer to research question one can be thus formulated as follows: an email listserve inscription was stronger and seemed to engage more participation than a Web-based bulletin board platform, at the stage of group formation. Participants in the email listserve initiated a process and gathered momentum for an idea, through the problematisation processes, allowing the group to move to the interressement stage. Additional indication of differential group engagement was in the fact that participants from the email listserve were the ones who proposed to carry on with the idea and eventually formally created

the innovators' network. Apart from the participants' choice to carry on using the one platform, the research data points to certain strengths of the inscriptions of one platform over another in this particular setting. Alternative perspectives might point out that it might be the groups' composition that determined participation or lack of thereof. This is less likely, however, because participants were randomly assigned to each group at the onset of the first iteration of the AR cycle. As pointed earlier, this analysis is done in an interpretive framework and so the aim of the study was not to carry out a comprehensive causal analysis of the two online media, but rather to determine participants' reactions and online experiences. After analysing their contribution, the strongest piece of evidence that can be reported is the listserve participants' choice to carry on their online discussion using one platform or another, during the first three stages of actor-network development (problematisation, interressement and enrolment). The fourth iteration of the AR cycle, which coincided with the mobilisation stage of the actor-network, however, brought about another choice of online platform, that of a Web-based discussion board, which participants found more adequate for large scale collaboration.

As participants interacted online on different platforms, the issue of the Innovators Online Network's long term financial survival impacted on actors' interactions, triggering some of them to search for business models that would be sustainable. Together with the Innovators Online Network obtaining government funding and legitimation, contacts with future users surfaced the need for another model of

online interaction, offering the advantages outlined during the second iteration of the AR cycle and remedying the disadvantages. This meant novel inscriptions (patterns of expected behaviours amongst users) were proposed, and accepted, that used initial translations obtained from potential users. This new model was coined "temporal online consultations" and will be developed in the Discussion chapter as an extension of the online groups section in the literature review.

Research question two was: "How did the participants perceive barriers and enabling factors to online collaboration?" The first and second iterations of the AR cycle provided material to answer the second research question. Thematic analyses of participants' contributions during face to face and virtual consultations delved deeper in some themes that were reported in the previous iteration of the AR cycle. Themes were grouped according to main themes and sub-themes emerging from the dialogues. The result of this iterative process provided a profile of information and commentary that was of priority to participants in the fora. Participants' translation of how these factors would act as inhibiting or enabling, fall into eight main themes and twelve subthemes.

Answering research question two was conducted in two stages: describing the translation of inhibiting factors and that of enabling factors. Results offered support for previously documented inhibiting factors of online collaboration: time, irrelevance and trust factors. Absence of the usual social cues that face to face interaction provides was construed as problematic. More in-depth discussion and

analysis showed that both of these could be alleviated. Time constraints decreased in power when relevancy of the material discussed online increased. This meant that the more interested people were in the online discussion and the more relevant the topics were to their business, the easier it was for them to make time for it. Trust was built online in this group, according to participants, who had started off as complete strangers with moderate initial levels of trust for each other reported that it was possible to build trust levels over time, as had happened for founders of the Innovators Online Network themselves, through online discussions and as other offline contacts started forming. The second part of the answer to research question two concerns the description of translations of enabling factors. The six main themes that emerged as enabling factors for online collaboration were networking, aspirations, community belonging, communication channels, storytelling and building online trust. The first theme concerned participants' beliefs about networking and the value of networking activity. The aspiration theme addressed business success and social entrepreneurship, a subtheme that leaders developed and acted upon as they did for the sixth theme – building online trust. This was explored more in depth with research question three that demonstrated how leaders discovered ways to build trust online that were new to them and got group legitimation in the process. Online discussions outlined how the inhibiting factors identified were overcome through emphasis on relevance and trust building activities within the context of participants' motivation to collaborate, such as community building and belonging. Leaders were active in this discussion and planned the trust-building

activities and community building activities that had been identified earlier as enabling factors to online collaboration. Leaders also used storytelling during interressement and enrolment stage. Enhancing factors, on the other hand, also concerned characteristics of computer-mediated communication previously identified as beneficial - community identity/sense of belonging and communication channels. Results of iteration one of the AR research cycle showed that online interaction acted as an enabler in itself, since participation in either of the online discussion fora was better at securing later online participation, than verbal commitment alone.

Answering research question two involved transcending the initial answers collected as inhibitors and enablers of online collaboration. This surfaced new interressement activities, used by actors to persuade other actors to join in pursuit of common goals, that reframed 'online connection' into 'virtual networking' described as the opportunity to make and use new business contacts. The material covered in participants' discussions allowed for the construction of the archetypal story of a successful business transaction completed through Intensional networks. These findings show that it is possible to explicate virtual networking through extension of Actor-Network Theory into the realm of Intensional networks. This was documented for the first time through descriptions of how and why contemporary knowledge workers build their networks of relations one node at a time as a resource for career development through online collaboration. Those participants who most contributed to the online discussions also perceived most

added value and benefits from online activity towards Intensional network building. The motivation to build on Intensional networks using computer mediated communication was documented for the first time through this research and will be developed in section 9-5 of the Discussion.

The third iteration of the AR cycle facilitated the group's inaugural summit and the official "birth" of the Innovators Online Network: Dialogues centred around group formation and strategy selection to overcome aforementioned inhibitors on interaction in web-based environments and creation of online channels. The material collected at this iteration of the AR cycle expands on the inhibiting and enabling factors of online discussions collected in previous iterations but this time with more concrete ways forward. This iteration also provided additional material on the group's recognition of leadership. It should be noted here that while the researcher participated in and facilitated the virtual discussions at the beginning of the research, she decreased the frequency and directivity of her postings as time went on to allow for the leaders to emerge in the group and create their own momentum. Defining leadership presence and activity in concrete terms so that it could be recorded as such throughout the research was, however, not a simple process, since leadership is a complex phenomenon. The present research relied on multiple types of data to study the leadership phenomenon in the actor-network such as the frequency of postings, the nature of their online and offline contributions and the way the actor-network evolved. Posting frequencies made use of numbers in a descriptive way, e.g. to show the extent of leaders'

contributions, rather than as 'quantitative' analysis measures. Research question three was: "How do online leaders and lurkers differ in deconstructing their online experience?" Results of the third iteration of the AR cycle also revealed that leaders and lurkers differed in their motivations for participating in online groups. Leaders described both personal (the opportunity to rise using new communication tools) and altruistic reasons (the desire to help innovators establish online fora). The other type of narrative that contributed to deepen understanding of online communication was those offered by lurkers. Most lurkers actually enjoy online contact with others, even if they leave few enduring traces of their activity online, but do not move on to the next level of human contact, as identified by participants – active networking. Studying lurkers' motives surfaced new knowledge about additional material than what was already known: that in some instances, lurkers fail to address the added value of online collaboration that others recognise.

Leaders and lurkers also differed in the unique outcomes they experienced during the online group formation, as reflected on re-authoring processes. Leaders reported experiencing or developing novel abilities for online facilitation, which lead to their re-authoring of the process. Lurkers, on the other hand, reported few unique outcomes or re-authoring processes, remaining sceptical as to the value adding characteristic of virtual networking. The challenge however is to help these actors see the value in virtual networking. This is where some social construction theories, such as the narrative one, can help plan desired change: if it

is possible at all for lurkers to change, this may happen after they hear other unique outcomes (for instance the research 'archetypal' story) and look at their story with new perspective, perhaps as a first re-authoring step. Leaders' and lurkers' motivations to participate in online collaborative groups are further developed in the second section of the Discussion chapter. More in-depth details on the particular roles played by the focal actors came from negotiating the answer to research question three. Narrative analyses of leaders' stories brought one unexpected phenomenon to the surface: that of social entrepreneurship. The focal actors that helped architect the Innovators Online Network revealed wanting to assist their country's innovators, in addition to furthering their own goals of business success. They offered much of their time and expertise without assurance they would gain from it and also modelled this by engaging in trust building behaviours. Such activity contributed to social capital as a whole, as the successful attainment of government funding showed. The research findings were summarised in an integrating model of collaboration in an online group extending social entrepreneurship theory as developed in a separate section of the Discussion chapter.

Possible ways to further build on advantages offered by online collaboration are exposed last – in narrative terms – and re-authoring as a change method is discussed in the context of the present research. Individual interviews were conducted with participants and narrative analysis of problem identification, dominant narrative, unique outcomes and re-authoring processes contributed in

answering research question three "How do online leaders and lurkers differ in deconstructing their online experience?" Three types of factors were addressed: the decision to participate at all, the decision about what role to play online and the reasons about the choice of roles. The decision to participate was different for leaders and lurkers. Analyses of leaders' narratives pointed to differences in deeper reflections underpinnings for emerging leaders and group participants in factors affecting online collaboration. Leaders emphasised (a) interest in making personal contributions to their country's innovators, and (b) the opportunity to raise profile locally offered by an online forum are detailed in case studies. Silent onlookers, on the other hand, were divided on their perceptions of the added value of networking. Two types of belief were expressed, some who "believed in" the effectiveness of networking in professional settings and others who did not, as summarised in the vignettes. Some participants told of feelings coined "silent commitment", described as reluctance to participate online, contrasting high face-to-face involvement levels. The decision about the online role played was expressed using different narrative concepts for leaders and lurkers, as shown next.

8.3 Actor-network development and leadership insights

Actor-network framework is about tracing the development of a sociotechnical actor-network, hence inscriptions and translations were recorded at the various stages of the actor-network emergence and of the enrolment process. The process of tracing the network development was done by "following the actors". Callon

(1992) called 'sociology of translation' the process that analyses the development and stabilisation of technology, integrating social and technological levels of the network. Successive iterations of the AR cycle during the development of the actor-network under study are represented in Table 8-2 below, together with the ANT processes associated with each stage of the research development.

Action Research outline		
AR cycles	Group activities	ANT Processes
First iteration of the AR cycle	Online conversations on email listserve and Web-based bulletin board platforms	Problematisation: defining a problem for which the solution is the very innovation process in which the actors are engaged in
Second iteration of the AR cycle	Online conversations on email listserve	Interressement: activities used by actors to persuade others to join in pursuit of common goals
Third iteration of the AR cycle	Face to face dialogues Individual interviews	Enrolment: distribution of roles in the network (started during second iteration of the AR cycle)
Fourth iteration of the AR cycle	Widening the network	Mobilisation: the result of the enrolment process at which point actors and processes become manageable entities noticeable and usable at government level

Table 8-2: Identified processes for each Action Research cycles of the study

Table 8-2 details the ANT stages of development (Callon, 1994): problematisation, interressement, enrolment and mobilisation to carry out an historical analysis of network-building describing how actors are called upon to

join the forming network and aligned. Each of the above ANT processes was described through the data collected at the corresponding stages of the study. The Actor-Network Theory, often used to describe the emergence of sociotechnical networks, was helpful in ordering and describing the findings. ANT was found appropriate to study innovation networks, whose emergence is typically characterised by complex webs of small activities and interactions. In the present research, ANT provided the 'meta' view of how to conceptualise what happened at the network level, as opposed to the individual level. The ANT patterns of actor collaboration through the traces (interactions, texts and exchanges) left on the network showed that some focal actors (leaders) could self-select in an email listserve environment. This self selection process did not happen in the Web-based bulletin board environment. In ANT terms, the email listserve environment allowed for stronger inscriptions for the initial stages of actor-network emergence, where complex decision making processes are at work. This may have been because of the real time impact of messages appear in participants' email inboxes, as opposed to participants having to make special efforts to log on to the Web-based bulletin board to check what the latest activity has been. Similarly, actor-network theorists include in their analysis, interactions between human and non-human actors, such as technology (Knorr-Certina, 1997; Law, 2000; Whitley, 1999). Latour (1991), for instance, refers to some software impact as "technoscience" and analyses its characteristics. In this light, the characteristics of the Web-based bulletin board, i.e. accumulation of organisational electronic memory, were not "strong" (Rose, 1997; Rose & Truex, 2000) enough to engage

participants in spite of the manufacturer's claims. For this early stage of online group emergence, it was not appropriate. Alternatively, online community researchers might describe the bulletin board quality in this intervention in terms of "poor usability" (Preece, Nonnecke, & Andrews, 2004). At the early stage of group emergence, the email listserve properties seemed to matter most to participants. This was further supported when participants chose to carry on interacting using the listserve, even after having been introduced to the alternative Web-based bulleting board. The Web-based bulletin board technology had stronger agency at the fourth iteration of the AR cycle though, when online interaction was aimed at the wider target population. In line with Law (1991) and Knights and Murray (1994) who consider that the ordering of actor-networks is "sociotechnical", the present analysis has shown how the social and technical aspects seemed to make differential contributions at different stages in the emergence of the Innovators Online Network. The listserve was chosen at the problematisation, interressement and enrolment stages and the Web-based bulletin board was chosen at the mobilisation stage of the actor-network emergence.

Early experiences at using specific technology or software influence users' experience, hence analysis of network formation and analysis necessarily benefits from collection of narratives from human actors. It follows, therefore, that such research should study each level, individual, group and organisation, and consider the interplay between them. Since language plays the double role of vehicle for understanding and transmission of these experiences (Taylor et al., 2001) the

choice of a type of discourse analysis was well founded. Preece and Maloney-Krichmar (2003) reported that the major changes regarding the technology/software supporting online interaction have happened since the Web became widespread in the 1990's. In their opinion, it is not the technological performance advances that are most significant but the way the technology is being used and who is using it. This emphasises anew that analyses occurring in online groups must take into account the interplay between humans and technology. Similarly, since translations and inscriptions act as balancing mechanisms for network development, there was a need to analyse them as the research progressed. This was addressed through thematic analysis (Owen, 1984) of texts recurring frequently in the participants stories - electronic postings and face to face meetings. On the other hand, elements of stories can be important yet occur seldom, or fail to be recognised as such at first. This is what narrative theorists emphasise as will be further stressed in section 9-4 of the Discussion.

The actor-network analysis was also conducted to identify the actors (the focus of this study was on leaders and lurkers as extremes in the continuum of online participation) and describe how they chose to collaborate during online discussions. After leaders and lurkers were identified, it was possible to compare their stories and motivations using narrative analysis for the roles they chose to fulfil during the formation of the Innovators Online Network. The first stage of development of the actor-network, as identified by Callon (1994) was problematisation. This was the stage where actors engaged others by pointing to

the predicament of New Zealand innovators perceived as isolated and in need for a common platform to interact. The interressement stage followed during which specific actions were performed by either of the focal actors, i.e. identified leaders, to convince others that their goals were worth of pursuit. In the present case, interressement-type actions were performed at this stage, but also throughout the development of the network and reported online or during meetings. One example of interressement activity was that of establishing alliances with certain groups whose objectives were in line with those of the actors, such as in the reported efforts to establish ongoing relationships with a newly formed expatriates association. Interressement activities are central to the survival of the network at this early stage because the network might not gather enough momentum to grow if this stage lingers on too long. This is one of the main ideas behind Actor-Network Theory: that 'allies' presuppose involvement of humans as well as technologies.

Network leaders indeed outlined that technology could act either as an ally (identified in study as "enabling" factors) or as an impediment (identified in this study as "constraining" factors). As each factor emerged in the discussion and participants categorised it as either an enabler or constrain, the actors included that factor in their translations (design processes of the future online platform). The focal actors who were the designers of the final technology platform also used inscriptions (to assign roles to participants through their use of the technology). Examples of inscriptions are the various roles that can be played in the Innovators

Online Network forum in its present form, where the administrator gives different levels (and access rights) to different participants, according to their centrality in the forum. In this sense, technology designers and innovators also design roles for humans, such as users, support people, or others using their technology to fulfil their roles. Making the technology work included making the human actors play the role designed (inscribed) for them. This exemplifies the way ANT theorists (Latour, 1991) conceived translations and inscriptions acting together as balancing mechanisms for network development, being constantly redefined through use of the technology.

Enrolment, the third stage of actor-network development, happened precisely with the distribution and allocation of roles in the network. The findings of this research outline the gradual emergence of the network through each AR cycle with participants leaving the network and new ones coming on. This was an ongoing self-selection system as leaders stirred the group to locate the appropriate actors that will create the knowledge and momentum needed at each stage. In this sense, ANT theorists describe innovation as a long string of - sometimes small - actions connected together (Callon, 1986a). In this online group, this happened as the group got interested in specific topics and actors other than the founding group members were sought after to join the group for potential valuable contributions. Mobilisation, the last stage of the actor-network development, was the end result of the enrolment process at which point actors (in this case leaders) and processes (such as communication platforms) became manageable bodies recognised at

government level. This indeed happened as the Innovators Online Network gained official legitimacy by becoming recognised by government officers as a new stakeholder group.

All interressement activities involved the dissemination of enabling factors as articulated during online discussions. Enablers were identified by the core group in their online discussions from the first and second iterations of the AR cycle. These were then elaborated upon, to attract more participants and convince others during the enrolment process. It is relevant to note that the constraining factors were not discussed further in the way enabling factors had been, perhaps in an attempt to strengthen the process of rallying more participants to the network. There was not enough in the data to surmise that the constraining factors were purposely played down to enrol more participants, but this would be a valid topic for further research. Enabling factors that were identified throughout the online conversations of the first and second iterations of the AR cycle and the postings of the fourth iteration of the AR cycle were further constructed through combining elements of different stories into the archetypal success story, a story that illustrated how online collaboration through the Innovators Online Network helped build intensional networks.

8.3.1 Proposed integrative model

The model developed below, integrates the findings emerging from the study into elements of Actor Network and Social Capital theories. This is particularly

relevant as Web-based interaction has the potential to increase social capital (Wellman et al., 2001) and as social capital has the potential (Prusak & Cohen, 2001; Stewart, 2001) to make the most difference to the future wealth of organisations.

Figure 8-1 pictures the factors at work in virtual leadership building, as they appear throughout the findings of the present research. It is represented in a pyramidal shape as a basis from which to design the leaders' and lurkers' online participation model of Figure 8-2.

Figure 8-1: Factors at work in virtual leadership building

The series of factors influential in the rise of virtual leaders in the group will be explained together with the next figure. Figure 8-2 is a model developed to represent the rise of virtual leaders in the Innovators Online Network as perceived by group participants.

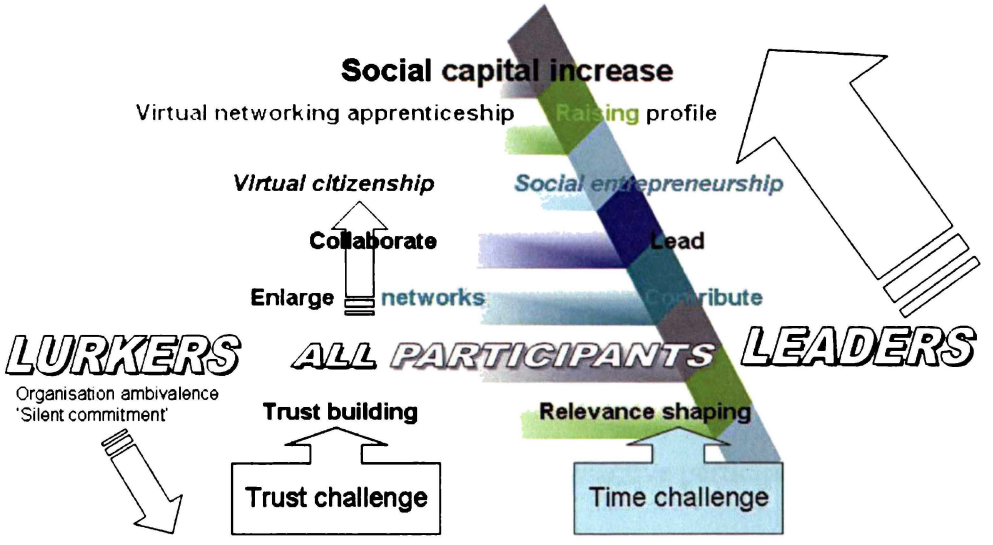

Figure 8-2: Virtual leadership as perceived by group members

In building the integrative model, the time and trust inhibiting factors to online collaboration were recorded first because they were the first encountered. These are presented in the model as 'barriers to online collaboration'. While the obstacles to online group collaboration are well documented (Ardichvili et al.,

2002) the present research adds to the knowledge in this field, embedded in participants' strategies to overcome these obstacles. For instance, time factors seemed to loose some of their constraining value as relevance of online interaction increased. Similarly, trust inhibiting factors decreased as trust building activities were set off to add to the "enhancing factors to online collaboration" level of the model. From this level on, the model shows how leaders and all other participants perceived their roles and what motivated the roles they chose. The lurkers are shown as playing a minor role while the rest of the participants, leaders included, could identify benefits to online collaboration. At a higher level in the model is the representation of the in depth analyses, showing that means of overcoming these obstacles were uncovered. This happened as participants articulated an added value of online participation: virtual networking. To the leaders there were important benefits to be gained from virtual networking: the opportunity to contribute, even from afar to New Zealand society, thereby gaining legitimacy and raising their profile locally. Figure 8-2 shows how active participants used the online channel: the latter offered them an opportunity to evaluate their networking habits, even to consider developing new ones to harness online power (Janson & Roper, 2004). Other than benefits on personal and professional levels, benefits that such virtual leaders can bring potentially extend wider in society.

Leaders identified in the present research displayed characteristics of social entrepreneurship: "people who realize where there is an opportunity to satisfy some unmet need that the state .... will not or cannot meet, and who gather

together the necessary resources (generally people, often volunteers, money and premises) and use these to 'make a difference'" as coined by Thompson, Alvy and Lees (2000, p.328). According to them, social entrepreneurs can either carry out social benefits type activities through traditional means or use creative and innovative means during their problem-solving process. As noted earlier, the virtual leaders identified in the present research bear the characteristics of social entrepreneurs, an old idea but also a newly researched phenomenon. The motivations that leader participants reported were concurrent with such definitions of social entrepreneurs. In a wider perspective, it is suggested to extend social entrepreneurship theory, and propose that virtual leadership has the potential to facilitate social capital building using yet untapped resources. Leadbeater (1997) stressed that there is a need to develop innovative forms of generating social capital and noted that social entrepreneurship is the future engine for real societal change. Since social entrepreneurs use social interaction to foster the latter, it is important, on the one hand, to help social entrepreneurs rise through novel channels, and on the other hand, to learn to identify them in the spheres they operate. As advanced by the latest research on virtual leaders (Yoo & Alavi, 1996, 2002) it would be expected that the phenomena of emergent leadership has duality (Giddens, 1999) as Structuration theory would conceive it. This would mean that emergent leadership is simultaneously enabling of and enabled by acts of virtual communication. Consequently, it is important for organisations to learn to identify virtual leaders – who can rise and contribute to the organisation through communication channels other than those typically used by conventional leaders.

Their identification carries with it the potential to uncover new social entrepreneurs while building momentum to reach the action stages sooner. As shown in the present study, throughout online interaction, group members simultaneously build up commitment to their ideas, cohesiveness to carry out team projects and high levels of internal motivation to put these into action. There is the possibility of gaining, as in the present case, government recognition and funding. This research extends the social entrepreneurship theory by describing the motivation at work planning for social entrepreneurs, and as happened in the fourth iteration of the AR cycle of the present research, to strive to increase social capital (Nahapiet & Goshal, 1998).

8.3.2 "Virtualising" ANT processes

While Actor network theory was not specifically developed to apply to computerised networks and to account for online behaviours, we may ask the question: can ANT processes be 'virtualised'? The virtual leadership building model comes to explain how these processes were carried out online. The bottom two levels time and trust challenges were dealt with by first problematising the issues through online group discussions.

Problematisation represents one facet of relevance shaping theme identified by participants in discussions: an issue can only be problematised successfully if it is highly relevant to actors. Virtual leaders used online discussion groups to do so and a Listserve environment seemed to have worked better to rally people around

issues. Trust building is an activity that was singled by participants as important from the beginning of the network. Yoong & Molina (ref) outline leadership, belief in collaboration and trust as relevant themes in their analysis. They emphasise the role of the leaders in encouraging knowledge sharing and innovation by building trust. In the present research innovators carried out this trust building activity online. Yoong and Galluppe (2001) demonstrated through the "Grounded Action Learning" method they devised how face to face facilitators were taught to facilitate online through direct experience and active reflection on their learning. We also know from the transformational leadership literature (Avolio and Luthans, 2005; high impact leadership) that transformational work involves trust building from very early stages on. Trust building is also one likely precursor of authentic leadership development. Similarly, transformational leaders may need to understand how to inscribe behaviour into the network that corresponds to or builds on followers' own motivation.

As represented in the virtual leadership building model, next ION leaders virtualised enrolment. All participants motivation, at this stage, revealed that engaging in ION was done with ulterior motives to enlarge their networks (this issue will further developed in section 8.4). Virtual leaders invested energy to show their followers that collaboration would indeed lead to them achieving their goals to enlarge their networks, pre-empting followers' "what's in it for me?" questions. Virtual leaders, however, had additional motivations: to contribute to the greater good of New Zealand innovation. As one would expect in actor-

network formation, the political activity of certain participants, and that of the leaders in particular, strengthened the size of the network and the relationships between actors. The network leaders enrolled resources and commitments to ensure the longevity of the network, and revised core group structure. Leaders also attended to the non-human network actors by ensuring the network is accessible by most computerized systems and provided with ongoing support. Lastly, leaders filed for and received, through online application processes, external funding to provide legitimation. Funding, as the one obtained through the government grant to support Enterprise Capability, was not a passive resource. It the case of the Innovators Online Network, it was rather a very active non-human actor.

Specific to the innovators online network was the online activity that strengthened the network and that can be conceived of as 'virtual' mobilisation. Virtual leaders designed and strengthened inscriptions that supported mobilisation. The innovators' network encouraged enrolment in the new network by making explicit the action of sharing stories of success, first on an informal basis, then through the construction of the archetype story of virtual networking. Actor network theory emphasises texts as critical to the process of gaining credibility because of the ease at which they travel across time and space and can be combined with other work. This takes on particular meaning when texts are produced and disseminated through cyberspace. Participants' accounts, for instance, about how virtual networking enhanced intensional networking were used by the leaders who

developed a 'virtual' type of interressement, i.e. appropriate to the online medium. Hence, what actors produced to gain credibility was often one and the same that strengthened the network.

It is in sharing personal dilemmas that have applicability to others that enduring lessons about leadership can be learned, trust can be built and bonds can be strengthened between a leader and other employees in the organization. In order to be powerful, stories must combine hopes with fears and reflection with action. Stories told authentically can provide a compelling way to contribute to strengthening group culture and values.

8.3.3 Re-authoring narratives: a leadership capability?

As emphasised earlier, narrative methods of enquiry carry within them the potential to re-frame and facilitate change. In the act of narrating, participants can better reflect and understand themselves in the roles they choose to play, and possibly trace reasons for their choices that may not have been fully uncovered previously. This has been conceptualised as participants being more engaged in the present via narrative interview (Bird, 2000). Information systems researchers have recently begun to recognize the ubiquity and value of narratives. Through the use of narratives, Brown (1998) explained how organisation members create meaning and gain political advantage during an IT implementation and Brown and Jones (1998) examined people perceptions of a failed IS project.

As shown in the Results chapter, in the actors' narratives section, some re-authored (leaders) and others did not (lurkers). Lurkers showed difficulty re-authoring: one vignette described an identified problem that could not be re-authored, possibly because of lack of clarity about the participant's organisational support of online collaboration. Another vignette described how a lurker reverted to known face to face channels of communication - his identified problem - only with slight - the beginning of re-authoring? - progress. He described his participation as having been "actively passive". Leaders were successful at re-authoring – in one vignette the identified problem (difficulties to get computer-mediated networks going with his previous venture) was re-authored because the Innovators Online Network provided the leader with an opportunity to rise as a leader; in the second vignette the identified problem - initial isolation - was re-authored as the leader discovered online abilities he did not know he had. Leaders also reported uncovering abilities in online facilitation and leadership novel to them. Participants' motivations behind the levels of contribution were described through the elaboration of "virtual networking", a new idea for participants. Participants that contributed most to online discussions did report "virtual networking" as value added to the online process by extending the reach of their networks. This supports the view that narratives aid individuals in making sense of equivocal situations (Taylor & Lerner, 1996; Weick, 1995) and shows that narrative concepts borrowed from the therapeutic field are useful in conducting research in organisations (Barry & Elmes, 1997). This is possible because, as Barry and Elmes (1997) show, narrative models encompass complex language

elements used to construct meaning and direction (using past, present and future elements) in strategic discourse. When confronted by unclear situations, people will always tell a story to clarify and explain. In other words, narratives allow participants to bring order to what would otherwise be muddled situations or to bring order to what would otherwise be very "messy" situations. More generally, some theorise that storytelling is the "preferred sensemaking currency of human relationships" (Boje, 1991, p. 106). As David Barry (1997) notes, the transformative power of the narrative approach is particularly potent with individuals and small groups. The present research showed how, in addition to representing human understanding and experience, narratives also functioned as a tool of persuasion. This supports Mumby's description (1987) of narratives as politically motivated production used to create believable explanations for the teller's actions. In an effort to convince the audience, the teller may mix and juxtapose narrative genres (Reissman, 1993). In the present research, for instance, stories were collated and juxtaposed with some hypothetical narrative elements to distinguish "what is" from "what could have been." In general, different genres, with distinctive styles, are modes of representation that are selected and invoked by tellers for different reasons and vary in their power to persuade and emotionally involve the audience to understand the teller's point of view" (Reissman 1993). The present research has consequently outlined the potential for re-authoring to be used in a process that may help the rise of self-selected leaders.

While leaders described experiences of self-discovery and recorded change in their online experiences, this did not happen with most lurkers and only partially with one. The participants in the group who did experience re-authoring were however, determined that others, including more sceptical peers, should at least consider the potential of virtual networking and set out to construct the 'archetypal' story to publish it on the Innovators Online Website. This is consistent with Davidson (1997) who used narrative analysis to examine sensemaking and interpretation during an IS development project. Dube and Robey (1999) also used stories as a symbol of organisational culture during a software development project.

With this, participants to the Innovators Online Network hope to use stories as not only communication tools but they also build on their transformative power and use online communication tools to spread the reach of their intensional network further.

8.3.3.1 Virtual leaders harnessed the power of self-narratives and storytelling

Answering research question three: "How do online leaders and lurkers differ in deconstructing their online experiences?" also showed how participants self selected to rise through online channels. The emergence of virtual leaders was described in the second iteration of the AR cycle, in relation to the number and type of their postings. These focal actors gained power and sought initial legitimation from group members. The Actor-Network Theory (Latour, 1987) is a

useful frame of reference to understand this phenomenon and used by Walsham (1997) for research in information systems. Since ANT focuses on actors rather than issues to understand how a particular new issue domain originates, it was well positioned to understand how technology impacts on the play and replay of social relationships.

While conventional leadership has been studied extensively, 'virtual leadership' is a novel phenomenon (Avolio et al., 2000) developing concurrently with computer mediated communication technologies, possibly requiring a different set of communication skills. This could entail the use of novel communication means for network building. Virtual leadership is thus developing ahead of our knowledge of the unique features of virtual teams (Pauleen & Yoong, 2001b). The present study documented the spontaneous emergence of virtual leadership and the means by which leaders can harness online communication. This manifests in an online forum to self-select, self-organise, gain legitimacy through action, open new venues for creative activities and demonstrate, sometimes to their own revelation, their abilities to engage wide-ranging audiences.

How different is virtual leadership from conventional leadership? This is a significant question for ongoing research. There are some comparative elements that should be noted. Virtual leaders have been described as motivated by altruistic motives more than other community contributors for whom personal visibility and social relationships derived from online participation may be more

salient (Butler et al., forthcoming). The virtual leaders described in this study, while indeed motivated by altruistic motives, also reported significant personal visibility motives underlying their self-selected leadership choices – a personal visibility which they enacted for the first time. Whereas they had previously attempted to rise and lead through conventional channels, they had not reached the leadership levels to which they had aspired. They had previously attempted to lead various ventures but with limited or no success. Leaders who rose through the online group selected themselves by deciding how much to post and how to formulate their contributions. The online gathering provided the self-selected leaders with a forum and communication channels which they recognized as an opportunity not available beforehand, granting the group the use of social interaction to achieve its goals (Giddens, 1984). In a sense, they 'self-fulfilled' their prophecy of success by rising to the task where they had previously failed, modelling to others as to how they too could benefit from virtual networking. By constructing stories that addressed different facets of followers' needs, the virtual leaders harnessed the very power of storytelling described by Denning (2005).

The initial purpose of the present study was not necessarily to draw a comparison between conventional and virtual leadership, but rather to offer an in-depth, albeit exploratory analysis of virtual leaders thus exposing possible complementarities between traditional and virtual leadership communication styles. The virtual leaders interviewed in this study stressed that only through online channels were they able to rise as leaders, given that their previous attempts to lead by traditional

(face to face) methods had been unsuccessful. Hence, the phenomenon described in this thesis is not one of novel leadership. Rather, virtual channels possibly provided these leaders with novel environments and opportunities in which to follow their mission, thereby increasing social capital for their country, as discussed further in the following sections.

8.3.3.2 Lurkers are 'actively passive'

The present research outlined how some silent onlookers 'believed' in the effectiveness of networking in professional settings, even if they could not engage in it themselves, however others did not. The former presented some interesting characteristics that some described as feelings of being 'actively passive', that is reluctance to participate online contrasting high face-to-face involvement levels. Although these lurkers reported modest re-framing which took place on a much smaller scale than leaders, such as value adding perception of virtual networking, no lurkers experienced re-authoring processes as such during the interviews. There was therefore, some awareness amongst lurkers of the benefits of engagement in such groups. Lurkers, however, experienced difficulties relinquishing their dominant stories and thus did not experience the unique outcomes necessary to initiate re-authoring processes. An additional factor emerged in this study: non participants classified themselves into two categories as far as going one step further in the networking theme: believers in active networking, but did not see online participation as a form of networking on the one hand and non-believers in any form of networking as beneficial professional

activity. There is a need to extend theory to explain these phenomena to include the variable - perceived value of networking.

Kollock and Smith (1996) called this group the "free-riders". Since then, definitions vary all the way to seeing lurking as a normative phenomenon as do Nonnecke and Preece for instance (Nonnecke & Preece, 1999; Nonnecke & Preece, 2003). These authors portrayed lurkers as passive participants who do feel a sense of community. Similarly, Community of Practice theorists view different forms of participation –amongst them 'peripheral participation' (Lave & Wenger, 1991). As stories of a different nature emerged from the present study 'silent commitment' was documented as an additional inhibiting factor, adding to those put forward until now (Preece et al., 2004). The findings of the present research support Cheney's (2000) descriptions of different organisation-participation modes including participation realised through 'active' non-involvement in some contexts. Cheney traced such unusual findings to the strengths of interpretive research, stating that other research designed to define participation might overlook the very data conducive to reaching such conclusions. Interpretive researchers, on the other hand, welcome the possibility that organisational concepts under research, such as participation, might bear multiple meanings within organisations and that a somewhat 'non-participation' can in fact represent one form of participation. This research also shed some additional light on lurkers' decisions about the online role they play, possibly documenting new inhibiting factors to online collaboration. One lurker could not change his

participation level because he was receiving unclear (equivocal) messages from his organisation (Weick, 1995).

From a narrative perspective, there is the additional point that agreed stories may be covert and considered 'insider knowledge' including 'business secrets', which is knowledge that should remain within the organisation. In the context of 'products and services' more and more distinguishable by the 'knowledge work'(Gee, 2000), these narratives fulfil an important function: they enable the members of a business organisation to articulate their competitive advantage. Such stories are communicated to workers in the organisation, but usually not revealed to non-members. Consequently, what appeared first as an 'individual' lurking phenomenon was actually a manifestation of negative organisational attitude to collaborating and sharing. Attempting to decrease lurking under such circumstances would necessarily involve action at the organisational level. Another lurker demonstrated high involvement in the face to face process contrasting with inability to carry out this involvement online. In such cases, individual training including experimentation with online means and follow up might help demonstrate to participants how they too can benefit from developing online communication skills. This process could greatly benefit from the same narrative methods of data collection and analysis to follow re-authoring processes as they emerge. This process could also benefit from disseminating the 'archetypal stories' that contain narrative elements of success to act as examples as previously shown.

8.4 From actor-networks to Intensional networks

While drawing from Actor Network Theory to explain group processes, the present study also points to elements of the micro level of communication in social networks such as drivers and inhibitors to online collaboration from the actors' perspective. This contributes toward filling some of the gaps left by social network analyses (Wellman & Gulia, 1999). The latter, as seen in the literature review, have produced much broad quantitative data, mapping networks and tracking knowledge paths and community interaction patterns at the organisational level leaving out a significant proportion of information exchange happening lower down in the system.

The second research question "What do participants perceive to be factors that enable or constrain online collaboration?" revealed some previously documented constrains time/irrelevance and trust. It also documented how 'virtual networking' defined as networking with virtual tools acted as an enabling factor (or "interressement" in ANT terms). As this was discussed in a 'public' forum, it is not surprising that the formulation of this concept remained general. It was not until later in the AR cycle that the same theme emerged from the analysis of the in-depth interviews, later iterations in the AR cycle, point to 'virtual networking' as one factor differentiating between the different types of online group members – leaders, participants and lurkers. On the topic of 'virtual networking', these individuals had very different beliefs and actions. They differentiated themselves

in the amount of personal benefit or added value they perceived they would gain from posting. Active contributors to the online discussions, self selected leaders and participants viewed virtual networking as added value to their participation in the online group. A significant point to notice is that virtual networking was also a factor in lurkers' decisions to not post. This was a particular contribution of the methodology used in this research - uncovering a new interressement towards online collaboration.

As commonly mentioned in the literature (Kimble et al., 2000), face to face interaction reinforced the formation of the network by providing a conduit to legitimise the self selected leaders, and reinforced patterns and decisions made online. A focal actor, in ANT terms, was formally chosen to carry through the group's decision and bring the Innovators Online Network to new interaction levels and nationwide exposure. This focal actor did indeed carry that role through, meeting with government officials and becoming a recognised player in the government's agenda of growth and innovation. A different direction for the network-building activity needs to be constructed, since in the four case studies, narrative analysis emphasised that individuals took upon themselves to build their own networks. Each had different stories and motivations attached to this activity: one participant described his inability to rely on his organisation's networks, another described how his organisation was sending mixed messages about participating in network activities, a third knowledge worker who exercised professional activities from a home-office described his isolation, and another

participant described himself as a geographically isolated expatriate. This is congruent with Nardi, Whittaker and Schwarz' explanation of Intensional network term (2002)

> *We chose the term Intensional to reflect the effort and deliberateness with which people construct and manage personal networks. The spelling of the term is intended to suggest a kind of tension and stress in the network. We found that workers experience stresses such as remembering who is in the network, knowing what people in the network are currently doing and where they are located, and making careful choices from among many media to communicate effectively with their contacts. At the same time, Intensional" also suggests a "tensile strength" in network activity; we found our informants endlessly resourceful and energetic in their everyday collaborative activities within their networks (paragraph 11).*

Paradoxically, these authors concluded that the focus for networking analysis of Computer-Supported Collaborative Work is not at the group level but rather at the individual level. The importance of Intensional network building skills increases with the levels of complexity required to fulfil work tasks. One might expect that individuals would need to rely on their networks to accomplish many of these.

Emphasis on team work is still to be expected, however certain tasks call for individual emphasis. As participants in the present study were individually interviewed during the fourth iteration of the AR cycle, it was both pertinent and feasible to collect stories on the reasons for participating and the participants' underlying motivations. It was not so much the participants' posting or non-posting behaviour that was investigated there, but their underlying beliefs about the usefulness of posting for themselves and others. This allowed for rich material to emerge. Virtual networking was found to play an important role for all participants – even lurkers' decisions to not participate were coloured by their underlying lack of belief about the effectiveness of virtual networking. Leaders, on the other hand, were passionate about the positive impact of virtual networking and recounted their impetus for driving the group forward was partially due to their deep beliefs on the positive impact of virtual networking. Virtual networking can therefore be considered as a significant force driving the construction of Intensional networks to run or perhaps one component of that engine.

The present research addressed a gap identified in the literature review and extended the findings from the Nardi, Whittaker and Schwarz study (2002) who did not examine how the knowledge workers in their studies used online channels to build their Intensional networks. Participant's descriptions of their Intensional networks-related activities contributed qualitative insights to this body of research such as actors' motivations and the beliefs about networking that underlie their activities in this domain. Intensional networks can extend widely encompassing

activities toward a common objective, and understanding of how particular subsets of people's networks can be activated as needed is essential. The present research also extends findings reported in the context of the resource formulation (Lin, Ensel, & Vaughn, 1981) of weak ties (Granovetter, 1983). Lin, Ensel and Waughn formulated a 'resource argument' that one major contribution of weak links may be in those situations where people can get in contact with others, through weak links, who can offer greater resources. Constant, Sproull and Kiesler (1997) found support for the resource argument, reporting that information seekers gained valuable technical information from information providers through an intra-organisational online network in a case study of weak-tie sharing. The present research findings indicate this may be the case also for the usefulness of weak ties between participants of multiple organisations and in the context of 'networking' professional information in Intensional network building.

Miettinen (1998) found the open-endedness of an actor-network insufficient to comprehend joint work. Intensional networks, on the other hand, can offer such direction. Intensional networks also address two key challenges in today's knowledge economy. Firstly, they offer individuals a personal resource toward the advancement of their own careers. Secondly, they offer a vital resource for organisations, a pool from which to recruit workers and partners, a preferred channel to achieve corporate goals of organisational planning and implementation. The 'archetypal' story constructed in this research builds on the manner in which these networks are built and used. Hence, 'virtual networking' possibly represents

how new (virtual) channels can be used to implement old (networking) ideas. 'Virtual networkers' may consequently be a new breed using old tricks.

8.5 Leaders 'black box' alternatives online collaboration formats

"Black boxes are created when "many elements are made to act as one" (Latour, 1987, p.131). Two universities donated support towards the development of the technical capability of the network. This support was "black-boxed" during the third iteration of the AR cycle. Initially, the Listserve online environment had sufficiently supported interaction between tens of participants, allowing them to develop strategies and policies permitting enrolment into new networks then strengthening these new ties. The growing network, however, had growing technical needs, involving more and more technical personnel. This fact became more prominent during the enrolment and mobilization stages when the network grew to more than 700 human actors. The technical robustness of the web-based environment was to be critical to the success of the mobilisation phase. This process must include the reconstruction of knowledge such as the storytelling exercise.

The first two iterations of the AR cycle also outlined the fact that even at an early stage of online collaboration, ties formed between human actors triggered generative activity and had potential use for Intensional network building. During the course of the Innovators Online Network, participants realised, some for the first time, how meaningful online collaboration could be to them. This brought

about new dimensions in their perceptions of the potential uses for online interactions. Balancing between factors that enable and constrain online collaboration, participants devised an alternative to conventional online groups that interact online in an ongoing manner: temporal online consultations lasting for short periods of time. Supporting this alternative is Cheney's description (2000) of how some researchers have used Social Network Analysis to account for relationships, communication and shared meanings between people in organisations and how attention has been directed to "interpretive diversity". Cheney recounted however, that it was not the amount of communication, rather the similarity between communication patterns that best predicted shared interpretations of the organisation's mission and that such research showed that most shared meanings were assumed rather than constructed by participants. Cheney emphasized the contributions of such research and called for further enhancement through analyses of language use within the systems. The research frameworks used in the present research brought to the fore such original findings thus allowing for new emphasis. It also sanctioned an alternative to ongoing, long-lasting online interaction – the 'temporal online consultations' alternative which emerged to optimise benefits from online participation.

In terms of the Innovators Online Network's (ION) attempts at online network building, using the conventional framework for online community participation, the Innovators Online Network has relatively succeeded in building one. When business models (scenarios) were scrutinised, one appeared most sustainable to

the aims of similar groups. 'Temporal online consultations' have been designed by ION as short term online discussions where groups come together to address specific issues. Temporal online consultations are now offered to organisations needing to carry out consultation processes as a complement to conventional consultation. This model was preferred by the latter organisations, rather than a model dictating that these organisations sustain permanent, ongoing, online communities on their website. Some contracts for ION have been secured with official organisations for the latter to organise and moderate such online discussions for short defined periods of time. In order to implement and put into practice the results from the third iteration of the AR cycle (that the Innovators Online Network develop a platform to connect New Zealanders involved in innovation), the existing online community model could be modified and developed into the 'temporal online consultation' alternative. Kimball (as quoted by Pauleen & Yoong (2001a) predicted that should this development succeed, actors could develop "culturally appropriate metaphors" or new 'patterns'. In the present case, this could mean, for instance, plan online consultations in addition to conventional modes of consultations to discuss specific topics. Temporal online consultation alternatives will attend to the factors described throughout this thesis – overcoming known and new inhibitors as well as building on enhancers to online collaboration, as shown below:

Firstly, a temporal online consultations alternative will effectively address the time/irrelevance inhibitor (first and second iterations of the AR cycle). Online

consultations are distance breakers, allowing more people to contribute from remote parts than do face to face only consultations. More interested parties can contribute their ideas (as opposed to random telephone surveys, who can reach remotely located but not necessarily interested individuals). Their asynchronous nature allows for people to participate in their own time, thus helping to cope with time constraints factors. Secondly, a temporal online consultation alternative will effectively address the time-bound aspect of the online consultations and the problem encountered by virtual communities in the 'communication plenty' paradigm. This is because there will only be as much communication as needed and where needed. Conversely there will be no 'need' to upkeep the community (fourth iteration of the AR cycle), or keep it going by using techniques described in the online communities chapter. This would provide an important service to small and medium or government organisations who have to carry out consultation processes but who cannot put in more resources in keeping an online community/channel open in addition to their information dissemination website. Thirdly a temporal online consultation alternative will effectively address the trust inhibitor: Temporal online consultations would be marketed by interested organisations, who would let their usual members know to come online, these people would possess some amount of legitimation and this may help the trust factor (first and second iterations of the AR cycle). This alternative proposed by the Innovators Online Network was adopted by the organisations approached, and perceived as more sustainable and value adding than the old paradigm of ongoing online communities. These organisations then carried out temporal online

consultations when they needed to consult their members or stakeholders via the ION website. Hence, in narrative terms, this study allowed for a 'reframing' of the initial 'virtual community' model into 'temporal online consultations' for innovators subgroups.

8.6 Leadership as "boundary object"

What leaders had not managed in the "conventional" face to face environment, they accomplished in the online environment, which supports examining the concept of leadership itself as "boundary", conveying it is a concept that may take on different meanings in various contexts but whose structure bears enough common elements for them to travel from one context to another. This constancy within change is a fundamental process in maintaining coherence within chaos.

Carroll developed the notion of leadership as a boundary object as follows:

> *"Boundary objects can be things or ideas (like leadership as a concept...) that both preserve difference but still move towards creating a greater identity. A boundary object then has to be fluid and plastic because we all attach our own meanings to concepts (...) but they have to be robust enough to enable enough common ground to have a conversation. In other words they are both a boundary (what separates people) and a bridge (what enables people to at least engage with each other). The*

> *whole point of them is that the world (even our own self constructions) is increasingly being seen as too complex to be able to achieve 'shared' meaning in any real sense." (Carroll, 2005).*

Virtual leadership, another concept that is emerging and developing simultaneously with technological development may have such unifying or bridging action. Much knowledge has been gained in the workplace environment where established leaders, who have been bestowed power and authority by top management, have led virtual teams. The present study, however, adds to the understanding of how self selected individuals lead a group of voluntary participants to organise themselves and produce action of a specific nature.

Chapter 9: Conclusion

This chapter will formulate concluding remarks about using the Action Research method together with the thematic and narrative analyses frameworks. It will also summarise key contributions of this research and list its limitations.

9.1 Appropriateness of the use of the Action Research method coupled with thematic and narrative analyses

Overall, the research and analyses methods each had their own contribution to this particular research. To the researcher's knowledge, this particular combination of research and analysis was used for the first time for this research. It allowed for new knowledge to be gained. Action research, for a start, fosters involvement of the researcher in the research process and necessitates collaboration amongst participants (Baskerville & Wood-Haper, 1996; Peters & Robinson, 1984). Indeed, in this study the researcher and participants worked in collaboration to carry out the study. There were no inherent conflicting interests between researcher and practitioners, against which Baskerville, Avison and Myers (2001) warned. As recommended by Elden and Chisholm (1993), the virtual leaders/practitioners became 'co-researchers', inasmuch as they contributed in the planning and implementation of activities. The iterative nature of the action research process suited the very character of innovation networks development. In retrospect, it was a good fit to use action research methodology, which displays enough flexibility to be able to carry out a project without being able to map out all hypotheses at the start, yet sufficiently stringent as an empirical endeavour. This was especially possible due to the use of the interpretive framework. As

Cheney (2000) noted, an important part of interpretive research is for the researcher to "understand key moments in his/her developing relationships with the organization under study" (p.20) and "reflect ... on the entire research enterprise, looking well beyond her own endeavours" (p.21) to finally include these reflections in the research commentary. As such, this represented a good fit with action research where a partnership between researcher and practitioner is not only taken into account, but also encouraged during the entire course of the research.

Thematic analysis allowed for the emergence of themes common to group participants. What participants disclosed less in a group setting were their personal experiences and motivations for choosing to either lead or lurk online. This material was accessed through individual interviews in a narrative framework, allowing reflection and generation of new conclusions throughout the interview process itself. In this sense, the narrative method offers an interesting complement to the thematic approach. The thematic framework allowed for the extraction of major themes through the constructs of recurrence, repetition and forcefulness. This type of analysis addressed the communication that took place at the group level, through online postings to all. The narrative framework, on the other hand, provided a different perspective – that perceived as salient by the actors about their experience, not necessarily that representing a consensus level of those themes that recurred, were repeated and forceful. Narrative analyses (Epston & White, 1989; White & Epston, 1990) were used to identify deeper

motivational content and reflective processes of the identified leaders and lurkers. The narrative analysis core concepts used were: Identification of "dominant narrative" and identification of "unique outcomes" that contradict problems identified in dominant narratives, albeit of considerably less frequency than the identified problems and tracing of "re-authoring" processes. This is where actors reconsider the previously identified problem and start on the process of defining new successes. The two discourse analysis methods complemented each other in various ways, conceptually as described above, but also in enriching each other's conclusions. Narrative analysis, for instance, enriched some of the main themes, e.g. beliefs about the value of networking and success aspirations, and subthemes, e.g. networking modes and levels of participation and social entrepreneurship, uncovered in a previous iteration of the action research cycle by thematic analysis. Overall, there was some level of correspondence between the recorded stages of development of the actor-network and the various iterations of the AR cycle, as seen below, apart from the fourth iteration, which involved in-depth interviews with the actors to find out what motivated them to chose either a leader's or a lurker's role. In other words, the particular way leaders approached the online challenge and used unique outcomes to re-author their experience could only be accessed through an analysis method that would consider few and far between "unique outcomes" as legitimate research data and not discount them on the account that they are not representative. Because of the exploratory nature of this research on self-emerging leaders in an online group, and because the stories of leaders call on highly individual mechanisms, it was necessary to use analysis

tools sensitive enough to capture novel material, even if it appeared in "small doses". Faithful to the overall interpretive approach, the researcher is immersed in a stream of collective and personal events in an inductive attempt to identify salient themes and create categories (Putnam, 1983) elaborated through interaction and integration of data with interviewees (Epston & White, 1989). The combination of the Action Research design – where the researcher initiated the group – and of the narrative analysis methods also allowed greater in depth documentation of lurkers online experiences, allowing for instance to describe the 'silent commitment' phenomena. Since the researcher had direct access to all participants in the study, this enabled detailed description as to how lurkers can be 'actively passive'.

9.2 Limitations of the research

The first and most obvious potential limitation of the study was its sample size: the group studied was a relatively small sample of the New Zealand innovators' population. Thus results are not to be generalised to innovators as a population.

A second limitation concerns the methodology used. From the interpretive standpoint that informed the data collection and analysis, what was sought was the production of different perspectives on the issues of online participation, not generalisable rules. In concrete terms, for this particular investigation, the narrative standpoint emphasises the production of "unique outcomes", outstanding

events rather than normative or frequent occurrence, and does not seek to draw universal conclusions about phenomena under study.

The third limitation concerns the specific skills involved in the research procedure. Firstly the interviewing skills (Bird, 2000) needed to carry out the types of narrative interviews described are specialised. Alvarez (2001) notes that since narrative interviews are so appropriate to collect the perspectives of information systems users, there is a challenge to researchers to acquire skills to conduct such specialised in-depth interviews where they would not stand aside from the stories but rather experiment with probing techniques to discover elements of interviewees' experience beyond the original story told. Online moderation skills are also a limitation to the successful outcome of online groups.

9.3 The researcher's narrative

In the following paragraph, I will review the process of carrying out the PhD research from a personal perspective. The research planning and process were evidently strong formative experiences in my career and very different in length and scope to any I had previously carried out. This research was, on the one hand, connected to my previous experience, and on the other, a significant stretch into an unknown and challenging world. For the two decades previous to starting my PhD, I practised as a clinical psychologist and accumulated extensive experience as a face-to-face moderator while directing collaborative projects in the Human Resources field. In parallel, I have had an ongoing interest in computer-supported

collaborative groups and conducted academic research in the various fields that form the foundations for the current research project (psychology, collaborative work, learning experiences). I was passionately interested in investigating how collaborative work takes place in the virtual environment and took up the opportunity to embark on my PhD to do so. Having moderated various Web-based exchanges and experienced online interactive situations, I was interested in moving on to the next step to identify the critical elements of the next phase of human interaction: collaboration.

This project, therefore, was a natural extension encompassing much of my previous experience, yet novel in its conception and research method. I was in awe at how fast people engaged in the online discussions and invested of their time into my project. Naturally it was somewhat related to their own needs and issues about online collaboration. Some success was also due to my own personal experience as facilitator and online moderator. This may be considered a limitation, in the way it affects replicability: there is no doubt that the facilitator has a significant impact on group development, whether on or offline. In the Discussion I have analysed the advantages of using the combination of methods for data collection and analysis. In retrospect, the action research method was a bigger challenge than I expected it to be. If one was to draw a comparison with other methods, where hypotheses and procedure are planned in advance of the research process and the research itself is simply the application of procedure, then using an action research method seems more stressful because it left so much

responsibility and pressure on me as the researcher. Action Research involving the creation of a group to then study it is also more stressful than studying an existing organisation.

Having decided upon a course of action, I set out (first iteration of the AR cycle) to instigate the formation of a core group that was to discuss online the possibility of forming a wider network for New Zealand innovators. From the start it was obvious that different participants displayed different online participation levels and styles. At this point, the responsibility for facilitating the online discussions was on me, and I was the identified 'leader' of the group. I facilitated the discussions that defined the changes that needed to happen and encouraged connections with participants through the problematisation stage. Online discussions surfaced the need for online collaboration platforms for these participants and by then, some of these participants who had argued for the creation of such a platform were well committed (had convinced themselves?) to acting towards this aim.

Once the initial six-week period for the online discussion was over, however, I stepped out of this role (second iteration of the AR cycle) and left the leadership role for takers. Offering space for self selected leaders to step in was probably the most important action I did in growing the initial small core group into a more powerful one.

At this point, the group relied on the fragile trust bonds that had started forming and decided to take on the challenge of creating this online collaboration platform. Leaders started stepping into the leadership space and this was represented not only quantitatively (messages doubled after I announced I would not be facilitating the discussion groups anymore) but also qualitatively (actions were formulated as to the next steps). Stepping out of the direct facilitation role freed some time for relationship building to help grow the network. I became an 'enabler' of leadership as opposed to an identified leader (Janson & McQueen, 2003).

Together with the complexity of facilitating the emergence of this online network, there is great pride in seeing my PhD research work grow beyond the research itself. The network has developed into a concrete entity separate from myself and made its own mark in the innovation scene as a communication infrastructure aimed at innovators. The network keeps growing and I occasionally receive news from one of its members or meet face to face some participants in the most unlikely places. Some of this contact involves assisting to overcome occasional obstacles; others are to share in successes and stories. As the thesis goes to print, the network is nearing 750 members and attracting regular interest from established innovation ventures keen to partake in a ready-made online network of like-minded people and organisations. Having facilitated the 'birth' of this group of creative, energetic, busy and sometimes unruly professionals, I watched it grow into toddlerhood and stride on its own. Members who have contributed some of

their prime time from their work desks, near their children's beds and internet cafes while travelling have also reported personal and professional benefits from their participation. I happily transitioned into the status of 'Godmother', now able to occasionally wave my magic wand and, for instance, help the network with internet hosting from my new position. So in retrospect, carrying out this type of action research project was indeed stressful, but exceptionally rewarding.

9.4 Key contributions to academic knowledge

The three main contributions of this research can be summarised as follows:

9.4.1 Developing the actor network "virtual leadership" model

The first contribution was to develop a new model explaining spontaneous emergence of 'virtual leadership' in an Actor-Network one online group of innovators. The thesis documented how individuals harness online communication in a forum to self-select, self-organise, gain legitimacy through action, open new venues for creative activities and demonstrate, sometimes to their own revelation, their abilities to engage wide-ranging audiences. While leadership has been studied extensively, virtual leadership is a relatively new phenomenon that may necessitate a different set of communication skills to those conventional leaders possess. Virtual leaders certainly offered different narratives and re-authoring processes than lurkers did. In a wider perspective, it is suggested to extend social entrepreneurship theory, and propose that virtual leadership has the potential to increase social capital using yet untapped resources. This comes at

an appropriate time during which governments around the world recognise the positive impact of social entrepreneurship on innovation.

9.4.2 Developing a narrative framework to deconstruct virtual leadership

The second contribution of the research was to develop a narrative framework to the study of virtual leadership. How can this be useful? Borrowing from one famous storyline, there are three possible responses to this question: all the better to interview with, all the better to understand with and all the better to change with (Janson, McQueen, & Levy, 2005).

9.4.2.1 Narrative data collection as part of an interviewing toolkit

Narrative interviewing method allowed for a richer collection of elements that differentiated the contributions of leaders in an online environment. Through the use of a narrative framework the potential for change was actualised by the leaders, who described experiences of self-discovery (unique outcomes) and were able to engage in re-authoring processes. This was not the case with other group participants. As noted earlier, most qualitative methods for interviewing and analysis emphasise the 'commonalities' of experiences, looking for recurring elements. By contrast, the narrative methodology, as developed and used, has the potential to tap into the uniqueness of leadership experiences.

9.4.2.2 Narrative analysis to facilitate understanding

Narrative methodologies are based on the social constructionist position that we are language beings (Fairclough, 1995). This study describes underlying beliefs and drivers of online group members as they displayed different online participation levels. Two factors emerged from the narratives to explain differential participation: beliefs about the value of networking as value-adding in the professional domain and beliefs in online communication channels for networking. Those individuals who reported most benefit from participation in the virtual network are the ones who also reported belief in the value of networking as a professional activity, but they had little prior positive experience with virtual networking. They evaluated their participation in the virtual network as having opened up new venues for virtual networking.

On the other hand, virtual leaders have been described as motivated by altruistic motives more than other community contributors for whom personal visibility and social relationships, derived from online participation may be more salient (Butler et al., forthcoming). The virtual leaders described in this study, while indeed motivated by altruistic motives, also reported significant personal visibility motives underlying their self-selected leadership choices – a personal visibility which they enacted for the first time and which is possibly related to their perceptions that leading this particular group in an online environment would bring added value in terms of their own virtual network building. They had previously attempted to lead various ventures but with limited or no success.

Whereas they had previously attempted to rise and lead through conventional channels, they had not reached the leadership levels to which they had aspired. Leaders who rose through the online group selected themselves by deciding how much to post and how to formulate their contributions. The narrative methodology helped articulate how leaders experienced strong unique outcomes and were able to engage in re-authoring processes. This did not happen with less active participants experiencing difficulties transcending their dominant stories for the reasons identified by the research (lurkers felt committed but did not feel their commitment needed to be expressed to the rest of the group or their organisations discouraged them from actively participating in the online discussions). These were some potential obstacles uncovered by this research to lurkers being able to engage in the identification of unique outcomes necessary to initiate re-authoring processes.

Narrative analysis hence allowed for a greater understanding of each individual's perspective and of the conceptualisation of emerging groups as networks in narrative form (Robichaud, 1998). Such potential is embedded in Shamir's remark that "leaders' biographies are an important missing link in leadership research because biographies produce leaders, and leaders, being at least partially aware of that, produce biographies, and both processes are important to the development of a leadership relationship" (2004).

9.4.2.3 Narrative methodology to catalyse change

The latter is consistent with earlier research in information systems (Davidson, 1997; Dube & Robey, 1999) and was so expressed by David Barry (McKay, 1998):

> *Stories have the power to release and change; if new story elements can be introduced into a problem-saturated narrative, remarkable things can happen. Where do these new story elements come from? I find the best ones come from that which was previously silenced - the forgotten story remnants left on the company cutting board (line 20).*

Perhaps the "remnant" stories referred to are the unique outcomes described in the present study, forgotten because incongruent with dominant stories. The participants who experienced re-authoring were determined to demonstrate to others the potential of virtual networking. They shaped the archetypal success story describing the successful activation of newly formed business relationships to publish on the network's Website. This narrative unfolds therefore, not as a 'real life' story, but as representing the knowledge accumulated on how to use networking links to create new business. This was particularly relevant to the work of the online group itself, which dealt with the question of how to reach more people and widen the network. Participants hoped to use stories not only to communicate but also to transform.

As Tomm (1989) emphasised, people not only "story" their lives as a way to confer meaning to their experience, but also act in them in ways that either liberates or constrains them. The narrative framework allows for this empowerment process as it does in the context of therapy because it also contains elements of an effective change method. In the present study, the archetypal narrative was formulated by participants and made up from a collection of main themes taken from individual narratives. The archetypal narrative was intended to demonstrate to sceptics what the benefits of virtual networking are through stories that have already taken place, as opposed to offering a hypothetical future vision. In doing so, narratives can catalyse re-authoring processes for other participants and the narrative method can be used as its best – change producing (Epston and White, 1989).

Hence one main contribution of this study was to integrate narrative elements of online collaboration into a description of spontaneous emergence of virtual leadership. The phenomenon of self-selected virtual leadership is very new, compared to that of leadership mode of action in the conventional arena. This is important in documenting how participants harness online communication in a forum. In so doing, leaders did self-select, self-organise, gain legitimacy through action, open new venues for creative activities and demonstrate, sometimes to their own revelation, their abilities to engage wide-ranging audiences. While leadership has been studied extensively, virtual leadership is a novel phenomenon,

developing concurrently with computer technologies and possibly requiring a different set of communication skills. Perhaps the strength of the narrative framework lies in its use for both data collection (i.e. interviews which are qualitative by definition) and data analysis – without the constraints of shifting paradigm between the two. Hence, an additional consideration for using the narrative approach developed here is its potential to act as "scaffolding" for theory building/analysis (Janson et al., 2005).

The research provided novel descriptions for lurkers' online experiences and motivations for lack of online activity. At the organisational level, organisational ambivalence about online collaboration certainly was described as impinging upon online collaboration. At the individual level, on the other hand, the concept of 'silent commitment' was identified as an addition to the previously known lurkers' barriers to online collaboration.

9.4.3 Extending the "intensional networking" theory

Thirdly, this research extended the "Intensional networking" theory by emphasising how novel online communication skills can help innovators and entrepreneurs fulfil their perceived need to acquire more 'active networking' strategies. The latter were viewed as crucial in the current New Zealand innovation milieu. Conventional (face-to-face only) networking strategies were perceived as inadequate. Inhibiting factors, however, include the 'silent commitment' pattern, potentially damaging, as online channels become part of

everyday business routine. This may indicate that knowledge workers may need additional skill sets to optimise productivity and learn from or teach each other. If this is so, there is a need to widen communication skills to include new networking strategies using online tools. This involved the study of individual and group processes as well as the motivations that underlie Intensional Network building. This clarified the potential role of online collaboration in professional network building of knowledge workers and surfaced an online collaboration practice allowing online communication to make more appropriate contributions toward organisational goals nationwide. Virtual environments designed for temporary wide-ranging 'temporal online consultations' to complement conventional consultation processes are being tested. This contrasts with previous models that judged the success of online communities exclusively through ongoing and growing activity levels.

9.5 Future research opportunities

Additional research needs to be undertaken on self-selected online leaders and followers, on the differences between virtual and conventional leaders, particularly identifying what set of unique skills leaders in the virtual sphere have that lets them engage wide-ranging audiences and potential benefits that they can help reap. Secondly research efforts could be targeted at identifying virtual leadership using online consultation tools. In particular, the question of the underlying mechanisms of the online rise of leaders should be investigated: do they, for instance, use interressement and enrolment mechanisms that downplay

technological constraints to stress its enabling effects? Thirdly, there is a need to uncover the protocols and potential of 'active networking' and construct an integrated model of the networking experience – face-to-face and online – as a foundation for sustainable business success and collective capacity building.

Appendix A: Initial email message sent to potential contributors

Hello ……..,

My research is progressing; we are working out the last details of the online discussion environment before inviting the members of the innovators group to join in within the next 2 weeks. When we last spoke, you said you would like to participate in the core group discussions that will take place online. So here is a brief reminder of what this entails.

AIMS OF THE INNOVATORS GROUP:

To discuss the main attributes of the virtual community for innovators and entrepreneurs that we are planning to launch later in the year. Topic examples:

1. What the online community will look like (issues of design)
2. Discussion themes to start with
3. Prototype launching foci: a region, a line of business, a product*
4. Results measurement
5. Other subjects you are interested in

WHAT IS THE TIME COMMITMENT INVOLVED?

Probably a time investment of a 15 minutes/week, for one month.

This forum will act as a Virtual network in itself: we shall experiment on ourselves how to produce value for ourselves out of online discussions. The Virtual Networking Project was planned as a win-win situation and so participation in the core group should bring some value in the short term as well. In my next Email I will attach a summary of the wider Virtual Networking Project to bring this core group into the perspective of the whole research project.

Thank you for participating in this project - your help is much appreciated. Naturally feedback from you is valuable at any time. PLEASE REPLY TO THIS EMAIL with a simple estimation of how many postings you might be able to contribute to the online discussion during the month of its duration.

Sincerely,

Annick Janson

Project Leader --Virtual Networking Study

Contact details…

Appendix B: Example of follow up email message sent to participants

Hello ….,

Thank you for your answer. Our general objective is to collaborate and exchange ideas on facilitating exchanges in a virtual community of innovators in New Zealand or virtual networking more generally.

What topics in particular would you be interested to discuss in the upcoming online discussion?

Best

Annick Janson

Project Leader --Virtual Networking Study

Contact details….

Appendix C: Postings from the online facilitator to the online discussion groups

1. First synopsis message from facilitator

Subject: Synopsis of initial postings

Hello to all participants in our online consultation group!

I thought I'd summarise some of the points brought forward in the online discussions aiming to collate views on significant issues on the planning and building of an online networking forum for New Zealand innovators. This online consultation expert forum was originally created for a 5 week period, so we are about one third through this stage.

SUMMARY

Initial introductions showed a wide range of interests and expertise such as: 1. Parameters of online communities 2. Networking models 3. Working models specific to New Zealand 4. Specific regional projects

In addition, the group extended online threads to off-line further collaboration and some mutual specific help was offered in certain areas.

USABILITY

We are also using this platform as a "usability" study, and will ask ourselves before the end of this discussion group: "what elements brought real value to me -

thus worth promoting while planning the wider community - and what needs to be modified or improved?" As individuals have very different motives for participating in (online) communities, it will be crucial to define target populations, their needs and shape the project to match them.

MAIN ISSUES

1. Parameters of online communities *****, of company ***, posed central questions: "what makes an online community work?" What are the factors that facilitate or inhibit online collaboration? How can we use know obstacles, such as trust and motivation to participate in online community, to make it work for our purposes? "How will an innovation forum deal with issues such as confidentiality?" and what will our working models be? *****, looking at how you use networking to achieve your goals, how might virtual networking be used to complement face to face networking and contribute in a unique manner?

2. Networking models: *****, of company *** designed an online tool facilitating the exchange of significant business information. He posits that, to be effective, virtual networking should be "as closely aligned to real world methods of interacting". I do so agree with him and aim to design a project whereby an online system will complement existing "terrestrial" networking practices and use the technology where it can add real value.

*****, of company *** is looking forward to being an active member of a core group to promote online dialogues and exchange of ideas and processes he described as having been the "hallmark of the Internet" of the past decade.

3. Working models specific to New Zealand *****, of ministry *** is gathering material on the subject of "how to most effectively commercialise innovations - what are the barriers/problems; what suggestions do you have for resolving them; what do you consider the most effective roles for government, and for other parties involved? Perhaps virtual fora of this kind could help conducting wide range consultations since they have the potential to reach out deep into the community.

For *****, of government taskforces ***, the focus is on people - former successful NZ innovators, entrepreneurs and experienced potential migrants (sharing their experience can help boost current ventures) and future generations of Knowledge Workers. *****, what is your idea on how to best use the technology at hand to build on existing networks and impact on the relevant groups of people in order to start creating today more potential business for tomorrow? What is your "mental model" of a networking platform to support commercialisation? What sort of "mechanism" would specifically help you in your business environment??

*****, of company ***, tell us more about the "active pathway to value" that you mentioned! Let's form a project to talk to the "50 companies that export more than NZ$50m"!

*****, of company *** sees the "art and science of picking winning ideas and people – then offering them a pragmatic commercialisation process" as a vehicle to attend to NZ's "shortage of commercialisation skills". Andy, can you describe the role that was played by networks on the road to commercialisation, and how virtual tools may help make the process more efficient?

*****, of TV station ***, is looking for some ideas for next shows on Innovation and Entrepreneurship.

4. Specific regional projects A Hamilton-based group focused on supporting new businesses in the Waikato is participating to the forum and we would like to hear more on their plans: ***** , of *** City Council, *****, of *** Networks. How will this group provide "an innovator or inventor (with) support to commercialise their intellectual property?", ***** asks. Perhaps *****, who has emphasised local (as opposed to national) initiative can share with us what successful local ideas he has encountered and how they were developed.

CONCLUSION

These are significant thoughts to begin a discussion. What are the actions that we can start taking right now?!?

2. Second synopsis message:

Subject: toward wrapping up the online consultation group

Hi to all,

As we are gearing towards the end of this online consultation group, I would like to bring up a few points and ask for your concluding remarks.

We are planned to go offline at the end of next week (date), and so it would be helpful if you could please post some thoughts to wrap up this online consultation in the coming week.

As to the definition and description of what an "online community" would be in the case of Innovators and Entrepreneurs (*****'s question), some ideas were put forward by *****, ***** and *****, for instance. We will need to decide whether the Virtual Networking Project will be best used in either:

1. Setting up "online communities" following some working models (such as www.knowledgeboard.com) with elements of information dissemination and online exchange of ideas,

2. Launching new networking platforms (examples*****)or,

3. Building on existing networks and help transform them into "active networks" (*****) perhaps by developing some new enabling technology.

*****, ***** and ***** focused on the business development and commercialisation aspect of our endeavour, with *****, ***** and ***** adding the perspective of using networks to deepen collaboration and to educate.

In all, it seems that some active networks are essential for "small companies to gain competitive advantage" (*****) and can perhaps play a key role in helping New Zealand build up its business knowledge base.

We also got wind of offline communication that followed up on some online initial contact and that is definitely positive - albeit difficult to quantify and account for!

What are your thoughts?

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