University of Technology, Sydney

Research Thesis

Leadership Practices for Innovation In High-Technology Organisations

By

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Student:

Date: 12 September 2014

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Abstract

Organisations the world over are constantly striving to innovate in order to survive and thrive in the current dynamic and challenging global economy. The strategic intent to innovate is, however, very difficult to execute, especially in large enterprises.

This research set out to explore the leadership dynamics of innovation within an iconic global high-technology organisation. In particular, the intention was to understand the dynamics of those practices that facilitated the conversion of creative ideas into innovative new technical products and services in a sustained, repeatable manner. To achieve this, it was recognised that the study of these 'social practices' necessitated the location of this research within the social constructionist research paradigm. This led to the adoption of an Action Research methodology as the most appropriate method through which to address the research question.

Over the course of two years, two separate sets of Action Research cycles were conducted by two groups of co-researchers employed within this high-technology organisation. This Action Research delivered several novel insights into the nature of the leadership practices adopted by the members of these two groups in delivering, in particular, four break-through technical innovations. Together, these leadership practices transformed the social dynamics (and particularly the power relations) within the two groups, making possible the collaborative endeavour that led to the company-lauded technical innovations. The principal finding of the research - that *social innovation precedes technical innovation* – highlights the role of leadership in the realisation of innovation within enterprises. Furthermore the explicit articulation of four specific leadership practices that facilitated the conversion of creative ideas into the innovative new technical products and services achieved through this research, contributes significantly to the body of knowledge on innovation. In addition, this research raises questions about the appropriateness of the ontological and epistemological assumptions that underpin traditional, positivist research, with respect to investigating the social underpinnings of technical innovation. By locating this research in the social constructionist paradigm, and adopting an Action Research methodology, the socially constructed realities of organisational life – and, in particular, the political basis of these realities - were explored fruitfully with respect to their impact upon an organisation's capability to innovate.

Chapter 1 – Thesis Introduction

1.1 Introduction

In spite of the wealth of books, papers and PhD theses written on the topic of innovation, our understanding of this complex, but vitally important, phenomenon remains elusive. As Zuboff and Maxmin (2002, p.21) have commented with respect to change management, the same can be said about innovation:

> Change management would not be the industry it is if organisations were changing. Change management is huge precisely because organisations are *not* fundamentally changing… the standard enterprise logic is organised to reproduce itself at all costs, even when it is commercially irrational to do so.

Thus in many organisations, as Dovey and McCabe (2014, p. 186) point out, the rhetoric of innovation substitutes for its practice. They go on to argue that an issue that exacerbates this problem is that of the 'politics' of innovation. As an endeavour that threatens the *status quo*, innovation is always likely to be resisted by those (often powerful) stakeholders who have a vested interest in the retention of the *status quo*. Furthermore, these authors argue, the inability to address these politics effectively is also a consequence of the location of the traditional research and development (R&D) function within the positivist research paradigm; the ontological and epistemological assumptions of which make it impossible for such research to address the politics of innovation. For this reason, the research documented in this thesis adopted an action research methodology – a choice based upon the nature of the research question and my epistemological assumptions about the knowledge sought in attempting to address that question. As such, the research outlined in this thesis is located within the social constructionist research paradigm. It assumes a social reality that is inter-subjective in nature and that is underpinned by social interests, values, beliefs, and interpretative practices. As Rapaport (1970, p. 499) explains,

> (a)ction research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.

This action research, therefore, sought to achieve innovation outcomes within an iconic global high-tech organisation and to document, and make transparent to others, the social

dynamics – in particular, leadership practices - that may have underpinned any technical innovation achieved through this process.

Much innovation, such as Apple's iPhone and Intel's microprocessors, has come out of the hyper-competitive high-technology industry but there is relatively little known about the dynamics behind innovative achievements. For example, it is unlikely that members of any high-technology organisation could offer a consistent answer to the question of *how* innovation occurs. The literature shows that some answers verge on the comical – for example, Peltokorpi *et al*. (2007) argue that the simple shape of a meeting room table altered the fundamental innovation outcomes of NTT DoCoMo. In my 25-year career in the high-technology industry, never has the shape of a meeting room table been the obvious supporting pillar of repeated innovation!

It is well known that increasingly a firm's survival depends on its innovation capabilities. As Steve Jobs commented on his return to an ailing Apple in 1997:

> The cure for Apple is not cost-cutting; the cure for Apple is to innovate its way out of its current predicament. (quoted by Gallo, 2014, p. 1)

The fact that the mantra, *innovate or perish*, features regularly in the business literature (see, for example, Khan, 2007; Taghavi *et al.*, 2004; and Raju 2007) suggests that innovation, while being vital to the survival of an organisation, is not easily achieved even in high-technology organisations. This research has attempted to understand why this is the case and to offer some insight into the leadership practices that may facilitate valuable innovation more effectively within the high-tech industry.

1.2 Background to this Research

I have spent 25 years in the Information Technology industry. Starting my career within a university while still studying for my undergraduate degree in the late 1980s, I was fascinated by the new technologies emanating from the legendary companies of Silicon Valley. In that time, working and studying at an Australian university, it seemed that the innovations I saw – graphical user interfaces, the first mobile phones, nascent internet technology – all stemmed from what appeared to me to be an unknowable, almost mystical, innovation capability of that particular foreign region. Taking on a new role in the public sector shortly afterwards, my intrigue at how Silicon Valley companies innovated grew as my concurrent experience of

the public sector in Australia became more akin to that described by Fred Brooks in *The Mythical Man Month* (Brooks, 1975), with dystopian projects endlessly delayed with little to show for the considerable effort and money spent on them.

The drive to understand innovation, and to contribute to it, led me to take a high-risk move to an Australian software start-up in 1995. The Australian software industry at that time was almost exclusively government-driven and government-based, and in hindsight I was very lucky to be offered a role with a private sector organisation. I found myself working with a group of technology and other professionals who, whether or not they realised it or intended it, were creating innovative software for the company. A primary frustration in this new setting was that, no matter how much I sought to understand the underpinnings of the innovation being carried out, this knowledge proved elusive and any innovation within the company proved to be short-lived and unsustainable.

As my time at this company drew on towards ten years, I saw instances where a small group, frustrated with the organisational *status quo* suddenly achieved remarkable innovation without the larger company facilitating or realising it. This small group consisted of people who had worked together for several years prior and not seen such success before. However, one year after this team's innovative achievement, most of its members became frustrated and left the organisation. This experience left many questions in my mind. How could the same individuals, in very similar organisational settings, vary so wildly in their innovative capability and enthusiasm? How was it that a company seemingly dependent on innovation for its success, was unconcerned about the frustrated attempts by its staff to innovate? Where did the burst of innovation come from in that one transitional phase, and why did it suddenly dissipate? The technology space in which the company worked hadn't changed and the people (until the very end of my time at the company) hadn't left. What was inhibiting our ability to sustainably innovate?

Following the careers of my colleagues after they had left this company shed little insight on this issue. Some moved on to start their own organisations and employed similar techniques and approaches to those we embraced in our period of innovative success. Yet they failed to recapture whatever it was that facilitated the prior successful innovation, with their start-ups 'perishing' just as Khan (2007), Taghavi *et al.* (2004), and Raju (2007) had warned.

I now find myself at one of the very largest global technology companies. I see the same perplexing situations, where large groups make public proclamations of their innovative prowess. However the authentic innovation that I witness within the firm usually comes from unappointed individuals and/or small-groups located within unheralded parts of the organisation. Furthermore, such innovation seems random with these small groups and individuals seemingly incapable of repeating the achievement and producing a sustained flow of innovations.

1.3 Current Research Concerns and Issues

My current research concern stems from the apparent contradictions I see between what I experience in my work situation and what the literature on innovation and leadership is articulating. From my perspective much existing research attempts post-hoc rationalisations for the reported innovation, with retrospective analyses of the value and degree of the innovation, based on after-the-fact analysis and data gathering (in this respect, see Baye and Hoppe, 2003 and Aizcorbe *et al*., 2009). There are rare cases of in-the-moment research covering actual events at the point of innovation (e.g. Nonaka and Takeuchi 1995) but very few instances of repeated innovation are reported in the research literature. In particular, these analyses remain frustratingly opaque as to what practices the individual participants on the ground actually undertook in order to create and sustain their innovative capability. Typically it is the CEO who is revered as the source of innovation, such as in Gallo's (2014) coverage of Steve Jobs' role in Apple's ability to innovate constantly. Interestingly, as O'Toole's (1995) examples of 'Rushmorean leaders' suggests, there is a significant difference in innovation capabilities between owner-led organisations and those led by salaried CEOs (something on which the literature is almost silent).

There are also areas of innovation research that offer comprehensive models of innovation, based to a very large extent on proxies for innovation rather than innovation itself. In particular, there is a large collection of research on the filing and granting of patents as a proxy for measuring a firm's innovative capability (see, for example, Baye and Hoppe, 2003 and Pavitt, 1985). The value of these proxies is then stretched by ambitious researchers mistaking the proxy for reality, and claiming that if an organisation has a large patent portfolio it must *ipso facto* be innovative. Fortunately some of these researchers (e.g. Pavitt, 1985) also point out the pitfalls and limitations of these approaches.

These concerns are not meant to dismiss the concepts and models proposed by these areas of research. Rather, my concern is focused on increasing the depth of understanding about the practices that participants engage in when innovating successfully. A further concern is that of the contribution of leadership practices (if any) to the capability for *sustained* innovation. In attempting to address these concerns, my research focused on in-the-moment practices, with the view to adding new insights to the existing body of research on innovation.

1.4 Research Area and Questions

To find answers to the questions asked above, and of myself for nearly 25 years, I contend that one cannot look for understanding of sustainable, repeatable innovation after the fact, through some detached synthesis of formulated metrics or proxies. It is extremely difficult to promote beneficial practices or develop and educate technologists on ways of leading others to innovate if we can only describe it in unrelated legal constructs or abstract formulae, rather than in the practices and approaches the very participants in the innovative effort should or could be employing.

There is a large body of research on factors that contribute to innovative success, ranging from where to situate the company or organisation (Firestone, 2010; Cassia *et al.* 2008; Howells, 2002; Urraya 2010); how to attract appropriate talent and expertise (Peltokopri *et al.* 2007; Fong, *et al.* 2000; Nonaka and Takeuchi 1995); appropriate incentives (Sherif and Xing 2006; Cohendet and Simon 2007); how to structure the working environment (Deutschman 2004; Cusmano *et al.* 2009); and even the assertions of different schools of leadership with respect to the enhancement of innovative processes (Fong, *et al.* 2000; White and Dovey 2004; O'Toole 1995).

Despite such a significant corpus of research, there exists a dearth of material describing what practices were actually employed at the moment of innovative breakthrough, and what practices individuals or groups embraced in their day-to-day work to sustainably innovate. Brown and Duguid (2002) offer some insight from their particular perspective of communities of practice but much more research is needed on this vital dimension of innovation capability. This thesis seeks to contribute to the enrichment of our understanding of the everyday practices that underpin innovation, by answering the research question:

What practices of leadership, in what combination and to what degree, combine to foster repeatable, valuable innovation?

My assumption in undertaking an attempt to answer this question was that I needed to participate in the research effort in order to gain access to the *knowing* (knowledge manifesting in practice) that would enable my understanding of this complex phenomenon.

1.5 Contributions of this Research to the Field

This research was envisaged to find out what leadership practices, if any, foster repeatable, valuable innovation. In particular, it was hoped that the findings and outcomes of this research would expand the understanding of how innovation happens in-the-moment, as individuals and groups engage in the fundamental practices that bring about innovation. In this respect, this research aimed to:

- Conduct a multi-year action research process focussed upon increasing the innovation capability of two teams within an iconic global high-tech company - a setting rarely chosen for such an approach.

- Scrutinise the role, if any, of leadership practices in facilitating innovation capability.

- Explore the nature of the workplace 'lived experience' of members of two teams within the high-tech organisation - teams situated on opposite sides of the world – with respect to how particular practices may have informed and shaped any innovation capability during the period of the research.

1.6 Situation and Chronology of the Research

The field work for this thesis was conducted within my current employer. In keeping with confidentiality and ethical requirements, throughout this thesis I refer to the company as ABC Company. My co-researchers and fellow participants in this work are referred to through the use of pseudonyms.

Initial planning for the field work was undertaken in 2009 and 2010, but did not start until 2011. The research field work concluded in 2013.

1.7 Structure of this Thesis

This thesis is subdivided into chapters addressing the constituent elements of the research.

Chapter 1: The *introductory* chapter provides a broad overview of the background to the research; the rationale that led to the central question of leadership and innovation under research; and an outline of all the chapters.

Chapter 2: The *Literature Review* contributes a wide-ranging investigation of subject matter centred on the topics of leadership and innovation. Furthermore, it offers critique, from a research paradigmatic perspective, of the traditional literature on these two topics, and it identifies gaps in the current body of knowledge.

Chapter 3: Entitled, *Research Methodology*, this chapter explores the possible approaches to addressing the research question, and outlines the logic underpinning the choice of an action research methodology and the resultant scope of study, methods of data collection, analysis and interpretation of field data.

Chapter 4: This chapter, entitled *Data Presentation*, presents the research data in the form of a strategic narrative. This narrative outlines the research cycles and their consequent analysis; team reflection on outcomes; and team interpretation of learning and the generation of action-informed theory upon which to base subsequent cycles of action. It, thus, constitutes the body of field work and related activities (data generation and analysis of each action research cycle) for the research. It describes the chronology of the research and concomitant evolution of the researchers' understanding of leadership practices for innovation, and the key actions and insights that show these practices in sharp relief.

Chapter 5: This chapter is entitled *Data Analysis and Discussion* and it draws on the narrative of Chapter 4 in its analysis of the research data and its discussion of the results delivered by the action research process. It identifies the vital themes evident from the research; the critical underpinnings of these themes; and the new knowledge generated from the research.

Chapter 6: The *Thesis Conclusion* presents a summary of the major findings and the contribution of the research to the fields of leadership studies and innovation - as well as to the organisation that hosted the action research. This chapter concludes the thesis.

Appendix A: The List of References of material referred to throughout this thesis.

Chapter 2 – Literature Review

2.1 Introduction

A significant body of literature exists on differing theories and perspectives on leadership, and its impact and interplay with the nature of knowledge and innovation, particular aspects of the acts of knowledge genesis, management tools and technologies and the consequential benefits that arise.

Works focusing on the impact of leadership on innovation, knowledge creation and exchange, and the attendant outcomes for high-technology advances are diverse and include notable seminal pieces: Nonaka and Takeuchi's (1995) articulation of a spectrum spanning tacit and explicit knowledge; Brown and Duguid's (2002) exploration of the communities of practice foundation for knowledge; and various theses on the act of knowledge creation and innovation taking form through the combination and exchange of existing knowledge (Nahapiet and Ghoshal 1998).

A common theme in this body of work is the focus on factors that contribute to the central knowledge creation experience itself, as well as the broad social and environmental context in which the innovative effort took place. Links back to the foundational literature in leadership are also made, from a variety of perspectives not always congruent or supporting agreed causes and effects. This includes areas such as team formation, shared experiences, existing knowledge, work practices, culture and so on. Each of these contributes to the substrate on which individual knowledge creation efforts rely, with an overarching dimension of the role of leadership in the act(s) of innovation.

The experience of participants, leaders, and collaborators are reported across the literature, but the nature of leadership, and practices local to the innovation effort are often disguised, or referred to obliquely, amongst the description of other topics. The leadership actions that shape, encourage and support the experience of discovery and innovation are of utmost interest to all organisations that seek to understand and replicate innovation, and yet are the practices hardest to identify in any organisation, and with which the literature also grapples, with questionable success.

This leads to the central challenge in leading innovation. In order to *understand* the successes of innovation, what leadership practices are employed before, during, and after the moment

of revelation, leading to new or improved products or services. Further, what notions of leadership should inform and guide any such inquiry into how that leadership then inculcates various factors leading to innovation?

To that end, I examine the literature in at two levels. First, a review of the existing schools of thought on leadership, and canonical disciplines identified over a broad period to approach an understanding of what is leadership. This seeks principally to inform the second level of review: With the contemporary views of leadership in place, a review of the literature on leader and leadership impact on innovation at all stages and across a plurality of dimensions is presented.

2.2 A Brief Review of the Literature on Leadership

Exploration and research on the topic of leaders and leadership enjoys a healthy focus across recent and historic literature. I will first briefly examine the major positions of researchers and the models and notions of leadership developed by scholars of various eras. This will provide a guiding approach to leadership to further the exploration of the practices of leadership in the context of innovation. All of the models examined still enjoy strong focus and following today, albeit with healthy criticism and discussion around the comparative strengths and usefulness of each.

2.2.1 Exploration of the Historic and Classic Notions of Leadership

The literature on leadership stretches back to some of the earliest forms of literature of any kind, where we see the likes of Plato, Socrates, Sun Tzu and other philosophers of the ancient world commenting on leadership, its forms and character (Plato *et al.* 2013; Giles 2005). They adopt an individualistic approach to leadership, focusing on explaining the work of leaders by the qualities and observable behaviours of a given person. Throughout other times, the likes of Frederich Nietzsche and Niccolo Machiavelli build on and expand the exploration of leadership from the perspective of extraordinary individuals performing deeds of great historic importance (Judge *et al.* 2002)

In their various forms, much of the historic literature leads to a heroic model of leader and leadership (Carlyle, 1841; Fairholm 1991), with the leader thought variously as “Statesman” (O'Toole *et al.*, 2002), “Great Man/Great Person” (Judge *et al.* 2002; Bass & Stogdill, 1990; Scott 1973; Jennings 1960), or “Hero” (Van Wart, 2003)

A number of contemporary models of leadership have reshaped and recast the foundational definitions or models of leadership – covered next in this chapter – but this heroic model of leadership has itself adapted to survive in some forms across the literature. An example of a contemporary model sympathetic to classical forms may be O'Toole's Rushmorean leadership (O'Toole, 1995), which bases itself firmly in values-first modes of leadership (similar to Transformational Leadership, discussed later in this review), but with hallmarks easily recognised in the works of Plato, Socrates, Nietzsche and others. O'Toole includes examples of George Washington, Abraham Lincoln and similar figureheads employing common values at the core of the leadership, with one such value being respect for followers.

Many contemporary models are derived from historic notions of leadership. This derivation extends to inheriting a central tenet shared across many of these historic conceptualisations: Leadership was, and is, the act of an individual. Whether acting as catalysts of success (Day and Lord, 1988), the font of great vision for the group (Sinclair, 2006), or the embodiment of group or organisational purpose (Colvin, 1996), the leader and their leadership merit are framed in individualistic dimensions. Notions of shared leadership or contextually-driven-and-group-actuated leadership are at best seen as a follow-on effect or consequence to the individual leader's effort, and at worst totally resisted as forming part of the leadership dialogue (O'Toole *et al.* 2002).

The classical model of leadership has an understandable bias towards using an objectivist interpretation of the history and circumstance of these leaders, considering context and subjectivity only insofar as they are elements describing the historic situations in which these leaders arose. Several broadly examined, and well-considered schools of thought on leadership have appeared as successors (or in complement to) the classical model, and attempt to varying degrees to take different perspectives, which are explored next.

2.2.2 Trait-based Leadership

The notion that leadership could be reduced to a function of the aggregate set of abilities, characteristics and qualities of a given person first takes shape as far back a Galton (1870) and continues through various seminal works, including Wiggam (1931), Drucker (1966) and Stogill (1974). In other early and recent literature (e.g. Carson 1987), explicit or implicit trait identification came about as a consequence of biographical examinations of the lives of figures such as George Washington and Winston Churchill.

Such post-facto examinations sought to elicit some common group of traits seen in these persons, that could henceforth be re-identified in others. Taken to its logical conclusion, it would allow traits so identified to be inculcated and conveyed to others: Trait-based leadership could be *learned*, rather than being intrinsically and immovably embodied in a fixed leader (Stogdill and Coons, 1957). Stogdill's works (1948, 1974) potentially provide the greatest coverage of the Trait theory of leadership, but also provides the critical researcher with many avenues to confront the flaws and limitations of Trait theory.

In *Handbook of Leadership: A Survey of Theory and Research* (1974), Stogdill provides an example of the compendium approach numerous researchers of Trait theory undertake in cataloguing all known extant leadership characteristics or abilities. In Fairholm's (2002) review of Stogdill's work, we see no fewer than 40 different traits identified. In creating such comprehensive lists of traits, critics such as Conger and Kanungo (1988) highlight that some of the traits – particularly "personality" and "social characteristics" – are in fact a demonstration of a different model of understanding leadership: In their assessment, and that of others such as House (1977), this was actually Behavioural Leadership.

A second, more considerable, criticism of the Trait approach stems from the kinds of comprehensive catalogues of traits Stogdill and other compiled. It was easy for researchers, such as Zaccaro (2007) to find mutually exclusive sets of traits evident in different individual leaders or cohorts of leaders. No universally agreed core set of traits for leadership has appeared in the literature, and researchers such as Wellins and Weaver (2003) show that ineffective leaders possess similar traits to effective ones. Zaccaro (2007) postulates that failing to account for situation and the individuals involved is part of the explanation, but seems to then shy away from exploring the possibility of true contextual and shared interpersonal leadership, instead declaring that Situational Leadership (covered below) is in fact Trait leadership using a trait-selection-dependent-on-situation model.

In the work of Stogdill, Fairholm, Drucker and others, we also see clear evidence of the theory of Trait-based leadership sitting firmly in the positivist view of objective reality, attempting with very few exceptions to reduce leadership to contextually-ambivalent quantised properties, or mechanical application of trait to situation.

2.2.3 Behaviour-based Leadership

If the Trait theory of Leadership attempted to distill what a leader *was*, by identifying ability-based building blocks, then the Behaviour-based theory of leadership can be best understood as defining leaders and leadership by what leaders *did* (Stogdill and Coons, 1957).

Several seminal studies drew prominence to the Behavioural school of leadership thinking in the 1960s and 1970s, being Stogdill's, Coon's, Hemphil's and others' work (Stogdill and Coons, 1957; Hemphil and Coons, 1957) at Ohio State University, and related studies at The University of Iowa, and follow-on work at the University of Michigan. From these studies arose the notion that Behavioural Leadership can be considered in two dimensions: Consideration (of followers), and Initiating Structure (to meet goals). Further studies including Blake and Mouton (1964) codified Behavioural understanding, and led to the development of instruments such the Managerial Grid allowing the mapping of behavioural factors to best align a leader with the model of the Iowa and Michigan studies.

This overt positivism in development of the Behavioural Leadership model is seen again in subsequent work focused on developing other tools, metrics and measurement devices such as the Leadership Behaviour Description Questionnaire (Hemphil and Coons, 1957), the development of the "Four Styles" synthesis of Behavioural Leadership (Doyle and Smith, 2001), and aspects of Deming's (1986) Total Quality Management work. Herein we see another of the contributions of the Behavioural model, that also led to significant criticism. Deming's work, for example, occurred during much of the post-World War Two research focus on understanding how to transform industry from traditional command-and-control based management, seeking new models that emphasised efficiency and organisational growth. Behavioural Theory's emergence during this time allowed circumstances for researchers to conflate management with leadership, blurring the distinction between the two (Fairholm, 2002). Behavioural Theory may not be the genesis of this confusion of management with leadership, but it certainly was a huge contributor to that notion.

From the perspective of approaching an understanding of how the Behavioural Model might inform us about the contextual realities of leadership, and the intersubjective development of leadership practice by all related participants in leadership acts, we see a significant bias towards considering the relationship and context factors predominantly through a lens of organisational hierarchy. In various published papers reviewed by Fairholm (2002),

researchers such as Argyris (1957), Barnard (1938), Follet (1998) and many others focused on those persons at the top of the organisational hierarchy. This in itself is not invalid, but a degree of lax taxonomy allowed for those at the top of an organisation to be labelled leaders (even if they were in fact managing), and therefore what followed from them must be leadership. As well as contributing to the confusion of the terms, these researchers mention little of how context and the subjective reality created by all those participating in organisational effort contributed to success or outcomes (House, 1977).

2.2.4 Situational Leadership

The flaws and criticisms of Behavioural Theory, from its conflation of management with leadership best critiqued by Bennis and Nanus (1985), to implicit positivist bias in manifestations such as Blake and Mouton's Managerial Grid (1964), stimulated research and discussion on how complexity and context might inform a different notion of leadership. Throughout the 1950s to 1980s, Situational Leadership was explored by a variety of parties intent on exploring how contingency transforms leadership. Specific focus was given to the notion that sense-making for acts of leadership requires an understanding of circumstance, and the specific situation in which the leadership arose. For instance, Hemphill (1950) explored the dependence of leadership on interactions between those with differing real or perceived positions of power. Fielder (1967) coined the notion of "contingency theory" of leadership actions triggered by an individual's bias to task-focus or relationship-focus. More esoteric models were developed by researchers such as Vroom and Yetton (1973) cataloguing the effect of varying degrees of buy-in or commitment to the goals sought in a given situation – a relevant example to this paper being innovation.

This highlights an ongoing issue developed in tandem with these explorations of Situational Leadership - that of many competing submodels. Models such as Fielder's contingency theory, or Vroom and Yetton's commitment/decision model were joined by other varyingly disjoint or orthogonal models, such as the path-goal-reward theories of Evans (1970) and House and Mitchell's (1974). Still other researchers such as Nicholls (1985) attempt to repair the flaws they report in the earlier models. In Nicholls' case, by applying a layer of consistency, conformity and continuity to Situational Leadership. One immediate issue this brings to mind is the dissonance between a model on the one hand approaching leadership as subjective and heavily variant on circumstance, while at the same time enforcing consistency as a goal. Can leadership be variant and consistent at the same time?

Of all the major contemporary approaches to understanding leadership, Situational Leadership comes closest to examining and exploring leadership and the interplay of context and subjective reality of shared experience. One aspect where it falls short is in the consequences of applying Situational Leadership thinking. In assessing the situation, relationships and context, researchers then recommend approaches for the situational leader as individual, separate from the group or its dynamic. Many examples attempt to compartmentalise the interpersonal and intersubjective aspects into almost trait-based approaches (Zaccaro, 2007). Fielder himself (1967) offers the Least Preferred Coworker model. Fairholm (2002) lists other positivist devices from fellow researchers: Hunt, Osborn and Marton's (1981) nine macro variables for the situational leader to control. E.g. Follower is in state X, therefore deploy leadership approach Y - an almost clinical, robotic approach.

2.2.5 Transactional Leadership / Transformational Leadership

Adherents to the approaches to leadership described above broadly take two similar approaches when attempting to apprehend the notion of leadership, as flagged by Fairholm (2002). First, there is a frequent and implicit substitutability between the embodiment of the leader (the noun), and the act of leadership (the verb). For a large variety of researchers, this has served their ends in researching classical, Trait-based, Situational or Behavioural leadership. The second similarity is in the common approach of defining what a leader is, and what the acts of leadership encompass, by a reductionist approach. Each model in its own way attempts to boil down the matter to find a focused definition or description. Fairholm points to the work of Spitzberg (1987), who articulates that conflating leaders with leadership may do a disservice to understanding either, and that what is needed is not a reduction of evidence into a tightly focused definition of leadership, but in fact an embrace of a much broader understanding and reflection on leaders and leadership, at a level above discussing traits, situations, or contingencies. In this approach, Spitzberg exemplifies the rise in thinking of Transformational Leadership as a distinctly separate approach to understanding leadership, that occurred in the late 1970s, 1980s and 1990s.

Forebears and contemporaries of Spitzberg developed the theory of Transactional and Transformational leadership, among them Burns (1978), Bass (1985) and Covey (1992). Central to the thinking on Transformational Leadership is the notion of a leader acting above the level of individual traits or actions, instead inspiring, motivating and leading others through a values-based approach. Bass (1985) describes this as working at an almost

aspirational level, where demonstrating shared values, articulating future high-level goals, and shepherding followers to find the power and agency with which to innovate and effectively contribute, all become the principal method of leading. To complement this, a leader can switch to employ the Transactional approach as well, in order to impart control or authority where needed.

The values-based foundations of the Transformational dimension were explored elsewhere by numerous researchers. For example, Eagly and Carli (2003) and Tichy (1997) each examine how a Transformational leader empowers their followers through legitamising actions, recognition of group values, and rising above short-term organisational pressures to recognise the intrinsic needs of followers for purpose, recognition and reward.

The values-based spheres of thinking on leadership – and particularly the Transformational researchers – widened thinking on what it meant to be a leader, and what leadership was. As Fairholm (2002) describes, Transformational Leadership moves beyond thinking of leadership as just the act of one person, embodied as the leader, and moves to a holistic view of

> the entire process of leadership taking into account such things as traits, behavior, and situations, but not being dependent on them. (Fairholm 2002, p. 13)

Tellingly, while opening dialogue on the role of followers, and the effect of thinking beyond the individual-as-leader, the proponents of Transactional and Transformational Leadership seem to place even more distance between their exploration of leadership, and the possibilities that deep context, and emergent leadership as a group dynamic present.

2.2.6 Informing Future Thinking on Leadership

Each of the major areas of leadership thinking still enjoy strong support amongst a wide body of researchers and practitioners today. Each has much to offer the researcher in a given field or specialisation of leadership, but as should be expected from such broad models, drawing specifics to help guide understanding of one very focused aspect of leadership from such a wide assessment of the body of work on the topic is daunting.

The classical “heroic” model of leadership remains distant from the interpersonal leadership practices of innovators, giving us only a high level notion that through greatness, will or embodiment of purpose, the very existence of a leader will translate into innovative outcomes for a given group. The more recent and contemporary perspectives on leadership – Trait theory, Behavioural Leadership, Situational Leadership and Transformational Leadership, bring varying degrees of congruence with practice theory and understanding, but do so only co-incidentally or in the purpose of exploring other aspects of leadership. Situational Leadership may come closest to providing insight into leadership performed with the goal of seeking innovation by accepting the potential that context and subjectivity might play in the realm of leadership, but none of these models differentiate objective reality from a socially constructed reality – each treats the situation of leadership from a set of value-neutral general laws, drawing on a common positivist heritage.

To further understand leadership as it applies to innovation, and in seeking to approach an understanding of the literature's current breadth and depth of exploration of leadership practices for innovation, I have chosen to expand the review of literature to include more immediate, functional aspects of leadership at a level approachable by any contemporary leader attempting to innovate or guide others to innovate. If the dominant models of leadership from the last several decades do not speak directly to the effect of innovation on leadership (and that rightly perhaps shouldn't be expected), then there is value in exploring more concrete aspects of leadership, in order to find the relative understanding of the impact, influence or presence of leadership practice on innovation from a bottom-up perspective. This may help to identify where gaps may exist in Leadership theories both old and new, and illuminate the reality of leadership for innovation as experienced by contemporary practitioners and researchers today

2.3 A Review of Literature on Leadership Factors Affecting Innovation

2.3.1 Leadership and the Organisation's locality and situation.

The location of an innovative enterprise has an influence on the potential for knowledge generation. Commentators in the field of knowledge and innovation research, such as Howells (2002), give a number of reasons why an endeavour's location impacts its outcome. Howells noted that fellow researchers such as Audretsch and Feldman (1996) had drawn statistical links between the information and/or skill density required to operate successfully

in a particular industry, and the comparative clustering and proximity of competitors within the industry. Literally, industries requiring highly skilled workers, those with advanced qualifications, or performing comparatively complex research and development tended to locate themselves nearer their competitors.

The clustering effect and observed innovation from clusters engenders conflicting opinion in the literature as to the "direction of causation": that is, does clustering result in objectively or subjectively improved innovation? Furthermore, is there confirmation bias in the reporting and research in the field, such that failed clusters, or clusters with no apparent impact on innovation, are not reported by researchers? Studies in Germany (Fornahl and Brenner 2009), the United Kingdom (Cassia *et al.* 2009), the United States (Firestone 2010), and others use a variety of qualitative and quantitative measures and assessments to praise the effect of clusters, regional focal points and other concentrations of innovative industries. While some comparisons are made with organisations not in such a cluster, none of the literature presents a comparison of clusters against each other, nor seeks to find any failed or underperforming concentrations of innovation-seeking enterprises. A small corpus exists questioning the theory and policy of clusters, such as Uyarra's (2010) critique of regional innovation policies that seek to mimic successful geographies such as Silicon Valley. She rightly points to such policies failing to accommodate the multi-level nature of any environment, as well as governments attempting to create innovative or creative clusters simply by shrinking the geographic scope of existing national policies without thought to how such policies translate to individual organisations at a local level.

One explanation for the lack of critique of clustering lies in the argument that the benefits of clusters and deliberate co-location with competitors are indirect, and need some proxy such as patent filing rates to gauge otherwise subtle and qualitative benefits (Fornahl and Brenner 2009). Howells (2002) argues that proximity does not help disproportionately to increase knowledge generation in its own right. Rather, it is the immediate consequences of this co-location that aid this affect. Howells (2002) details how the obvious manifestations of knowledge, codified in reports, books, journals, etc., are not the real vector that provides a boost to knowledge creation in these areas. All participants in the industry, local or remote, in theory have the same access to these materials. Rather, it is the informal interactions and social links that act to provide a boost to innovation and knowledge creation. Firestone (2010), Casia *et al.* (2008), Howells (2002) and others in the field describe this affect as

spillover. Spillover is information and knowledge overflowing one organisation and reaching its peers through these informal mechanisms.

A similar notion of the power of such social transfer of information, later boosting the innovative capacity of individuals and their employers, comes from Brown and Duguid's study of Xerox (2002). The authors observed the internal politics and machinations of Xerox's business, and saw the effect of location play out in two inter-related ways. First, they describe a similar effect of sharing and cross-pollination between like-minded practitioners in the same city. Brown and Duguid formalise this channel in their notion of communities of practice; a term that brings with it concepts of shared ideals, passions, values and beliefs. The strength of such a community is evident in the second part of their observations at Xerox.

When staff at Xerox were frustrated in their attempts to have the business (or more specifically, management) appreciate the novelty and inventiveness of their developments of the graphical interface for computers, they had available a natural conduit through which to release their partially formed ideas and inventions. In turning to their communities of practice, they felt a justified belief that their work would find value elsewhere. It was because this community existed, at and beyond the boundary of the organisation, and formed in no small part by the physical closeness of the people working in Silicon Valley, that the seeds of new knowledge found fertile minds in immediate vicinity.

> It is along these boundary-spanning interfirm networks that ideas often leak. If one firm cannot make something out of promising ideas ..., these networks will take them to others where they will be used (Brown and Duguid, 2002, p. 432)

The ideas for computer mice and graphical interfaces flowed through this network, and thrived. Xerox's organisational environment of indifference and impediment did not prevent this innovation and knowledge evolving and growing to the point of ubiquity in the IT industry. In a company physically isolated, where communication with industry peers and groups would not be as easy, such an escape route less likely would be found.

Unexpected cultural factors can complicate leadership decisions around location and proximity to clusters and other important knowledge sources. Gu and Tse (2010) provide insight into a problem specific to the Chinese domestic environment. Many observers in the literature see China as a natural powerhouse of innovation due to the sheer magnitude of its

population, and current economic climate. But a long history of emigration sees the domestic Chinese talent pool “hollowed out”. A huge population of junior talent exists, including new graduates and young entrepreneurs. A much smaller population of very experienced senior innovators also exists. This group is very small in size, and largely drawn from returned émigrés who have worked in high technology clusters like Silicon Valley. What China lacks is the middle-tier of experienced innovators and creators, able to bridge generations and link the great knowledge and experience of the small senior cohort with the raw capabilities of the junior cohort. A leader deciding to situate their innovative effort in China or a similar culture with strong emigration must be aware of, and deal with, this reality.

2.3.2 Leadership and the Influence of Government Policy

Government policy and action at local, provincial and national level, can contribute to healthy regulatory support for innovative industries. Goldberg (2006) provides coverage of the decade-long effort by the governments of British Columbia and Canada to address the slow attrition in western Canada's innovative capabilities, witnessed throughout the 1980s and 1990s.

Key to the strategy was identifying those aspects of industry that government policy and action could observe and affect. Goldberg (2006) highlights the governments' identification of the population of highly-qualified people within innovative industries, and the potential of locations like small and large cities. These cities could act as a crucible for emergent knowledge, sustaining social capital across industries and organisations, becoming key targets for policy intervention.

Policy makers recognised the need to address these demands using:

> (a) systematic approach that includes competitive tax policy, value-for-money public goods, and capital outlay for early stage ventures. (Goldberg 2006, p. 646)

Further policy instruments were catalogued by Goldberg (2006), including knowledge commercialisation assistance and environmental health. Brown and Duguid (2002) highlight the deliberate policies of government that have contributed to Silicon Valley's success at knowledge generation. The US Department of Defense at Moffett Field, NASA at the AMES Research Facility, and the National Science Foundation's numerous grants to quasi-government agencies in the region were deliberate policy initiatives of the US federal

government. The government acted as either leader or close follower in order to promote the growing knowledge ecology of the region.

2.3.3 Leadership Support for the Role of Brokers in Industry and Between Organisations

The way a company promotes sharing of information, and signals its preference for innovation, can result in greater knowledge generation and innovative output. In Cillio's study (2005) of four different industries, she found that those organisations which employed or promoted the behaviours of internal knowledge brokers gained a distinct advantage over their rivals in terms of quantity and value of their new knowledge creation. Cillio's concept of a broker was founded firmly in the idea of gathering and digesting market and consumer data. Brokers shepherd this data through organisations to extract maximum benefit, but also to prevent less useful information disrupting the innovative process.

Cillio (2005) further explored the outcomes of organisations in the industries she observed, that did not use such brokers. Instead, these organisations relied on direct transfer of information from customers straight to the business. Where the organisations were large and many participants were involved, the difference between broker-supported and non-broker-supported innovation was small, due to the overwhelming effects of technical and process-driven innovation. In smaller organisations, there is a substantial difference in outcomes, where those using brokers benefited greatly with innovative ways of working, products, and capabilities.

Fritsch and Kauffeld-Monz (2010) expand the notion of brokers as the hooks that allow an organisation to embed itself into a knowledge or innovation network. Their analysis highlighted the leader's dilemma in harnessing brokers to foster the “absorptive” capabilities of the organisation, while skirting the perils of being locked in to a point of information isolation, or shepherded into innovative “entropic death” (Fritsch and Kauffeld-Monz 2010). A key point explored, but not fully addressed, in their research is why some firms fail to grasp their position as broker between other organisations – it is unclear whether this is a failure of leadership to see the opportunity, or a misjudgment on the value of the brokers and their innovation-fostering benefits.

2.3.4 Team or Group Selection, Formation and Critical Mass

Assembling a team predisposed to innovation, or more capable of realising new knowledge, is widely regarded as one of the most desirable factors in facilitating emergent knowledge. It is simultaneously one of the most unpredictable factors. Peltokorpi, *et al.* (2007) observed firsthand how acknowledging that not just any team is suitable, and dispensing with organisational norms in casting the widest possible net to find appropriate talent can create an innovative climate that far exceeds any comparably-numbered team or group.

Atypical team selection techniques were highlighted again by Peltokori *et al.* (2007), in their analysis of NTT DoCoMo's i-mode project. The recruiting effort sought out contributors that had left the field, convincing them to return to participate in a counter-cultural group aimed at radical product innovation. Hoisl (2009) codifies these practices into an assessment of importance of mobility: not only attracting former contributors or team members, but accepting that future mobility, and the departure of team members is not only natural, but healthy. Management are challenged by Hoisl's findings that the highest performers in an innovative team will be more productive if allowed mobility. Essentially, Hoisl highlights the unspoken tenet of attracting desirable team members: they are sourced *from* some other organisation or team, thus mobility must be viewed as a two-way process.

If encouraging and allowing mobility for team formation is a leadership imperative, Nalbantian and Guzzo (2009) demonstrate how best to foster a mobile intra-organisational culture, and the perils of unmanaged or unbounded mobility. In the companies analysed, they observed that successful mobility cultures included management backing for identifying high achievers early; ensuring mobility covered different aspects and divisions of the business; creation of an internal job market; and equal concentration on ensuring a vacated position did not adversely affect the business area from which a team member was sourced. Equally strong indicators of poor mobility culture, and resultant poor innovation and lack of success were observed. The most telling practice of organisations hurt by mobility in forming innovative teams was where the innovation cycle was significantly mis-matched to the personal mobility time-line. Individuals were never exposed to the full cycle of product or process innovation, and thus innovative effort could suffer booms and busts of available mobile talent. Nalbantian and Guzzo proposed the idea of a “catcher” position (or leadership action) within an organisation, as someone who is exposed to all facets of the business, as well as customers and competitors. This catcher acts to advise where an individual would

match a given need, while ensuring that the whole picture of the business and its goals are kept in mind.

At the point of conception, Fong, *et al.* (2000) illustrate that heterogeneity in team make-up is crucial to fostering the formation of new knowledge, and encouraging innovation that will impact the wider organisation or industry:

> Multidisciplinary interaction is necessary because decisions reached from the standpoint of one discipline frequently have a major impact on the approach taken by another discipline. (Fong, *et al.*, 2000, p. 45)

This heterogeneity has additional major benefits to a team seeking to innovate, in providing greater capacity for breadth of endeavour as well as depth. The importance of breadth in overall innovative impact is highlighted by Leiponen and Helfat (2010). A team drawn from diverse foundations provides a greater variety of knowledge. Leiponen and Helfat show that even from a purely statistical standpoint:

> By accessing a greater number of knowledge sources, the firm improves the probability of obtaining knowledge that will lead to a valuable innovation outcome. (Leiponen and Helfat, 2010, p. 225)

The authors also illustrate another, more subtle, benefit from such a mixed innovation background in the team. Those of a similar background, or with similar previous experiences, are likely to shirk attempts to tackle similar problems or areas of uncertainty. That is, like-minded innovators avoid similar forms of ambiguity or risk. By creating a heterogeneous team, it is more likely that one or more team members will fight against this risk-aversion in specific areas, and allow the team to embark on innovation in a space that may have been avoided.

Post group formation, the practices, norms and dynamics of the team are in a malleable state, and initiatives such as informal meetings and events encourage conversation, camaraderie and most importantly lower the inhibition to informal knowledge sharing (Hoegl and Schulze, 2005).

2.3.5 The Role, Effect and Potential of Knowledge Custodians

Nonaka and Takeuchi (1995) established a seminal spectrum of knowledge, spanning tacit knowledge held mostly subconsciously by individuals, through to explicit knowledge codified in processes and systems. Harnessing this existing knowledge as a fuel to drive emergent knowledge requires an understanding and acknowledgement that new knowledge chiefly emerges tacitly within the cognition of people, rather than mechanically from explicit processes (Hoegl and Schulze, 2005).

The knowledge realisation process is conveyed in Nonaka and Takeuchi's (1995) Socialisation ® Externalisation ® Combination ® Internalisation pattern for new knowledge (SECI). New knowledge is first socialised as one person experiences or understands for the first time some tacit element. It is then translated by that person in verbal, symbolic or other form to an audience in a process of externalisation. Now shared amongst many people, it is combined with other knowledge, refined and restated, tested and used. Lastly, the new understanding from the experience of combination is internalised by the participants, feeding a new cycle of knowledge creation.

Exploiting the tacit knowledge of team members to directly feed new knowledge creation has been a demonstrated success in many cases (Hoegl and Schulze, 2005). Hoegl and Schulze summarise the efficacy of experience workshops employed by BP Amoco, and expert interviews utilised by ABB Switzerland. These techniques supported emergent knowledge realisation through the combination of context, direct experience, and know-how of others. Popadiuk and Choo (2006) stress that organisational knowledge depends on an enabling context and interpretation that contribute to new knowledge creation.

> [Constructing new knowledge] is dynamic, relational and based on human action; it depends upon the situation and people involved rather than on absolute truth or artifacts. (Popadiuk and Choo, 2006, p. 307)

Fong, *et al.* (2000) argue the need to return to the custodians of tacit knowledge when forming new teams to explore emergent knowledge and spontaneous innovation. While blending a variety of custodians together into a new group exacts a toll during the period that shared understanding is established, it is crucial in avoiding the pitfalls of rote-learning and group-think, which bring no understanding of context or existing knowledge into play.

Acknowledging the power of such collaboration between individuals from different units, divisions or sections is important in creating new knowledge from the sharing of existing knowledge (Adenfelt and Lagerström, 2005).

Much of literature is based on an implied axiom of "more is better" when discussing number of knowledge custodians in a team, and the amount of knowledge they contribute. Leiponen and Helfat (2010) show the results of an analysis into the effects of greater and greater numbers of knowledge sources forming within (or available to) a team. They identify a threshold of approximately eight extant knowledge sources, beyond which an innovative team would see diminishing returns. They find no evidence that higher and higher numbers of knowledge custodians is detrimental to a team: they merely cease to provide the same value of innovative outcomes.

Gershkov *et al.* (2009) suggest that organisation leaders with a surfeit of knowledge sources should encourage teams to compete in "innovation tournaments". The tournament model was proposed more as a challenge-based reward scheme (discussed in the next section), but shows the benefits to be had by a competitive model that allows sharing of results. This could potentially maximise the value of large numbers of knowledge custodians while simultaneously providing novel rewards for intra-organisational constructive competition.

2.3.6 Incentives, Rewards and Compensation

Providing mechanisms for peer assessment and reward promotes team members' receptiveness to new knowledge, and encourages their own willingness to contribute existing knowledge assets to the resource pool utilised in innovative efforts (Sherif and Xing, 2006). The actions of staff observed in Global Consult's knowledge management initiatives showed that the concept of credit could benefit the creators (in a financial sense) and the value of the new knowledge as an organisational asset. Particularly for small teams or businesses using incentives that motivate the exchange of information and knowledge – such as those referred to as *Ba* in Japan - and the formation of shared contexts/spaces, shared experiences, interplay, and collective memory are associated with the most innovative outcomes (Aramburu, *et al.* 2006).

Sherif and Xing (2006) showed that this approach worked across many types of project but found that the mechanism could act as a disincentive to classes of professionals who chiefly

operate under the billable-hours approach. Here, the act of assessing and rating new knowledge and its creators was seen as an unrewarding act in itself, incapable of being recognised by those professionals' own reward mechanism.

Non-monetary rewards act as a powerful motivator and contributor to knowledge creation and innovation. Where peer recognition and communities of practice are strong, the opportunity to explore new knowledge is itself a form of reward that benefits innovation (Cohendet and Simon, 2007). In this respect, Gershkov *et al.* (2009) show that multiple innovative teams, within an organization or across partnerships, can be enrolled in innovative tournaments where, in addition to the learning being shared at the end of the process, peer recognition of effort and contribution is achieved. It is also used to distribute bonuses – monetary or otherwise. Where team members observe, communicate and provide feedback on other teams' efforts in the tournament, the bonus prize pool is split according to peer-based recognition, eliminating any sense of bias or mismatch between effort and reward.

Chambers, *et al.* (1998) highlight that the power to craft the job itself can contribute to its attractiveness. The use of such non-monetary rewards is regularly reported to both attract competent people and induce and support new knowledge generation and innovation. Such job-attributes as having clear space from competing roles; autonomy in decision making; goals that stretch but don't discourage; a path for career progression; and the use of free exploratory time are recorded as being critical to the knowledge creation process (Deutschman 2004; Chambers, *et al.* 1998).

Monetary reward is not strongly correlated with the innovative or knowledge-generating experiences reported in the literature. One noted exception is where remuneration acts as a disincentive if it is judged to be significantly poorer than that of other team members; or of colleagues exploring broadly similar domains; or of members of a community of practice, profession or discipline at other organisations (Chambers, *et al.* 1998).

Ultimately, reward mechanisms are methods to communicate an organisation's value proposition to those it wishes would join its ranks. This proposition suggests the exchange of desirable features, in return for new team members aligning their interests and goals with those of organisation. Chambers, *et al.* (1998) reflect that in total, the proposition and its associated rewards need not necessarily be perceived as financially lucrative, but must

promise challenge, and the ability to learn from other collaborators, and partake in the realisation of truly new knowledge.

2.3.7 The Role of Brokers in the Micro-environment

Knowledge brokers act to close the cognitive distance among participants involved in innovative effort (Cillio, 2005). They select what parts of information will be of most use, and blend and reform multiple information sources to match information complexity to their audience's level of understanding. Brokers also facilitate the translation of existing and new knowledge characterized by varying levels of complexity, in ways that increase a community's absorptive capacity.

Cillio (2005, p.46) identifies four key types of brokers who act as conduits between markets for innovations and emergent knowledge, and those participating in creative genesis. These types are Knowledge Coders, Pure Knowledge Brokers, Information Brokers and Integrated Knowledge Brokers. Each form of broker is adept at promoting new knowledge realisation and fostering innovation in particular ways, as a function of the cognitive gulf and knowledge complexity in question.

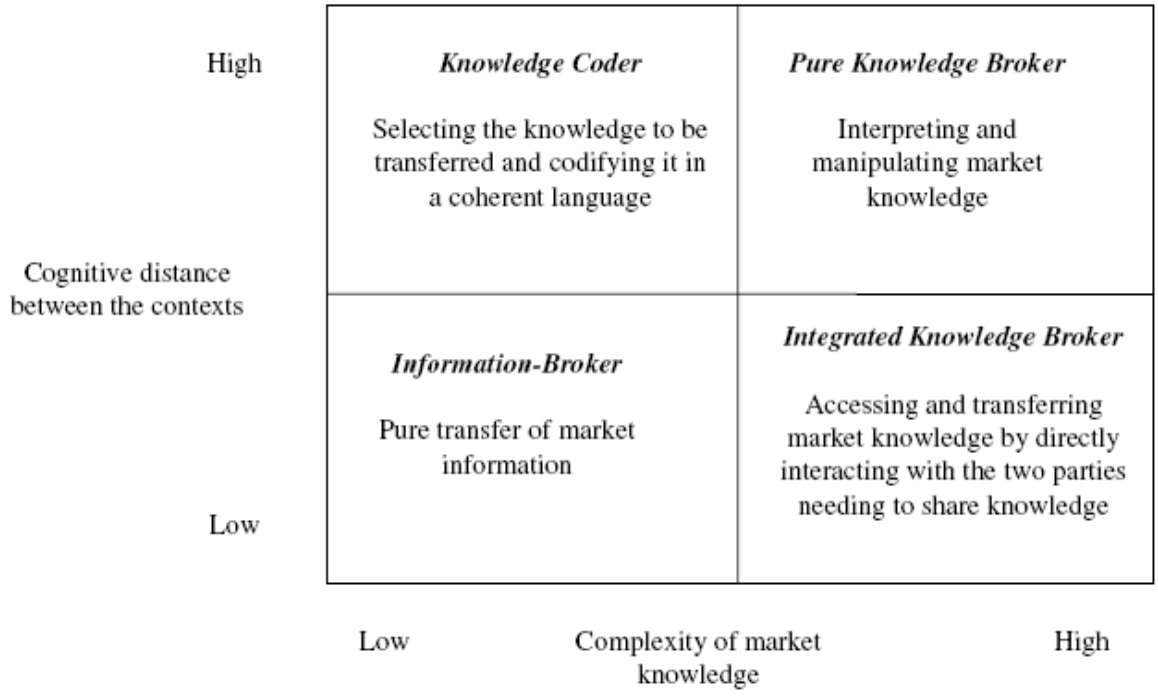

Figure 2.1 Typologies of Internal Knowledge Brokers
(Source: Cillio, 2005, p. 406)

Howells (2002) described the "knowledge broker" role as knowledge intermediaries, highlighting the effect such individuals have on individual firms participating in the gun, jewellery, contract research, and testing industries in Birmingham.

Intermediaries or brokers need not be explicitly nominated, and can emerge out of the social interactions and relationships between actors (Kodama, 2007). Kodama transforms the notion of communities of practice (Brown and Duguid, 2002) at the individual organisational level into strategic communities. Many strategic communities can act simultaneously within the one company. Particular actors in these communities act as hubs, "dynamically bridging" multiple communities or boundaries to facilitate innovation (Kodama 2007).

Similar pragmatic brokers emerge in circumstances such at DoCoMo's utilisation of the *Ba* perspective in creating contexts for teams to explore knowledge and pursue innovation. Here, Peltokorpi, *et al.* (2007) highlight the role middle-managers play, bridging the visions of top-management with the dynamic frenzy of the production team, and using the power of language to construct meaning and to contextualize action.

> They internalize visions through interacting with top managers, and play the roles of instructor, coach, mentor and coordinator to facilities knowledge creation. (Peltokorpi, *et al.*, 2007, p. 57)

When an organisation gets to a large or very large size, there is benefit in formalising the role of a knowledge broker. Hoegl and Schulze (2005) raise one of the key issues faced by large organisations in arguing that their very size makes moving ideas, knowledge and know-how from one part of the organisation to another, a significant challenge. Such scale makes it difficult for everyone in the organisation to know everyone else. It particularly inhibits any one person from understanding everything about the business, and the knowledge assets it possesses. Specialisation increases with company size and, while it can be an important catalyst in the creation of new knowledge, it can also magnify the problems of information hoarding and impenetrable knowledge silos. Hoegl and Schulze (2005) describe how IBM has addressed this issue through the creation of a dedicated knowledge broker role in the IBM Relationship Manager. This style of broker is charged with spending equal time as researcher and liaison officer, with the most critical skill identified as their ability to make connections between those seeking knowledge, and the resources that can provide it.

A broker's ability to act across the organisation, and at the industry and macro-environmental level beyond the firm itself, is in large part affected by the porosity of the intra- and inter-firm boundaries.

2.3.8 Organisational Structure, Rigidity and Formalism

The organisational structure in which knowledge generating and innovation activities take place affects the outcomes achieved by such activities. While arguments about the negative effect that the functional hierarchical organizational structure has on innovation efforts abound, new, more innovation-friendly, organizational structures – such as the cellular structure – are showing promise in this respect (Deutschman, 2004). W. L. Gore, an organization recognized as one of the most innovative in the world, is thriving, producing an ever-increasing range of innovative products based on its expertise and innovative capability in fabrics and plastics. Commenting on the role of its cellular structure on its success, Wilbert Gore, the company's founder, noted:

> ...[W]hen there's a crisis, a company creates a task force and throws out the rules. That's when organizations take risks and make big breakthroughs. Why, he wondered, should you have to wait for a crisis? (Deutschman, 2004, p. 55)

Creating organizational agility, and eliminating the forced use of one-size-fits all knowledge management practices, is seen by Sherif and Xing (2006) as beneficial to innovational efforts. Effective leveraging of existing knowledge in new innovative endeavours happens at a scale no larger than the smaller constituent groups or projects within very large organisations. In this respect Sherif and Xing (2006), drawing on their research in a large global IT consulting firm, comment that structural rigidity can inhibit the flow and use of existing knowledge assets. Similarly, O'Leary-Collins (2005) illustrates how scale can be used directly by innovative firms and by those funding innovative effort, through collecting multiple innovative efforts together into innovation portfolios, thereby gaining “strength-in-numbers”. Furthermore, Aramburu *et al.* (2006) highlight how organisational size, scale and rigidity impact the knowledge-generative context (*Ba*) and the socialisation-externalisation-combination-internalisation (SECI) models of Nonaka and Takeuchi (1995). An organisation that prevents the significant actors in knowledge generation from moving freely to all points of an organisation as they see fit, adversely impacts the health of the *Ba*, and inhibits each phase of the SECI approach. Such promotion of mobility is the logical conclusion of the

mobility-in-team formation discussed previously, and covered extensively by Hoisl (2009). Organisations heavily reliant on the top-down or bottom-up physiognomy can combat the disadvantages inherent in such structures by using the middle-up-down approach to improving the vitality of the vision, context and exchange of knowledge (Nonaka and Takeuchi, 1995; Aramburu, *et al.*, 2006). This approach was used in the DoCoMo i-mode project, where middle managers were charged with the "care" of knowledge creation, acting as the universal conduit between staff, line-managers and top level executives (Peltokorpi, *et al.*, 2007).

Empirical evidence for successful hybrid organisational structures has been observed in the video game industry. Cohendet and Simon (2007) witnessed communities of specialists thriving in their efforts at new knowledge creation and innovation, being supported by a skeleton hierarchical structure in business areas that played a purely administrative role, such as finance and accounting. Cohesion amongst the project teams, and the other departments of the organisation, was maintained through project leads forming a trans-organisational creative committee, to align the sometime-chaotic game invention and knowledge creation with the business needs of profitability, liquidity and long-term survival.

Taken to the extreme, relaxing organisational structure and form leads to the analysis of partial or whole outsourcing of effort for the innovating firm. Several researchers in the field provide insight into the types and degrees of outsourcing that work, and the threshold at which an outsourcing firm ceases to be innovative itself. Cusmano *et al.* (2009) followed the outsourcing behaviours and outcomes of industry in the Lombardy region of Italy. They found that a clear spectrum existed, where outsourcing to partner firms or related entities provided concrete benefits to the innovative effort, followed by reasonable outcomes when firms outsourced to unrelated entities in the same region. However, in this study, few, if any, organisations had tried, or succeeded, in incorporating offshore outsourcing into an innovation framework. No matter the degree of outsourcing, organisations with successful innovation programs tended to only outsource non-core, support functions such as administration and basic information technology. Windrum *et al.* (2009) performed an analysis of numerous studies in the field, and developed strong conclusions that firms wishing to innovate should never outsource their core innovative functions. They found that this led to the antithesis of a successful innovative culture, with the organisation hamstrung at future attempts to innovate, and management left misconstruing short term cost benefits for

long term innovative advantage. A leader looking to craft a contemporary organisational structure would thus heed the warnings against attempting to short cut their way to innovation, even though their rational assessment may call for it.

> Managers are boundedly rational, in that they do not know the characteristics of the stochastic process that generates incremental and radical innovations, or the final payoffs to each strategy. (Windrum *et al.* 2009 p. 212)

There can be unintended casualties in projects seeking innovation and new knowledge within a centralised and formalised organisational structure. The organisation's enabling culture can be retarded by the constant struggle with the strictures of the formalised hierarchy, negatively impacting the desire for future collaboration, learning and trust (Adenfelt and Lagerström, 2005). A polar opposite is described by Goldenberg *et al.* (2009), where an organisation deliberately opens itself, not just to collaboration but also to early interaction with potential customers and adopters, through engaging innovation "hubs". These are people or groups of people in a social network who lead or influence the decisions of others in adopting new innovations. Engaging with such hub actors allows an innovating firm to harness positive opinion to further the success of innovation, as well as to gain access to diverse opinions and feedback through the large social connectedness of the hub – resources that would not normally be available to the typical firm. The authors leave a powerful question to be considered by leaders of innovative effort: if harnessing the power of such hubs can be so beneficial, should a leader go so far as to actually co-opt or enroll them into the innovative team itself? This leads to questioning the very nature of the organisational boundary, discussed next.

2.3.9 Porosity of Boundaries Within and Between Organisations

The porosity of boundaries within an organisation, and between it and its environment, contributes to its ability to exchange and combine knowledge assets to form new knowledge. Cohendet and Simon (2007) traced how creativity flowed in a video game development firm, allowing parallel teams to innovate based on new knowledge from surrounding groups within the company. The video game firm concluded that the best creativity and innovation was demonstrated when the project teams developing different games were not totally isolated, nor forced into an unnatural hierarchy. Rather, optimal innovation was exhibited when the project team members were allowed to operate as specialists partly involved in their

communities. Importantly, the team members were also free to interact across the nominal boundaries with no prescribed approach or rigidly enforced protocols. The term community of specialists was coined to describe the participants who could explore the "informal cognitive spaces" and permissive boundaries to trade knowledge and information (Cohendet and Simon, 2007).

One measure of the benefit derived from a porous boundary to the organisation is in its absorptive capacity. Spithoven *et al.* (2010) characterise this as an organisation's ability to monitor and accept from the environment technology and knowledge over and above that generated by in-house innovative effort. The authors take absorptive capacity beyond the traditional definition of a simple internal R&D effort, and build the concept of open inbound innovation to describe deliberate policies leaders can foster to systematically search out valuable input to the firm.

Unexpected rigidity or unplanned impermeability of organisational boundaries can have insidious effects on the health of the emergent knowledge environment, and the ability to innovate. Rogoff (1990) highlights the importance of shared understanding, shared stories, and communication of shared history in enhancing the factors within and between groups that facilitate knowledge sharing and provide the grounding for innovation. But when the units within an organisation struggle to use a common language, effort can be lost in adapting and compensating for this – effort lost to the knowledge creation or innovation cause (Adenfelt and Lagerström, 2005).

Managers and leaders can mitigate the buffering or insulating effect on knowledge generation, of the gaps or holes that exist between group boundaries. Burt (1997) shows that the boundaries, or network holes, can be spanned by leveraging relationships and contacts in other teams. This opens further possibilities for information flow and feeds the environment of emergent knowledge. By allowing porous boundaries to promote communication, additional benefits flow from the simultaneous support this gives to the formation and strengthening of social capital.

2.3.10 Understanding and Exploitation of Social Capital

Social capital exists between the participants in a social network, and is a shared asset. It has significant "stickiness" in that it cannot easily be traded or swapped for other assets. Thus any

social capital developed within the organisation becomes a competitive advantage that is hard to mimic or reproduce elsewhere, and can be leveraged to generate intellectual capital (Nahapiet and Ghoshal, 1998).

Leveraging social capital within an organisation promotes the internal flow of existing knowledge, guides future endeavours and emergent knowledge realisation, and increases the stocks of knowledge within an organisation. These assets are enhanced, rather than diluted or exhausted through use (Thornhill, 2005). Fritsch and Kauffeld-Monz (2010) conclude that members of a social network make available the inherent social capital for social returns rather than private benefit.

Social capital can be categorised into three segments, each capable of nourishing and supporting knowledge generating activities aimed at innovation. First, structural aspects of social capital can enhance innovative undertakings by facilitating exchange and combination practices in attempts at new knowledge realisation. Structural attributes of the social capital network allow members to greatly exceed their individual capabilities: attributes such as the topography of the network (be it hierarchical, hub-and-spoke, etc.), the density and redundancy of paths through the network, its total size, and the poly-specific capabilities of acting to benefit scenarios for which it was not originally formed (Nahapiet and Ghoshal, 1998; Burt 1997).

Second, the relationship dimension of social capital builds one of the key observed contributors to successful innovation and ingenuity at the micro-level – participant trust. By building a shared feeling of trust, communication of ideas and existing knowledge flow more freely, and members of the relationship network within the organisation are more willing to take risks, especially within uncertain or ambiguous contexts (Nahapiet and Ghoshal, 1998). Furthermore, in combination with the “obligations and expectations” aspects of the relationship axis of social capital observed by Nahapiet and Ghoshal (1998), group participants know what capabilities their colleagues and team-members have, and just as importantly, those that they lack.

In White and Dovey's (2004) case study of a software development firm, the magnifying effect of these particular social capital enablers was shown. First, the formation of the team was based on implicit trust by both management and new team members, and optimistically-

modelled use of expectations to entice, rather than coerce, volunteers to join the innovation effort.

> Rather than trying to persuade members of staff ..., the strategy of the CEO was to tacitly appeal to them to voluntarily 'migrate' to the project; an act through which they would be demonstrating the flexibility of their orientation to work and learning. (White and Dovey, 2004, p. 408)

The very act of volunteering to join the team showed a capability to be flexible, adapt to, and exploit an emergent knowledge scenario. Once enmeshed in the team, the same aspects of social capital were observed to foster new knowledge creation. The team adopted contemporary project management practices around team meetings, and daily check-ins, where personal goals, objectives, fears, and feelings were freely exchanged. This mechanism quickly grew the trust assets of social capital, as well as re-enforcing the tacit and explicit understanding of capabilities within the team, and the consequential expectations of achievement. This allowed the pursuit of new knowledge and innovation in the fully justified expectation of positive support and encouragement from the team, without fear of competitive inhibition or impairment.

Third, the cognitive dimension promotes shared understanding, stories, and beliefs amongst members exploiting the existing social capital resources, and enabling the exchange of sources of meaning in, and exploration of, new knowledge to progress more quickly across the joint capital base (Nahapiet and Ghoshal, 1998). Additional powers are brought to a group that enable its participants to more quickly assimilate existing knowledge and explore new knowledge more rapidly through guided participation (Rogoff, 1990). The relationships and exchanges along the lines of trust are used to quickly test and evaluate new knowledge as its genesis unfolds. Burt (1997) adds fine-grained detail to the innovative benefits and increased opportunity available to those who grasp the power of social networks. These benefits come

from access to information on a magnified scale, timing benefits in early exposure to existing and new knowledge, and referential confirmation of data by the network.

The promotion of norms, sanctions, obligations and expectations are hallmarks of social capital, and help diverse communities seek closeness in their quest for new knowledge and innovation. Coleman (1998) illustrates that these aspects of social capital can be taken to

extreme, where the similarity in the cognitive dimension of participants becomes an inhibitor. Rather than allowing members of the social network to leverage the assets held collectively in ways they see fit, the threat of sanction, and even expulsion from the network, is used to continually narrow the focus to only areas of knowledge exchange and discovery that are deemed suitable by the homogeneous group. Rogoff (1990) reflects that a certain difference in participants is required to avoid such an insular mindset. Coleman (1998) notes that the tendency to move from supporting knowledge exploration, to only seeking existing knowledge confirmation is especially strong where identities in the network enforce sanctions and expectations in selfish ways. The identities effectively sacrifice the common wealth of social capital for their own personal gain.

Burt (1997) provides additional insight into social capital's potential to contribute to emergent knowledge through his elaboration of structural hole theory within the networks that form social capital. Figure 2-3 illustrates Burt's observation, that maximal value from the social capital network, including the benefits to innovative endeavour, is contingent on relative scarcity of peers possessing a given skill, talent or knowledge base within the network.

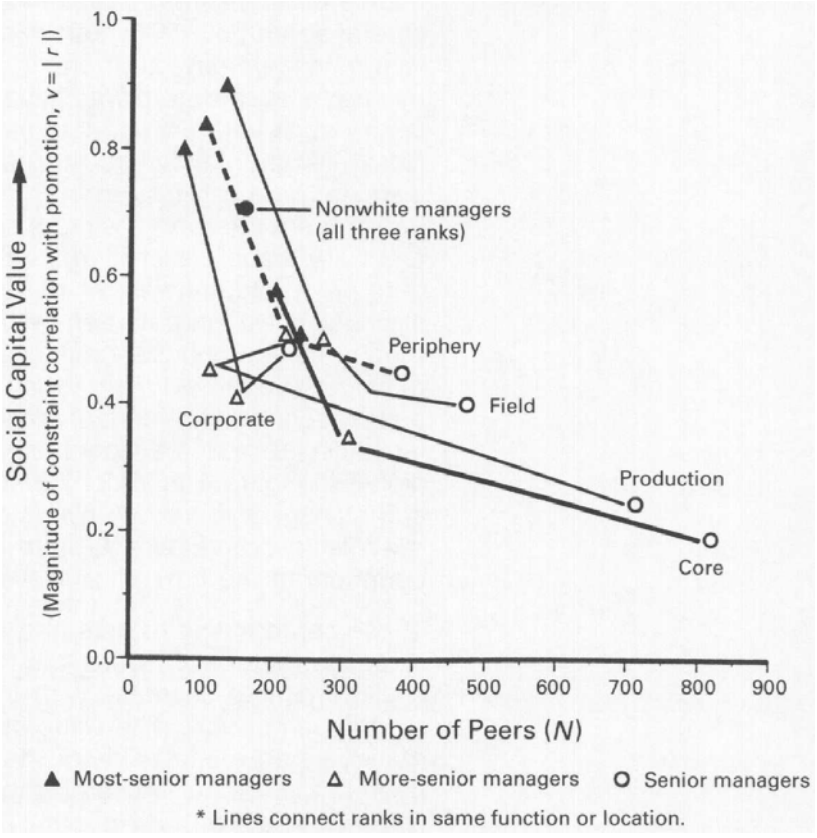

Figure 2-3. Social capital value variability as a function of peer number
(Source: Burt, 1997, p. 353)

By enlisting well-matched team members with few peers, networks embodying the social capital can be strengthened, and bridges to other networks made that provide new and different support to innovative efforts and knowledge realisation.

The literature presents several significant criticisms of Social Capital theory, as well as studies of its limitations and drawbacks. In their study of social capital in the context of industry clusters, Molina-Morales and Martínez-Fernández (2009) provide one of the most telling insights into issues with social capital. The authors highlight that the very qualities and foundations that allow organisations to find early innovative success through exploiting social capital can become limiting and even detrimental factors at later points in the firm's innovative maturity. Explicitly, they found that the effort and obligations in exploiting social capital, maintaining trust, and supporting the surrounding network are compensated by significant early advantage in innovative efforts. But as the level of trust in the network grows, and members become familiar and more repeatedly exposed to the same actors and themes, the benefit of social capital can degrade because the rigour in the host network itself decays. Members become overly trusting, unquestioning and comfortable with the relationships and connections, and more effort, cost and time must be spent to extract a similar benefit. Molina-Morales and Martínez-Fernández coin the phrase “too much love in the neighborhood” to describe the effect.

2.3.11 Learning Culture and the Learning Organisation

Learning cultures thrive when the benefits of the learning pattern are reaped directly by those whose efforts form the culture in the first place. Sherif and Xing (2006) reported that the project consultants within the Global Consult organization they researched, realised they were helping themselves every time a new project was initiated because they were using the documented experiences of success and lessons learned from previous projects as the starting point.

Culture can be inherited from the organisation's structure and history, but can also be successfully revamped if found to be inhibiting. Peltokorpi, *et al.* (2007) reveal that one of the greatest culture-building techniques used by DoCoMo's i-mode team was the abolition of the boardroom or hotel-room meeting space, with its rigid meeting-table and psychological

imposition of barriers between all participants. In its place, a shared context was brought to life in the cultural choices of how meetings would happen, by the purchase of leather lounges, a karaoke machine, and a well-stocked bar. These actions built core messages into the culture – remove any barriers, share the mental and physical context.

Hoegl and Schulze (2005) provide numerous techniques to promote a learning culture that directly contributes to innovative capability and healthy environments for emergent knowledge. These include informal meetings, workshops, briefings, interviews with experts, and using brokers to signal support for a learning culture. Of particular benefit is encouraging individuals to participate and share their knowledge, with the goal of creating new knowledge when those individuals hold "correct and complimentary" knowledge (Adenfelt and Lagerström, 2005). This acts as a beacon to others to contribute to and enhance the learning culture.

Inculcating the learning culture predisposes the organisation to innovation, and in so doing, increases the first-mover activity by that organisation in its environment. This, in itself, can create a formidable competitive advantage (Thornhill, 2005).

Sustaining the learning culture allows an organisation to move from a single instance of knowledge creation to an environment that supports the continuity of emergent knowledge. Dovey and White (2005) explore three strategic approaches that allowed White's firm, WiseTech Global, to create a learning organisation. First, revisiting the core values of the organisation renewed the commitment of all staff to innovation. Second, staff members were empowered to participate in fora and make decisions to propel ideas and new practices. Lastly, consensual responsibility for progressing innovation was agreed, with the management enlisted as a peer rather than governing influence.

2.3.12 The Role of Leaders and Leadership

Successful leaders of innovative enterprises provide the best enabling systems and structures to allow staff to explore and exploit knowledge, and share and mix tacit knowledge bases to create new knowledge (Tsai and Li, 2006). Taken to its most sophisticated form, Fong, *et al.* (2000) crystallise the epitome of innovation-supporting leadership in the concept of the value management style of leadership. This emphasises dedication to the motivation of staff, their skill development and the promotion of synergies wherever they may emerge. In doing so,

the value management approach seeks to maximise innovative and knowledge-creating outcomes, while satisfying all stakeholders who have contributed their tacit and explicit knowledge to the realization of these outcomes.

The speed of innovation and knowledge creation is influenced by leadership practices that promote individual learning and, as a consequence, opportunity for emergent knowledge realization. These include moving staff to more demanding or challenging positions before they are fully comfortable with the idea (Chambers *et al.* 1998). The challenge of adapting to a new role, and the concomitant realisation of a skill or knowledge gap to be filled, provides a positive environment for knowledge generation to flourish.

Leadership that involves itself directly in the selection of the knowledge workers within the firm directly contributes to the innovative capabilities that are built in an organisation (Chambers, *et al.* 1998). By acting directly, leaders form a unified mindset amongst a team, which can be maintained more easily through regular reference to the performance and outcomes that are achieved. The relative importance of leadership can alter dependence on how the determination (or lack thereof) for innovation is reflected in the business context for emergent knowledge. When DoCoMo adopted the concept of *Ba* to act as the context for the project, it deliberately acknowledged that leadership would link that context to the knowledge creating process (Peltokorpi, *et al.*, 2007). Using concrete steps such as establishing the vision for the team, linking the past, present and future of the company and project to possibilities at hand, DoCoMo leadership of the i-mode project fostered the recognition of emergent knowledge as an ongoing cascade of potentials to be exploited.

Less theoretically, Peltokorpi, *et al.* (2007) illustrate how the i-mode project used leadership to unleash the innovative potential of the team by promoting unusual and out-of-the-box actions. The i-mode project leaders publicly invited new team members from all over the company, eschewing Japanese cultural norms and, in doing so, highlighting their desire to innovate at every step in both core and supporting processes.

White and Dovey (2004) show how strategic intent in owner-led organisations can particularly equip a firm for innovation without prescribing exactly the course or nature knowledge should take. In responding to regulatory stimuli, White's firm – WiseTech Global – developed supporting contexts that firmly recognised the strategy of knowledge emergence, rather than targeting specific new knowledge

> Interests would transform concurrently with the contexts that give them meaning, and therefore the knowledge that serves them would be emergent – it would not develop into a fixed state, but would always be a 'work in progress' (White and Dovey, 2004).

Leaders who embrace a values-based model are seen by their followers as the best guide for embracing change and uncertainty that accompanies the ongoing environment of emergent knowledge (O'Toole 1995). By displaying capacity to listen to the goals and ideas of staff, encourage team members to challenge the status quo, grant autonomy and decision making powers to the knowledge worker, and take the lead by exemplary action rather than executive fiat, leaders distinguish themselves in challenging and uncertain environments, and promote innovation and new knowledge.

Leaders of organisations seeking innovation longevity must master the paradox of short-term survival versus long-term success. A benefits realisation approach, or what Andriopoulos and Lewis (2010) call ambidexterity, can allow a leader to balance the need to survive by cashing in on apparent success early, with the patience to extract full benefit at the risk of exposing stress in the organisation. The authors frame ambidexterity as a leadership approach allowing successful balancing not only the above-described survival paradox, but also of possibility/constraint, passion/discipline and diversity/cohesiveness paradoxes. They summarise ambidexterity as the ability to both split and integrate conflicting forces to the benefit of the organisation and its innovative drive.

2.3.14 Determinism and Prescribing Knowledge Realisation and Innovation

Peltokorpi, *et al.* (2007) summarise the linear model of innovation, within new product development scenarios, as a process commencing with scanning and searching for candidate emergent areas, followed by the application of selection criteria, provision of necessary resources for realisation, and ultimately delivery of the new product or service. They highlight the attraction of the simple belief that this linear course can be traversed at will, and the folly of ignoring the social context in which innovation and knowledge creation occur. Without a holistic approach, such as their context/process/leadership analogy, determination alone is not a sufficient condition to generate new knowledge.

This realisation is brought into clarity when assessing the performance of new ventures and their subjective knowledge generation and innovation success (Tsai and Li, 2006). As new ventures possess little of the baggage or history of existing firms or organisations, the efficacy of knowledge creation strategies are affected by fewer co-factors. Tsai and Li (2006) demonstrate that executing knowledge creation strategies that facilitate flexibility, dynamism and support provide a beneficial environment for the creation of new knowledge assets. Those that set a fixed imperative to innovate do not create such a supportive environment.

One particular factor that plagues attempts at prescriptive innovation is the aversion to risk. Several researchers (Bekefi *et al.* 2009, van den Bergh 2008) show fixation on risk as an inhibitor of innovation. Further, such emasculated innovation leaves a vacuum in which competitors with a healthy attitude to risk can exploit. Bekefi *et al.* (2009) remind us that risk and innovation are "two sides of the same coin". The literature is in general agreement that prescriptive avoidance of risk will lead to innovation failure.

Furthermore, there is little support in the literature for the notion that an organisation, team or individual can simply deem innovation to happen, or new knowledge to be discovered, by sheer force of will. Instead, support is offered for the approach of adopting innovation as a strategic intent, and aligning strategic initiatives and vision to enable – not force – a knowledge-generating environment.

2.3.14 Emergent Knowledge Realisation and Innovation as Strategic Intent

Innovation as strategic intent is exemplified by the success of DoCoMo's revolutionary i-mode project (Peltokorpi *et al.*, 2007). The firm's president established a vision for innovation, and created a semi-autonomous team free from direct oversight or direction. In doing so, a clear preference for innovation was established without prescribing the ultimate direction.

Thornhill (2005) identifies one of the benefits of approaching knowledge creation and innovation as strategic intent: a given industry and its structure is difficult to change, but the learning and innovation intent of the organisation is not, and identifying the innovation-performance relationship can help adapt the organisation to its industry. With the intent to innovate, strategic initiatives such as talent identification, selection, investments in training

and development, retention programs, rewards, and resource allocation can all support the knowledge realisation vision (Chambers *et al.*, 2005)

Articulating an innovative strategic intent allows leaders to guide the creative effort, within a chaotic emergent knowledge environment, towards the attainment of a set of goals and, ultimately, the fulfillment of the company vision (Nonaka and Takeuchi 1995). This is exemplified in Mazda's decision to pursue the development of the rotary car engine, which Nonaka and Takeuchi (1995) observe was an outcome of the company deciding to pursue its innovative "fate" rather than a direction to satisfy some economic mandate.

2.4 Conclusion

The review of literature has explored many of the factors that contribute to, and form, the supporting environment for knowledge creation and innovation. There is strong support from the research literature for the role of leadership practices of various kinds, in the fostering and promotion of knowledge creation endevours that lead to innovative outcomes for an organisation.

Organisations, their leaders and decision makers, should be aware of the contextual factors that can affect their innovative ability. The particular industry, its dynamism and the competitive forces at play within it, demand a certain innovative vigilance. The choice or circumstance of physical location will affect the interplay with communities of practice, and the benefits to be drawn from the local and regional policies of governments and regulatory authorities.

Within the organisation itself, crucial aspects of innovative effort will be determined not just by the explicit acts of creative employees at a certain moment but by a wealth of factors that have guided and led them, and that have shaped the immediate environment of the group in which they work. Team selection and group formation; understanding the place of knowledge custodians; and the generation and leveraging of social capital all play a significant role in the synergistic creation of knowledge. Providing desirable incentives and rewards helps motivate individuals and teams to generate knowledge that aligns with an organisation's innovative vision and purpose. Furthermore, avoiding structural rigidity, and the facilitation of knowledge exchange by brokers transcending the boundaries of the group, and the

organisation as a whole, are hallmarks of an environment that is amenable to the cross-fertilisation of ideas and collective creativity.

Setting a strategic vision for innovation, and communicating this intent - rather than a mandate - for specific knowledge creation or innovation provides appropriate direction without prescribing requirements the means to achieve desired outcomes. Building a learning organisation requires the harnessing of appropriate emergent knowledge and the creation of a culture in which innovation thrives. In this respect, leadership succeeds in nurturing innovation when a wide collection of trusted practices and behaviours forms a cohesive value proposition to those being led, and demonstrates consistent leadership support for the organisation's espoused strategic intent to innovate.

One question that much of literature skirts - vaguely alluding to but rarely tackling head-on, is this: What practices of leadership, in what combination and to what degree, combine to foster repeatable, valuable innovation? Can such leadership practices be learned, and in their execution, can a leader repetitively craft new innovative teams?

Chapter 3 - Research Methodology

3.1 Introduction

In order to best understand and apprehend the reality in which leadership practices exhibit, a theory of that reality is needed to act as the foundation on which to identify an appropriate research methodology through which to address the research question. In this respect, Crotty (1998) provides a useful outline of how a research framework can be developed. This process commences with an exploration of the nature of the reality in which the research phenomenon manifests. Thereafter the nature of the knowledge that the research is intending to access, and the manner (methodology) through which this knowledge will be accessed, needs to be determined. Finally the methods of data collection and analysis need to be established. Thus, in order to develop the most appropriate methodological approach to the research, each of the following four realms needs to be addressed:

1. The identification of the ontological assumptions that underpin the research. The researcher needs to understand the nature of the reality in which the research phenomenon manifests;
2. The identification of the epistemological assumptions that underpin the research. The researcher needs to understand the nature of the knowledge that is being sought through the research process;
3. The research methodology that allows the researcher to access the knowledge required to address the research question most effectively;
4. The methods to be employed by the researcher in gathering and analysing the relevant data.

3.2 Purpose of the Research

The preceding review of literature highlighted several areas in the realm of leadership and innovation where knowledge in the field is limited, or gaps exist in understanding the practices used by leaders in high-technology environments to realise innovation. The chapter concluded with these questions: *What practices of leadership, in what combination and to what degree, combine to foster repeatable, valuable innovation? Can such leadership practices be learned and, in their execution, can a leader repetitively craft new innovative teams?*

3.3 Research Question

I was seeking answers to the question of whether leadership plays any role in the creation of innovative products, services and practices within high-tech organisations and, if so, what is the nature of that leadership? Through dialogue with relevant others, the research question was refined to: *What practices of leadership underpin repeatable, valuable innovation in one global high-tech organisation?*

3.4 Research Objectives and Outcomes

The objective of the research was to gain access to knowledge of the means through which innovation within a specific high-technology organisation is achieved. Through the application of a selected research methodology, the intended outcome was the articulation, in explicit form, of knowledge related to the leadership practices that underpin successful innovation within the context of this high-tech organisation.

3.4 Research Audience

While of interest to academics and researchers in the fields of leadership and innovation, this thesis is also targeted at employees and leaders of organisations in the high-technology field.

3.5 Research Contribution

Through the development of the understanding of leadership practices that manifest during the research process, this thesis aims to contribute to enhancing our understanding of the role that leadership can play in the creation of new, innovative high-tech products and services.

3.6 Ontological Assumptions Underpinning the Research

At the broadest level of investigating any phenomenon, the researcher must determine the nature of the reality in which the research is situated. The research question - *What practices of leadership underpin repeatable, valuable innovation in one global high-tech organization?* – assumes a social reality that is co-constructed through human practices and cognitive endeavor. This implies an inter-subjectively created and sustained reality that has no objective basis. It assumes that a reality in which concepts of 'leadership', 'innovation' and 'high-tech organisations' make sense, does not exist outside of human consciousness. Thus, the ontological assumptions point to the location of this research within a constructionist research paradigm. As De Figueiredo and da Cunha (2007, p.70) comment, the assumption within this

paradigm is that social reality is co-constructed 'through our interactions with the world, in an emergent process that changes knowledge as we keep interacting with the world'. This means that social reality is in a continual state of flux, as it is created and re-created according to human interests, values and interpretations of experience. In this respect, LeMoigne and Morin (1999) points out that our knowledge of social reality is accessed, and created, through our interactions with it.

Thus the notions of "leadership" and "innovation" are social constructs that enable human beings to engage with each other in particular contexts in their attempts to realize their everyday individual and collective interests. As such, the apprehension of these concepts continually transforms as human interests change.

3.7 Epistemological Assumptions Underpinning the Research

The next philosophical question that a researcher must ask is that of the nature of the knowledge that is sought through the research effort. Does it exist in objective form or is it subjective in nature? Having located the research within the constructionist domain, the assumption is that the knowledge sought through this research is inter-subjective in nature and manifests in everyday practices, activities and discourse. An implication of this is that this knowledge is emergent; that it is accessed through self-reflexive and collectively-reflexive processes, and that aspects of it can only be accessed through action. Thus certain forms of knowledge – or *knowing* – only manifest *in practice* (that is, in *doing*) and accessing such knowledge requires participation in the actions through which such knowledge manifests. In this respect, Denzin and Lincoln (2005, p.24) point out that this subjectivist epistemology means that access to the requisite knowledge involves social processes.

These epistemological assumptions raise issues such as the meaning of "leadership" as a practice. As a human construct that is contingent on context, what differentiates "leading" from other social practices? Addressing this issue becomes an important aspect of this research in that it is attempting to identify that which differentiates those social practices that enhance the possibility of innovative high-tech products and services being created within a specific organisational context. A secondary interest is in the innovative nature of the tangible outputs of the research - such as products, software code, process-knowledge, etc. - that these practices generate.

Research located within the constructionist paradigm seeks to understand and apprehend how social interaction and discourse creates, embodies, develops and consumes the research-pertinent knowledge. This requires a form of critical inquiry – that is, a form of research activism that is party to the ongoing transformation of a specific socially constructed setting.

The decision to locate this research within a research paradigm other than the positivist paradigm was a brave one given the problems relating to the credibility of alternative research paradigms within high-tech organisations. Within these settings the positivist research paradigm is generally taken for granted – the assumption being that the 'scientific method' is the only legitimate way to conduct research – and 'subjectivist' research is greeted with scepticism. Assuming a single reality, positivism makes no distinction between the natural reality and social realities. While this approach to research has had spectacular success in the natural world, its success in the social world is questionable. In this respect, the increase in the rate of adoption of alternative research paradigms in social research (including that conducted in high-tech settings) over the past thirty years (see Richardson and Robinson, 2007; Chen and Hirschheim, 2004; and Walsham (1995) is an indicator of a new awareness among researchers of the different nature of social phenomena (compared to natural phenomena), and that positivist assumptions may be flawed with respect to social realities. Another issue relevant to this research was that it became clear that the complexity of the research question required a more appropriate research methodology than that of positivism in that with positivist research the research question is adapted to the requirements of the methodology. This 'reductionism' leads to the operationalising of the research question by reducing it to its simplest form. From the perspective of alternative research paradigms, this would over-simplify the complex social phenomena under research in ways that would negatively impact their integrity and, thereby, the validity of the research (in the sense that the research is no longer addressing the complex phenomenon it purports to be addressing).

3.8 Research Methodology

Given the assumption of an emergent, inter-subjectively constructed reality and a subjectivist epistemology that endorses critical inquiry as the primary mode of knowledge acquisition, an appropriate methodology was required. Action research was recognised as the exemplar methodology for research located within the constructionist paradigm.

3.8.1 Action Research

Reason and Bradbury (2001, p.1) define action research as:

> a participatory, democratic process concerned with developing practical knowledge in the pursuit of worthwhile human purposes, grounded in a participatory world view... It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions.

Action research embraces the practice of *praxis* whereby theory and practice are viewed as being in a dialectical relationship wherein theoretically-informed-action and action-informed-theory constantly co-produce each other. Central to this practice is the creation of new knowledge through self-reflexive action. In the context of this research, the assumption was that leadership is collectively achieved by a social group as it attempts to transform a social context in ways that are beneficial to the attainment of its mission. Action research thus has two dimensions: the achievement of a political goal (for example, the creation of innovative products) and a research goal (which involves transparency of the research process and the bases upon which action is founded, in the interests of generating new knowledge). As action research usually requires the transformation of a particular social reality (in order to achieve its mission) it is a politically challenging research methodology in that such transformation impacts the interests of those committed to the retention of the *status quo*. Where such people have strong power bases, action research becomes a politically dangerous research activity (Martincic and Dovey, 2011) and requires sophisticated intrapreneurial skills (Dovey and McCabe, 2014).

Each spiral of action research encompasses thought (planning), action, reflection, learning (new knowledge creation) and transformed action (on the basis of the learning and thought it engenders). These activities within each spiral are documented and a broad range of data is collected and made accessible to others. In this way, the evidence of the consequences of the research action is able to be scrutinized, and decisions based thereon contested. Through the collective interpretation of the outcomes of the action and the implications thereof for subsequent action, a group manages its 'reading' of the research process in the interests of achieving its political goal. Furthermore, the extensive documentation of the research process contributes new insights and knowledge for the benefit of society. This interplay of action and

research within a continuum of spirals of research is shown in figure 3-1.

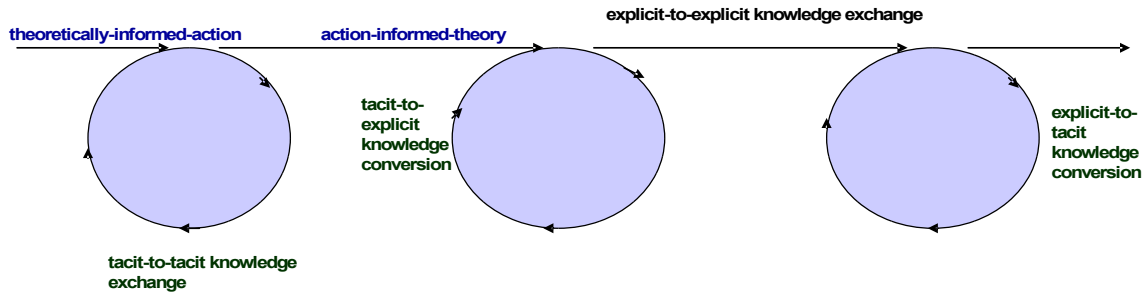

Figure 3-1: *Visualising the continuing cycles of action research, transitioning through action to return to the baseline of theory, embodying the concept of praxis (Dovey, 2008)*

Action research is, thus, conceptualised as an on-going, collectively constructed, process of reflexive action that emphasises dialogue, analysis and synthesis in a transparent form of *praxis* that leads to relevant learning and mission-pertinent knowledge creation (Dovey, 2008). As such, this methodology offers the necessary framework to analyse the social practices that influence innovation within the high-tech setting of the global organization in which this research is located.

3.9 Research Methods

3.9.1 Selection of Participants in the Research

The selection of participants for the action research was via members of the organisation volunteering for involvement in initial discussions. By choosing a democratic and socially-focused approach, the research adhered to the social principles of action research. Fortunately initial publicity for the proposed research had an overwhelmingly positive response and several cohorts of participants volunteered.

3.9.2 Data Gathering

Throughout the research process, data was gathered in a variety of ways. These included:

- Personal and team journals, blogs and web sites
- Interpersonal email communication
- Personal and team presentations to both team members and other peers and colleagues

- Pre- and post-cycle interviews
- Notes and minutes of theorising, strategising and post-action meetings

In addition to the rich variety of qualitative data, quantitative data was also available through existing structures in the research environment. Access to this information was reached with the consent of the action research participants, in keeping with the democratic foundations of the chosen methodology. Quantitative data was available for areas such as:

- Technology designs
- Software code written
- Code review and comment on peer software code
- Project participation and membership
- Peer recognition of leadership efforts
- Executive recognition of leadership efforts
- Nomination and membership of internal leadership initiatives
- Proposal of new innovations
- Participation in new innovations (especially in a leadership context)
- Launch to market of new innovations

3.9.3 Data Handling

As action research is grounded in democratic notions, data, results and outcomes of the research were shared in a transparent and open manner wherever possible. This default openness was moderated by the guiding ethical requirements of the study, both as a research project within The University of Technology, and a workplace project within the environment of my employer. This topic is covered more fully under the heading Problems and Constraints.

3.9.4 Data Analysis

Methods for analysis of qualitative data included hermeneutic analysis of texts and transcripts, group dialogue, and evidence of group progress towards the development of innovative new products and services.

Analysis of quantitative data incorporated a number of techniques developed with the input and consensus of the research participants. These included measures of absolute volumes, rates of change, and perceived impact of the various categories highlighted under the Data

Gathering heading above.

3.9.5 Potential Problems and Constraints

A number of potential risk factors were present during the research process. These included organisational access, available time for the research, and the ability to adhere to the tenets and principles of action research.

As mentioned above, access to willing participants and co-researchers within my organization of employment proved not to be a problem. With respect to the availability of research time, as a part-time researcher, there were constraints upon the time I was able to dedicate to this research. My co-researchers and participants are equally constrained, being full-time employees of the organisation and having a wide range of other tasks and projects to which they had to contribute time. This constraint was mitigated by effective planning and time management practices.

My lack of experience and familiarity with the action research methodology was another potential risk factor. While I had experienced action research in smaller projects within a Masters-level program, I had not previously conducted such research on the scale undertaken for this thesis. This risk was mitigated by drawing on the expertise of my supervisor who is an experienced action researcher.

Chapter 4 – Data Presentation

4.1 Introduction

This chapter presents the data of two distinct Action Research projects within ABC Company. While it is customary to present data such as this separately from the higher-order analysis – a custom adhered to in this thesis, with analysis following in the chapter subsequent to this one – the nature of Action Research itself requires a level of ongoing analysis in the form of reflection on cyclical outcomes, and insight into subsequent theorisation for later cycles.

To that end, this chapter presents the experiences, theorising, insights and reflection from in-the-moment and/or intra-cycle analysis in adherence to the Action Research methodology presented in chapter 3. The form of strategic narrative is used, wherein the actual chronology of events, personal experience, and ongoing change represented by the Action Research cycles is described "in the moment", as much as possible demonstrating the contemporary praxis occurring at any point in the research as theory informed action and action informed theory. This complements, rather than substitutes, the data analysis that follows in the next chapter.

4.2 Overview of Action Research Field Work.

With the support of my supervisor, and that of my employer, I under took two distinct sets of action research field work from late 2010 through to late 2012. Each set of action research was performed with a different group of participants, exploring different notions and aspects of leadership practices and their impact and relevance to innovation within the two groups.

Group one emerged from an existing organisational leadership development program. Participants from the program had acknowledged its benefit to them, but upon completion of the fixed program were wondering how they could further explore leadership topics. This group of co-researchers explored the development of a leadership peer support group, in which we explored what leadership happens before, during, and after an innovative effort or event. The co-researchers also examined how to become more conscious of the interplay between leadership practices and innovation outcomes.

Group two was a group known as DTech. It had joined the company through acquisition and collectively struggled in attempts to adapt to being "an ABCer". As co-researchers, they embraced action research as a viable tool to first diagnose what leadership practices had led them to be stuck in a cycle of failed attempts at innovation, and then to identify new leadership practices that led them to successively improve and normalise their day to day work, and hit long-desired innovation and product release goals.

4.3 Group One – Emergent Leadership Peer Support Group.

4.3.1 Background

Promoting and developing leadership from the ranks of engineers and technicians is seen across the IT industry as both a difficult and desirable goal. Simultaneously possessing expert technical insight and capability, together with a business-minded and business-aligned focus has seen examples of outstanding innovation and business success: the likes of Steve Jobs at Apple exemplify what a leader of technological background can achieve.

ABC Company has historically called itself an “engineering-led company”, by which is meant that all core business and development decisions would be founded on its core engineering philosophy. This sets it apart from many other players in the IT field.

To achieve an enduring capability to have engineers lead the company, ABC Company has invested in a variety of programs to recognise and develop individual contributors, those showing leadership practices within its ranks, and those that demonstrate leadership qualities (sometimes unbeknown to the individuals themselves).

This structured program has its limitations, however. While individuals at all seniority/responsibility levels within the company have access to several dedicated programs to build and refine their leadership, there is a gulf in the provision of longitudinal support for a given cohort working their way through the company over a span of years. There is also no explicit linking or tracking of how growth as a leader allows the individual to positively impact the innovation performed in their group. It would be unusual for a 14 year old company to have programs with the foresight to plan for the decades ahead, but new (and newly recognised) leaders in the company are seeking exactly this when they have exhausted the structured programs that the company offers, and are struggling with questions of innovation that seem to have no ready answers.

In talking informally to participants from a range of courses, several people mentioned their desire to take their learning further and work with their peers if the company could not offer further structured leadership development and ways to inject new perspectives and insight into furthering innovation in the company. This was the motivation to invite all such course alumni in the region to a group discussion on the nature of this Action Research project (and Action Research itself), and whether they saw potential benefit from engaging in an Action Research program to explore their own peer leadership development as a new dimension to both their own growth, and how they could shape innovation in their teams and projects. This was in effect the first cycle of Action Research for this group, amongst a set of 5 cycles over the following six months.

4.3.2 Cycle 1 – Initial Meeting

The first cycle occurred on 13 September 2011.

4.3.2.1.1 Theoretically Informed Initial Position

There was a sense of curiosity in the group that responded to the briefing on the nature of Action Research, and in particular what we might explore within this "Leadership Peer Support" group, as no one had previously participated in Action Research. With this in mind, our initial discussions turned to how we could explore the notion of leadership and leadership practices in the group, together with the topic of innovation, in a way that allowed everyone to become more familiar with Action Research at the same time while furthering our research aims.

One of the driving motivations for the initial discussion was participant perception of the leadership path each had taken, and what new avenues they sought to further themselves as leaders. We framed the initial cycle as one to surface the existing group understanding of leadership practices that had helped the participants effectively drive innovation at the company.

4.3.2.1.2 Plan for Action Research Cycle

Our plans drew on the framing of the session as a "looking back, looking forward" exercise. Numerous approaches were discussed, from presentations through to written pieces. Several people asked about the most appropriate method in light of using Action Research: Should we for instance vote to choose the approach. I provided some insight into the democratic

principles around AR, suggesting that the group agreeing to a given decision making technique was more important than the technique itself.

The co-researchers' discussions moved quickly in the direction of simply sharing past leadership practices that had anecdotally provided some impetus or problem-solving capability to drive innovation. As participants began sharing examples, it was apparent we'd segued into the execution phase. We quickly negotiated how best to capture this data, and settled on a two-pronged approach of capturing major themes on flip charts, and details in the researchers' journals. These journals were of a medium chosen by the individual participants, aimed at capturing each person's thoughts, perspectives and insights in the Action Research cycles. Most participants chose to use a traditional paper-based book or notepad, though several group members opted for an electronic document.

4.3.2.1.3 Execution

Each of the sixteen participants took turns to describe practices they'd successfully deployed, or techniques that had been covered in previous structured leadership training/workshop sessions that they had seen succeed for other people. Follow-up questions and conversations touched on what people yearned for by way of leadership guidance, and how sharing and learning from each other's practices might help projects' and products' development that at times became stalled or misdirected, with no obvious innovation occurring.

The themes collected across the group are shown in figure 4-1.

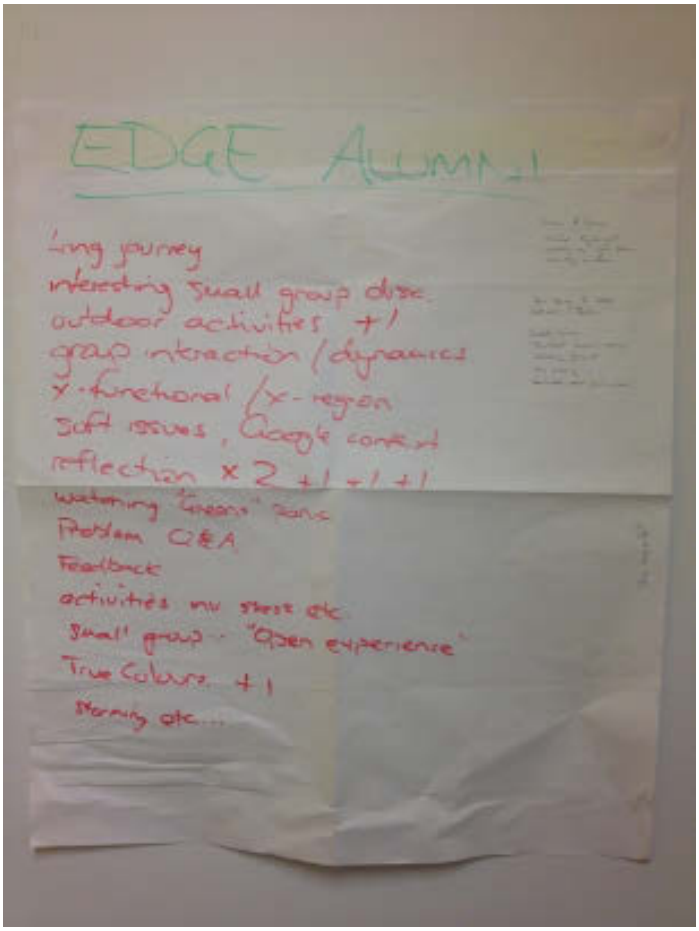

Figure 4-1. Anecdotal leadership practices collected from the group

Without prejudicing later reflection, and the analysis that follows later in this thesis, two rough groupings of themes were evident at this initial collation of stories of leadership practices. Interestingly, these two thematic groupings matched analogous groupings of participants.

The first topic group, and related group of participants, described a diverse set of "typical" team building and transactional activities that they felt had provided leadership growth directly improving the efficacy of their team's innovation. Several observations at the time highlighted that these weren't exactly leadership practices in their own right – perhaps more broadly it could be said that the practice of encouraging team participation in such activities was the identified leadership practice.

The second topic group, and the group of participants which was by far in the majority, described various examples of practices and events where two or more leaders of teams or groups – who in all other respects had no day-to-day working relationship with each other

within company – had taken the time to privately reflect on issues, obstacles, problems and challenges with which a given team was struggling. Over the coming cycles, we began to refer to this as the "Leadership Confidant" practice.

4.3.2.1.4 Reflection

The central realisation to emerge from our informal initial cycle was the hidden dimension around what follow-on program or path might usefully be provided to foster leadership practices for maximum innovation capability. Where we had thought from our pre-cycle discussions that we would potentially see a range of practices that could be observed and related, the largest issue we confronted was what happens to a team's innovative drive if relevant leadership practices are absent? As a follow on, what if this absence of demonstrated leadership practices is not from deliberate "practice starvation" or neglect, but the result of no clear approach through which a leader can learn of other effective practices.

Those who successfully used some form of informal discussion, reflection or sharing process with other leaders from across the company flagged that this particular practice could be considered a vital leadership practice in its own right, and also be a kind of meta-practice through which details and notions of other practices could be shared. From previous research and the literature, including Brown and Duguid (2002), I raised the notion that this cross-organisational network was an example of a "leadership" community of practice separate from organisational hierarchy.

Some time was spent reflecting on whether to explore the more complex meta-practice, or the more immediate leadership confidant practice. While the practice of sharing practices has intriguing elements, the consensus was that we as researchers were all new enough to Action Research to want to keep the focus on a well-defined scope of investigation, and not reach for more philosophical levels of investigation before achieving relative comfort with the methodology.

4.3.2.1.5 Insight from Actions and Adaptations of Subsequent Theory

Our working theory became focused and streamlined, and was best summarised by one comment made towards the end of the afternoon.

> "I need someone to talk to without baggage"

(researcher's journal, 12 Sep 2011)

This statement succinctly captured how our thinking had changed even within one day. The research group was drawn to the singular aspect of exploring ongoing peer support as the vehicle to aid leaders blocked at a critical juncture of some innovation effort.

Having someone in whom to confide who was "outside the project, but inside the company", was one of the key facets that shaped the group's thinking and exploration from this point.

4.3.2 Cycle 2 – Pair and group forming – practices important to "leadership confidants"

The second cycle occurred over the week of September 26 to September 30, 2011.

4.3.2.2.1Theoretically Informed Initial Position

A subset of researchers from the first cycle expressed their determination to attempt to form a leadership peer support group of some structure, and explore some of the issues that prevent such groupings forming casually with any great frequency. There were different perspectives on the core leadership practices participants expected to see manifest, as well as the impact and relationship these practices have or would have on innovation.

The first practice most expected to explore was that of establishing trust, particularly for the first time in a new relationship with considerable risks and consequences. There was some disagreement about how directly establishing trust from a peer outside an area of innovation could directly impact that innovation. Other practices that some thought might be experienced were crafting new organisational structures and power dynamics to directly and indirectly impact innovation outcomes. This built on the notion expressed by one participant:

> "If the company stops you innovating, you can change your focus, or *change the company*"
>
> (emphasis of original participant, researcher's journal, 26 September 2011)

4.3.2.2.2 Plan for Action Research Cycle

The cycle's planning followed from the comments about seizing one's own destiny, and crafting organisational structures with mindfulness and purpose. This lead thinking that we as

Action Researchers should look to actively discuss, guide and be aware of the group forming process. This organic approach would allow us to experience this leadership practice, whereas a dispassionate "shuffling by paper" would rob us of that vantage.

One topic that several group researchers noted was how this cycle (and subsequent cycles) should deal with various forms of conflicts-of-interest, such as participants in the same organisational group; in a reporting chain; or with some other relationship or friendship that might impact the ability to provide and receive leadership peer support. We agreed that the best approach was to capture data about any potential conflicts, and share that in the group forming process to enable "informed partnerships" which avoided any matching of participants with any form of conflict.

In the end, the chosen approach could best be summarised as the search for "Amiable Strangers".

4.3.2.2.3 Execution

The cycle's execution phase began with introductions of the organisational departments and major projects for each participant. This data is captured in table 4-1.

Table 4-1: Leadership Confidant Participants, Department and Projects

AR Participant	**Department(s) or Group(s)**	**Main Project(s)**
GA	Finance, Data Management	Billing, Financials
AMC	External Networks	Network tools
TA	Sales engineer	Client support
SAW	Administration	Training, Manager support
KR	Internal Networks	Network buildout
AL	System administration	Network contracts, buildout
BM	System administration	Resource quota enforcement
PGN	External Networks	Network management
GR	Corporate Infrastructure	Identity management, team manager
BO	System administration	System automation
JB	Locality-based services	Location-based services

JG	Security	Security hardening
SR	Map Services	Location and mapping
MS	Mobile Platforms	Asia-Pacific Mobile services
SB	Security	Security standards

Many co-researchers were already familiar with each other's organisational department or section, though as is typical with any company, the contemporary projects on which they worked changes over time. This information was greeted with curiosity, spurring conversation about how various group members' work might relate to the work of others in ways they hadn't previously examined or discussed.

We also discussed the nature of personal friendships and relationships, and strong work-place bonds that had evolved over the length of everyone's employment with the company.

These potential conflicts-of-interest around relationships, project work and organisational hierarchy and structure were captured in our research journals, and are summarised in table 4-2.

Table 4-2: Leadership Confidant Potential Conflict-of-Interest Mapping

AR Participant	**Departments(s) in conflict**	**Project(s) in conflict**	**Personal/company relationship(s) in conflict**
GA	-	-	MS
AMC	EN, IN	-	-
TA	-	-	-
SAW	-	-	-
KR	EN, IN	-	PGN, AM
AL	SA1	BWM	BM, BO (manager of both)
BM	SA1	BWM	BO (same team), AL (manager)
PGN	EN, IN	-	AM, KR
GR	-	-	BM
BO	SA1	BWM	BM (same team), AL

			(manager)
JB	GM	-	-
JG	S	-	SB (same team)
SR	GM	-	-
MS	M	-	GA
SB	S	-	JG (same team)

After discussing the relationships, and potential conflicts, and very brief details of what areas people felt that leadership peer support might ultimately aid them in search of innovation within their projects, the grouping shown in table 4-3 was proposed.

Table 4-3: Leadership Confidant Groupings

Group Number	**Group Members**
Group 1	AM, TA, BO
Group 2	KR, SAW, GR
Group 3	JG, AL, JB
Group 4	SB, SR

These groupings did not include PGN, BM or MS. The first two members of the research group decided other work and time commitments would not allow them to meaningfully contribute. Following the principles of Action Research we had discussed and understood at the beginning of our work, this was entirely their prerogative and we left the invitation open to return to the research group should their circumstances change. The third person to not join a group, MS, ceased employment with company.

With these groups formed, attention turned to how to begin building the group relationships and "breaking the ice" on current innovation issues and desires. The remainder of the time was spent in this large group identifying the best time over which to hold the next Action Research cycle, and to cover in more detail more fundamentals of Action Research principles and practices. Some team members were anxious that the coming cycle would be their first attempts at independent Action Research (without my presence as instigating researcher).

4.3.2.2.4 Reflection

Even with the best of intentions, initiating this kind of contact was socially and professionally difficult. Personal and professional risks are high, and trust was not yet established. Several factors made the group forming process easier in our particular circumstances. First was the effective guidance I gave to the team around Action Research. The second enabler was the combined awareness that this kind of leadership peer support has been explored – however briefly – in previous workshops each of them had undertaken, and that in this instance, it was "with a purpose": specifically, establish leadership peer support so as to further and amplify their own and their team's innovation efforts.

Establishing trust also seemed to benefit from these factors. We benefited from shared history and experience of other leadership programs, and self-selection for participation. This jump-started the building of trust, which continued on it in a low-stress, low-stakes way with the first introductory sessions after pairing. Focusing on innovation was what marked this activity as different from those previously experienced.

Perhaps the one area where our low-stakes, safe approach to building trust was challenged was a core concern several of the researchers voiced. Admitting to needing help with innovation from an organisational, political and career perspective, was a risk mentioned by multiple participants. As one participant phrased it:

> "It takes some balls to stand up in front of your peers in this company, and admit that you are stuck. We're all meant to be the best in the business. … It's a relief to know I'm not alone in the way I feel" (researcher's journal, October 2, 2012)

Reflection on this very topic unearthed a pent-up feeling of anxiety about this sort of admission. This was soon followed with the realisation, that soon became a shared tenet of the group, that the benefits could be huge to the ways in which they lead their teams, and their innovation goals.

Gaining benefit from the Leadership Confidant approach would not be fast. It would take time over several months to build trust, explore issues, and share insights and perspectives in the small groups.

4.3.2.2.5 Insight from Actions and Adaptations of Subsequent Theory

Establishing, nurturing and promoting the trusting confidant relationship had emerged to be the key to using the relationship as the fulcrum of the leadership confidant practice. Building and bolstering this at two levels was the main insight drawn from our second cycle.

One cannot force into existence a meaningful confidant-style relationship without a firm grounding of trust, or at least a clear and agreed path among the participants toward establishing that trust. Taking time and knowing that there would be no sudden, immediate innovation breakthroughs was a fundamental building block that carried through the rest of the cycles. As much as we were all eager to point to product, process and capability innovations, we had to "follow the causal path" (researcher's journal, September 30 2011).

With a trusting relationship established, further exploration of leadership and innovation issues can occur. Our subsequent theorising revolved around exploring this as a kind of positive feedback loop. Sharing issues as leaders of innovation effort would bolster trust, which in turn would foster deeper, frank and honest sharing of issues, challenges, problems and the like around the various projects of the group members.

4.3.2 Cycle 3 – a reflection and peer support session

Cycle 3 took place between October 4 and October 15 2011, with different pairings and groupings performing the execution phase at different points throughout that period.

4.3.2.3.1 Theoretically Informed Initial Position

There was a natural desire among the researchers to exercise their new-found partnerships and groupings, and explore the Leadership Confidant notion. Additional leadership practices people wanted to explore, and expected to see manifest, were approaches to increasing trust in a relationship deliberately crafted to be "a meeting of strangers", as well as practices around shared communication of complex, difficult organisational situations, and mature empathic responses to the problems of others.

4.3.2.3.2 Plan for Action Research Cycle

A window of two weeks was agreed in which the pairings and groups should find time to meet and begin the confidant process.

A question was raised as to what form or structure meetings should take. Several options were voiced. First, reference was made to a light-weight structure used in a previous leadership workshop that some group members had previously attended. For the benefit of those who hadn't experienced it, a quick recap was given explaining the structure.

1. Participant in question takes time to describe the context and detail of their problem, issue, challenge or opportunity.
2. Confidants (in our newly-established vocabulary) then take time to ask probing questions and seek clarification and insight, while resisting the urge to present solutions as questions. For example, phrasing a question as “Have you tried...” would not be appropriate
3. Confidants would then spend a block of time openly discussing the scenario in front of the group member who had presented the issue, but with that person asked to resist where possible the urge to correct/interject/overrule the path of these discussions. The idea here was promoting reciprocal listening on the part of the person presenting, and resist the urge to justify or criticise ideas or actions.
4. The group then discuss options and ideas, with the original presenter explicitly highlighting what new actions or ideas they would take away from the session.

Some group members found this structure useful, almost re-assuring. Others indicated they felt constrained by it. The result of the ensuing discussions was to agree that so long as pairs and groups felt comfortable, they could use part, all, or none of the approach as they saw fit.

Due to some possible conflicts around commonality of project or reporting chain as outlined earlier, each participant would journal the observations, but would share only those aspects that did not raise confidentiality issues outside of their grouping within the research.

4.3.2.3.3 Execution

Over the course of two weeks, the participants met in the groups they had formed in Cycle 2. The groupings were as showing earlier in table 4-3.

Late on October 15, we reconvened to consolidate the journal highlights that each group had agreed to share. We were fortunate that in their own opinion, amongst all the groups only one topic had been raised that could be considered sensitive to some participants in another

subgroup. In their own estimation, the subgroup in which the topic had been raised felt that it was an issue altogether of a positive nature, directly related to a potential innovative breakthrough, and it was considered the entire research group was trusting and mature enough to have this topic raised. The journalled highlights are summarised in table 4-4.

Table 4-4: Key leadership and innovation issues from first Leadership Confidant meetings.

Group 1 (AMC, TA, BO) factors affecting innovation focus

- Career path, particularly related to having worked in one area for some time, and feeling that innovative potential is being left untapped due to working on the same old topics. This was identified with knock-on effects of lack of motivation in "core" work, and a converse rise in seeking out skunkworks-style volunteer projects and other avenues through which to find and realise innovation potential.
- Managerial conflict, where an individual's ambition for product and service innovation is not understood or supported by the relevant manager.
- A revolutionary idea for world-beating network bandwidth control, need help from multiple different networking teams
- The endless effort needed to ask (or fight) for resources such as money, head-count, and access to existing company products and services, and the effects of resource starvation for new initiatives (both good and bad)

Group 2 (KR, SAW, GR) factors affecting innovation focus

- New project, product and service duplication across the company. This was recognised as a positive and negative. Avenues for innovation exist, but concerns abound over wasted and duplicate effort.
- A three-way conflict with local success at innovation, wanting to help other groups in the region follow similar paths to innovative success, and those other groups' historic issues with a remote "uncaring" headquarters.
- Career path and managerial conflict, including issues with long tenure and innovative achievement in a team apparently being "snubbed" by having a new manager parachuted in over the top, affecting motivation to try new things and perceived reward for successful innovation.

Group 3 (JG, AL, JB) factors affecting innovation focus

- Career path concerns and promotion opportunities linked to innovation and project success.
- Conflict over responsibilities with other distributed teams, where groups move between company departments and the consequences for supporting innovation underway, and the discovery of duplicate/overlapping projects in other areas
- Resource starvation preventing "cool" new ideas from taking root, or delaying the progress of new initiatives and innovative efforts.

Group 4 (SB, SR) factors affecting innovation focus

- Career path and promotion concerns from a group member who had relocated from company headquarters, feeling that their efforts and achievements were being overlooked or devalued
- New ideas for building secure systems within the organisation, and providing software security building blocks to internal projects and groups

A wide-ranging all-of-group discussion on several of the topics. Without pre-empting the reflection that followed, many in the research group were intrigued and even amazed that there were recurring themes, even amongst such a small cohort.

Notable Common or Recurring issues:

1. Individual career path and promotion opportunities, particularly coupled with the notion that one must be involved in a highly visible and/or innovative project in order to be awarded a promotion.
2. Conflicts with manager, reporting hierarchy and peer teams, where individual drive to innovate is not supported by management, or where buy-in and commitment from peer teams is not supported by management
3. Duplication of effort and the perceived inefficiencies of a large organisation
4. The adversity felt by distributed teams, and related issues with headquarters both impeded progress and inducing extraordinary effort just to "be seen".

5. The difficulty/inability to get resources to bring great ideas to life.

Also visible was a genuine heightened enthusiasm among the participants, and fervour for the Action Research process.

4.3.2.3.4 Reflection

The most central learning gained in this cycle was the realisation on the part of each researcher that they were not alone in the struggles they faced outside of the technology and innovation work on which they were trying focus. Whether it was frustration with organisational processes, disillusionment with career paths, or the constant jockeying for scarce resources with which to pursue their ideas, the group members realised that they were not the only leaders grappling with difficult personal and organisational issues.

The feelings of sudden shared understanding, and possible future purpose were best summarised in the words of one group member:

> "Wow, it's not just me!" (researcher's journal, October 15, 2011)

Some co-researchers felt that the simple act of confiding in others, and sharing experiences had had an effect in itself, even before trying to take any action subsequent to the meeting: the mere act of talking and confiding had brought relief.

Each group and the researchers within also reflected on the other benefits that confiding in others had provided. Many recognised that the discovery they were not alone, and the strikingly similar problems discussed, had generated the seed of a new professional network or community of interest. Some noted the positive follow-on effects this might have – the (potentially only temporary) relief felt following the confidant sessions freed up mental time and space to refocus on existing or new innovative efforts, and the coming in to play of a nascent professional grouping or network allowed the participants to tap into the very considerable professional and technical expertise amongst the leaders in their cohort.

This emergent community of practice was an unexpected, but welcome outcome of this research cycle.

4.3.2.3.5 Insight from Actions and Adaptations of Subsequent Theory

Key insights from the third cycle surrounded how the notion of Leadership Confidants was emerging, and how plans should change to nurture the beneficial side effects of the professional network that was forming around the research work.

Key to fostering the Leadership Confidant practice, and allowing leaders to commit their energies to innovation effort, was the realisation that "once is not enough". That is, undertaking the kind of intimate small-group session with one or two other leaders was not going to magically transform their varied problems, and rocket their innovative efforts, after one single meeting. Subsequent theory should be shaped to accommodate a continuing program of Leadership Confidant sessions, and the reflection and follow-up associated with them. In essence, our theory evolved into one that sought to cement a commitment to a longer term relationship, and evaluate value of the experiment over time.

4.3.2 Cycle 4 – Ongoing Leadership Confidant sessions

Cycle 4 covered the period from November 2011 to January 2012. As with cycle 3, different groups and pairs met at different times. This period encompassed multiple meetings for each pairing or group.

4.3.2.4.1 Theoretically Informed Initial Position

Our initial position was taken directly from the reflection and insight of the third cycle. Principally, the group anticipated observing the leadership practices that would continue to create and expand trust among researchers. Also expected was more expression of the practices of evolving Leadership Confidant groups along with how learnings from these sessions and groups were taken back to a participant's day-to-day work and the resultant new or modified leadership practices that changed their innovation efforts.

4.3.2.4.2 Plan for Action Research Cycle

Planning for this cycle was quite brief, with consensus that the structure of meetings, data capture, synthesis and reflection from cycle three work well, and would be repeated (multiple times) in cycle four.

The researchers were mindful that should any revelatory moments occur, or significant changes in practices or new practices our leading innovation manifest themselves, they would

warrant reflection in a timely fashion. As such, regular check-ins were scheduled throughout the three months of cycle four to undertake ongoing reflection of the progress and outcomes from the various subgroups and pairings.

4.3.2.4.3 Execution

The practical mechanics of the sub-group and pair meetings were broadly similar to those outlined in cycle three, so won't be repeated here for brevity. Groups and pairs met over the three month period as outlined in Table 4-5

Table 4-5: Summary of Leadership Confidant session meetings.

Group	**Meeting Dates**
Group 1 (AMC, TA, BO)	November 19, December 6, December 18
Group 2 (KR, SAW, GR)	November 15, December 12, January 10, January 22
Group 3 (JG, AL, JB)	November 14, January 18
Group 4 (SB, SR)	November 12, December 3, January 16

The participants once again recorded their personal observations, reflections, insights and realisations in their research journals. At the end of the three months of the cycle, the following key highlights were drawn from those notes and records:

- All of the group members who had expressed frustration or issues over career path and progression found deeper insight into their situation, and a sense of opportunity, with pessimism lifted, from the possibilities shared with them. This included several participants noting that they were spending far less time worrying, and more time trying and testing new ideas seeking out innovation and seeking new internal career options.
- In one specific case from Group 1, TA had in his own words “a 180 degree change”, from feeling isolated and unable to meaningfully contribute in his role, to now being in the enviable position of choosing between two new positions that had become available to him with the personal introspection generated from his Leadership Confidant cohort, and the professional networking aspect of the evolving relationship.

> "I'm out of a career dead-end, and releasing years of pent-up innovation!" (researcher's journal, January 31 2012).

Being able to confide in other leaders about the fear of failure in a new position, and the (common but unfounded) fear of betraying or forsaking former teams had helped TA specifically, and many of the others concerned about their career more generally.

- Ideas for a completely new BWM technology approach "unblocked" thanks to the ability to confide in leadership peers with knowledge of both the technology and the market. The crux of the technological breakthrough here was to treat the resources managed by BWM as a market, and introduce market forces of supply and demand into the controlling architecture. For the group members in question, this was considered part breakthrough in innovation, and part admission that they had lost sight of the unusual degree of freedom ABC Corp provided all employees to work across boundaries and organisational groups in search of breakthroughs and innovation.
- Dealing directly with managerial conflict. For some this was the realisation that conflict left unaddressed was toxic to their long-term ability to innovate, as well as their professional career overall and personal health. For others, it was coaching and practicing ways of having conversations with their managers to bring about positive change to the relationship. This was typified by KR using the Leadership Confidant approach to work through his thoughts and feelings, seek input, and approach his manager ready to deal with the conflict, only to have his manager thank him profusely for taking action where the manager hadn't, and a sea-change in the relationship beginning almost immediately from that point.
- Several groups explored and developed coping mechanisms for duplicated effort, re-starting earlier company efforts at a "product catalogue" to help avoid (or at least identify) duplicate or closely related efforts. There was also the creation of an informal group to work on merging split efforts into one allowing for more ambitious scope and radical innovation. These initiatives also had some additional benefits around short term relief from resource shortages by pooling those available. By the conclusion of our research cycles, these efforts had seen success throughout the company's Asia-Pacific region, and the group were starting to plan for expansion to push into the Americas, including company headquarters.

- Group 3 explored “returning to our engineering roots”, and by the end of the cycle, had found time and motivation to work on new software security tools. The signature comment from this group, that became a running comic interjection, was “look at me, I'm a manager but I'm coding again!” (researcher's journal, January 31 2012)..

4.3.2.4.4 Reflection

Repeated confidant sessions over a period of months were hugely beneficial to leaders dealing with issues that otherwise are distracting them from focusing on innovation effort. The initial research had started out seeking avenues for leadership development that fostered innovation from some external or higher party, and had instead found the spark of innovation, and a potent leadership practice to drive it, within the research effort itself.

Much of the remaining reflection mimicked that of the third cycle, and primarily confirmed the growing understanding and confidence in the Leadership Confidant practice. All group members were pleased that allowing a succession of individual and group sessions had changed people's perspectives on notionally intractable problems – career, management relations, duplication of effort – and had seen multiple concrete cases of actual innovation in the company's software development domain. This latter part was one of the unexpected outcomes. Research focus had been on higher level notions of leadership and innovation, rather than trying to target any particular instance of innovation. The BWM and Security work was a pleasant bonus.

An additional recognition was the dimension of benefit purely for an individual's innovative work. The leadership confidant cohort acted as both an additional community of practice, and also a heterogeneous parallel team, helping co-researchers draw on varied skills and experiences, modelling the team heterogeneity goal. Variegated teams and a mix of perspectives, backgrounds and expertise are well recognised in the literature as contributing to the innovation capability of a team (e.g. Peltokorpi *et al.* 2007; Fong *et al.* 2000; Leiponen and Helfat 2010). We had been reminded first-hand that while we were a group of leaders seeking to explore leadership practices, we were also a group of individual innovators with many and varied backgrounds and specialities, naturally forming exactly the kind of mixed group espoused by contemporary innovation literature.

4.3.2.4.5 Insight from Actions and Adaptations of Subsequent Theory

The main insight from this cycle was not directly to do with leadership practices that fostered innovation, but in a more nuanced way, leadership practices that tackle the countervailing factors that obstruct and derail innovation. These factors – frustration at one's role, company position, managerial relationship, access to resources, and more – are often seen as part of normal business. We realised that practices encompass more than just a focus on what should be done. Practices should also develop around defending a culture of innovation, removing impediments, and deflecting the other contextual and environmental factors impeding innovation.

As a group, planning began for a subsequent cycle that would use this evolved theory of the two-sided approach to leadership practices, and the Leadership Confidant practice in particular. For a variety of organisational and personal reasons, the adaptation of the theory did not proceed far beyond this point, and the initial informed plans for the next cycle ended up being placed on hold, to be substituted by an alternative approach to cycle 5.

4.3.2 Cycle 5 – Seeking longitudinal structured follow up

The fifth and last cycle of action research occurred during February 2012, culminating in a two-day workshop on February 28 and 29, 2012.

4.3.2.5.1 Theoretically Informed Initial Position

The research group's nascent success at fostering Leadership Confidant relationships, and the small but apparent boost to (or unblocking of) innovation efforts amongst the group garnered interest from the wider company. The action researchers were asked to consider if our learnings could be shared and explored with a wider community.

In essence, this meant exploring the questions: Can the practice of leadership confidants be codified and systematised, in a classic tacit-to-explicit knowledge shift, for scaling throughout a large organisation? Would spreading this approach, learning and outcomes lead others to the same successes around their desire to lead innovation?

4.3.2.5.2 Plan for Action Research Cycle

Planning grappled with several issues not strictly related to Action Research per se (though much Action Research planning also took place). There was amongst the group a nervousness

or anxiety, that control would be lost, or that the democratic underpinnings of our Action Research approach would be lost. In a sense, concerns centered on whether this would not be strictly *our* plan.

To combat this, approaches were made to the relevant leadership development HR teams with the notion of inviting them to join the research group, rather than the reverse. The plan was to incorporate HR's logistical capabilities with the research group's developing body of knowledge, and work together on a wider Action Research effort to build a scalable Leadership Confidant program.

The proposal was well accepted, and the HR team brought some planning ideas to the group, such as ideas to incorporate formal organisational change theory, leadership models, etc. We agreed that we would be open to using such structured parts if they furthered the exploration of leadership confidants, in a way the Action Research participants craved.

4.3.2.5.3 Execution

The line between planning and execution in this cycle was somewhat blurred. In one respect, putting together the pieces of the workshop was essentially planning, but could be considered execution of the "we will create a workshop" plan.

Whatever the perspective, the actual work that followed was to construct the components of a two-day intensive workshop that included:

- An overview of Action Research and its principles
- A briefing on the action research to date
- Case study sessions with the core action research group where explanations were provided of the nature of their personal involvement, contributions, growing leadership confidant relationships with others
- Outcomes and experiences in the workplace, from changed behaviours and practices, through to any noticeable changes in innovation or innovative outputs
- Follow-up session planning for after the two days, to attempt to establish the same kinds of relationships and pair and group bonding that had been seen in the core action research work.

A variety of tangential topics were introduced at the urging and suggestion of the HR team involved. This included sections on systems theory of organisations, adaptive leadership, resistance to change and “emotional intelligence”.

Much of the content was very interesting from a general leadership perspective, but even before we had concluded the days with the expanded cohort of researchers, many members of the original core group were commenting that the content was not particularly focused on our research of leadership practices for innovation, and instead had moved to other topics and themes.

We agreed to hold off premature analysis and reflection on this until the conclusion of the workshop, so that our reflection cycle wouldn't also have a blurred boundary.

4.3.2.5.4 Reflection

Reflection upon this final cycle was split between what had been learned in the cycle about leadership practices for innovation, and what had been learned about the mechanics of the cycle itself, collaborating with a new/external group at this stage of the Action Research process.

The notion of collaboration with a wider group of researchers was attractive in the lead-up to the workshop. Many expressed the opinion that the two days ultimately did not result in an exploration of the practices around leadership and innovation the Action Research group had identified in previous cycles, nor those that had been called out in the theoretical initial position for this cycle. The feedback from the Action Research group was generally mild frustration that they had not controlled the agenda more closely, and the HR representatives had been allowed to change the focus of the effort. This wasn't seen as malicious or confrontational, rather more a reflection that the HR team were eager to bring in many other topics, without some of the history of Action Research that the core research group had experienced in the preceding 6 months. In hindsight, much tighter focus on our Action Research topics, and some firmer positions on keeping this focus not being incompatible with the democratic notions of Action Research might have better served all involved.

As to the actual experiences within the workshop, and the questions of leadership practices and innovation, we agreed that our cycle had not generated the next stage of insight we had planned. Two of the team did point out that we may very well have discovered another subtle

but vital leadership practice worthy of further thought. A leader seeking to expand their professional (or even informal) network does so employing some practices that, at least in this instance, can impact the desired end-goal of innovation or discovery. In previous cycles we had discovered the Leadership Confidant practice had enabled many of our group to remove frustrations or organisational impediments, allowing ourselves to focus or refocus on our genuine innovation efforts. Here in this cycle, by attempting to expand the cohort quickly to a much larger scale, and share the crafting of our Action Research direction with others significantly less experienced in the field, we ultimately suffered a loss of control over the destiny of the Action Research Cycle, and ironically also some part of the new-found focus we had worked to develop in the preceding 6 months.

We took this as an important lesson to take in to future cycles or further research: the Action Researcher must be vigilant in balancing expanding participation and scope within the field of research.

4.3.2.5.5 Insight from Actions and Adaptations of Subsequent Theory

This cycle provided more scope for insight and the development of subsequent theories than earlier cycles, principally because we added another layer of insight and feedback for the external participants who joined us for this cycle. We discussed and shared our thoughts and position on what the rapid expansion had done to our research effort, but also provided a input to our colleagues from HR and other areas on the pace and scope that had worked for us for all five cycles.

Another key learning from this cycle was the firm belief that the Leadership Confidant process must be given its own time to develop and bring benefits to the fore. It cannot be rushed or "hot-housed" in order to force a multiplicative function on the approach. The group extended this belief to other practices of leadership, such as engendering trust, identifying and sharing risk, providing rewards that are valued and so on. As the terminology suggests, these leadership *practices* do not lend themselves to instant mastery or perfection; rather they are part of the ongoing behaviour of successful leaders.

In this respect, those practices encountered a phenomenon reported in other research, of an organisation responding to intrepreneurialism. Work on the leadership confidant practice had flourished while under the radar, outside the visibility of management or incumbent power

structures within the organisation. Success when eventually noticed triggered a response common to intrepreneurs, wherein existing management and power structures within an organisation respond to a perceived threat by either co-opting or destroying the intrepreneurial effort. In this case, the vested interests of HR and other groups within the company sought to maintain the status quo by subverting researcher/leader practices (however inadvertently), and impeding attempts to alter the social and cultural landscape for innovation.

While attempts to expand the scope and size of the research in this cycle were met with some setbacks, there are obvious future avenues to explore around the theories that have slowly developed. It is certainly worth examining whether the leadership confidant and related practices are as valuable for new leaders as for existing ones. We also harbour an interest in how best to integrate new large populations into an existing support program without falling prey to immune-like responses to the disruption such intrepreneurial practice can generate. In a completely different area, we have only our subjective reporting and analysis for the actual observable impact of our efforts on our work in innovation: future theory should be framed to include deeper exploration of how to measure the impact of what is being achieved in our Action Research.

Almost all of the original participants in this Action Research cycle have indicated that they intend to continue their semi-regular confidant sessions, and where possible share their evolving experiences amongst the Action Research community we have formed. The current realities of work commitments for many of the team make a sixth or subsequent cycle following on from this point impractical. It is still something many greatly desire, and opportunities will be sought in the coming one to two years to further this exploration of Leadership Confidants, emergent leadership, and the many of the other practices we encountered during this field work.

4.3.3 Summary

The Leadership Confidant practice has been called many things by many researchers over the years, and I will explore this more fully and formally in the Chapter 5 where its constituent leadership practices will be examined. While we have not discovered an entirely new leadership practice, we have provided an original approach to establishing, executing and reaping the rewards of such practices for innovation in a high-technology environment.

Already visible are the enduring effects of this particular Action Research effort amongst Group One, where new innovation continues from the outcomes of these cycles: in peer network teams working together on product innovation; career counselling and alternative avenues established; people deciding to stick with the company (preserving their expertise and tacit knowledge and social capital) while exploring career moves to different teams in the company; and collective action to demonstrate the problems and impediments caused by resource constraints, many of which are artificial or contrived.

4.4 Group Two – Acquired Group from M&A

4.4.1 Background

In 2007, ABC Company acquired the DTech Company for its capabilities and market share in the display advertising space. Display advertising is an industry term used to describe the placement of advertisements on websites to be viewed as part of someone's visit to that website, as distinct from ABC Company's other advertising business, known as search advertising, which displays smaller (traditionally text) advertisements along with textual search results, providing links to follow to reach other web sites.

As part of most acquisitions made by ABC Company, the existing technologies and platforms are assessed for the suitability to operate at ABC Company's demanding scale, and where deemed deficient, are scheduled for complete re-engineering using ABC Company's proprietary tools and systems.

In tandem, ABC Company operates and encourages an engineering mobility policy, where software engineers, developers, and other core technology staff are encouraged to seek new opportunities within the company after they have served a minimum of 2 years (and are meeting performance goals). Thus as time progresses following an acquisition, there is a consequential blending and turnover in the teams performing the re-engineering work for acquired companies' technology.

4.4.2 Initial Engagement, Analysis and Theorising

In this context, one team within one of the descendant technology groups from the DTech Company acquisition approached me in early 2012 to explore the possibilities Action Research presented them in the ongoing efforts to complete the re-engineering tasked to them as part of the acquisition. This group was known as the DTech migration group, and their

goal for the previous 5 years had been to redevelop their technology to work on and with related ABC Company technologies. What had originally been a 2 year project had demonstrably run significantly over schedule, and one of two managers responsible for the team had personally expressed concerns about the issues with technology integration being only symptoms, and that one of the key areas many team members wanted to explore was the personal and social integration of the team and subsequent "ABC Company" team members.

Without prejudicing the Action Research principles, he expressed his fundamental concerns that an enforced integration of the team and its team members was at the core of the inability to design and produce the innovative replacement products required to complete the project, and that surely a more democratic and participatory set of goals and integration choices could overcome the historic issues that had plagued the team.

We agreed to explore this question with other team members to determine if there was a collective, voluntary desire to explore this topic through the lens of Action Research.

4.4.2.1 AR Co-researchers

The members of the group involved throughout the cycles identified by their initials:

AK	JR	DK
AE (parallel team member)	MW	JR
	NL	JB
BV		
	PS	MA
CV		
	AS (parallel team manager)	PC
EK		
		PG
FS (Team manager)	AP (parallel team member)	
		SY

Almost all team members participated in Cycles 1 through 7, with the exception of AS. The circumstances of his departure are germane to the Action Research, and are described in the relevant Action Research Cycles. Cycle 8 was a short cycle with a subset of the group performed approximately one year after the earlier 7 cycles.

4.4.3 Outline of Action Research cycles

Over the course of four months, the team engaged in eight Action Research cycles of varying depth and complexity. These cycles did not happen at fixed or regular intervals, but rather as the reflection and evaluation of previous cycles led to new understanding and ideas, subsequent cycles were then agreed, as outlined in table 4-6.

Table 4-6 Action Research Cycles for DTech Group

AR Cycle 1	Exploring Personal Background
AR Cycle 2	Team History
AR Cycle 3	New Priorities 1
AR Cycle 4	New Priorities 2
AR Cycle 5	Democratic Derailment
AR Cycle 6	Stop, Start, Continue
AR Cycle 7	Commitment
AR Cycle 8	Where are we now?

4.4.3 Cycle 1 – Exploring Personal Background

The first cycle undertaken occurred in January 2012.

4.4.3.1.1 Theoretically Informed Initial Position

Framing the initial position within action research theory was particularly difficult for the first cycle. At this stage, the group had formed, but were still hesitant about how action research actually worked, and what to expect from it. If focus was to be on what was a leadership practice, and what (if any) such practices promoted or aided innovation in the team, several group members flagged that first we should try to discover or identify who were the leaders and take stock of the practices as the currently existed. This led to a discussion on the nature of explicit leadership from a position of organisational authority or seniority, versus implicit leadership and emergent leadership.

Agreement was made that the goal was not to come up with a new definition of leadership, and that we would work with the descriptions from Chapter 2 of this thesis. That freed the group to focus effort on the precise topic to explore – leadership practices for innovation realisation. To this end, it was agreed that the first cycle would be a deliberately simple one,

attempting to uncover who was who on the team, and whether they had, or offered, some form of leadership, that could later be explored for relevant practices and their impact on the innovative nature and product developments of the team.

The first cycle therefore was one of simple personal discovery and exploration, laying the groundwork for future cycles.

4.4.3.1.2 Plan for Action Research Cycle

Many team members were familiar with a common pattern used at ABC Company and other companies of simple introductions when a team or group first convenes. Stories were related about typical meetings where attendees would state their name, position and the interests they represented. Taking this notion, it was transformed to an approach better suited to action research goals. In effect, as researchers we wanted to perform introductions by way of personal biographical snapshot, designed to not simply convey the information each may already know about others, but to hear from each individual in turn:

- What they considered the most important skill, talent, point of excellence, or learning from experience that they had to offer the team (the group decided to use the colloquialism "Super Power" to describe this aspect).
- An immediate insight or piece of information they had to offer the team
- One thing they needed from their peers in the team
- One thing they needed from their manager
- What innovation impact they thought the team would have in one year's time
- One of the most important things in their life, either personal or professional

In planning discussions, the first point above was deliberately chosen to stimulate a sense of inquiry and intrigue amongst the team – even though many of them knew each other well, and/or had worked together for considerable time. This was aimed directly to foster a sense that Action Research in general, and our work in particular, could be enjoyable as well as instructive. Demonstrating the reality of the team as a heterogeneous collection of talents and

backgrounds would highlight the value and innovative potential such a mixture provides (as reported in the literature, e.g. Peltokorpi *et al.* 2007; Fong *et al.* 2000, and others).

The later points were designed to explore the topics of the day, to provide us some fertile ground for thinking about subsequent cycles.

4.4.3.1.3 Execution

The process was followed by most researchers, with many of the newer members of the team openly indicating that they were learning things about their peers they would otherwise never have known, and that this knowledge would positively affect the work at hand, and their goal to innovate to make the DTech software a success.

One of the two managers participating deviated from the agreed approach. This had positive and negative outcomes. This manager used his time (and indeed used significantly more time than allocated) to berate the team on not achieving goals, and that if they worked harder they would somehow avoid the mistakes that had delayed the work for the past 2 years.

> "You should be getting the job done. If we stop making mistakes, we can hit the launch goal."
>
> (researcher's journal, 17 Jan 2012)

This was received negatively in a number of ways. First, the mood in the room became defensive, though the other participants highlighted that the manager's opinion was a valid input, and that under our agreed Action Research principles they welcomed the contribution. This stopped the defensiveness and lower mood turning into a session of making excuses and losing sight of the Action Research experiment being undertaken.

A second negative outcome revealed itself over the remainder of this cycle, and in the following cycle. Many of the team had experienced this type of response from this manager in the past, but it had never been expressed to the whole combined group. Several of the senior team members were the staunchest in pointing out that the opinion was welcomed, *but was universally disagreed with*. Many of the new team members reacted to this by paying less heed to this manager's input for the remainder of the cycle, and instead gravitated towards the senior individual contributors who had emphasised that blame and management

diktat were not working to provide impetus for innovation, and the Action Research cycles would offer a fresh approach based on team understanding and consensus.

The final negative outcome played out after the second cycle, and will be discussed at that point of the narrative.

Already apparent were some of the positive outcomes, largely unintended, of this manager's outburst. Many new and old team members reacted in an almost opposite fashion to that implored of them. Instead of allowing themselves to be directed, they grew more confident in seeing each other open up and be willing to share their defences of the group and their disagreements with AS. This nascent embrace of sharing, and the silent encouragement by the other manager, FS, would have concrete positive impact on their team dynamic and innovative effort.

Equally, other realisations were implicit in some of the small talk, and end-of-cycle interactions: Meritocracy still mattered; Just because one manager had a dictatorial style didn't imply the other did; Some of the team management welcomed being challenged, and was happy to admit they didn't always have all the ideas; The individuals on the team could alter their own destiny without permission.

4.4.3.1.4 Reflection

Following the exploration of personal backgrounds, reflection turned to whether the shared knowledge would now have some observable impact on leadership practices in the team, and resultant innovative outcomes in the work at hand.

The signs of leadership practices of interest were already evident in people's discussions at this first cycle. In conjunction with the second cycle that followed immediately, we observed leadership practices heretofore unseen, or well hidden, from many team members

- more direct, more constructive input in to the code review process.
- Each team member taking individual initiative to ensure code modules under their stewardship are of higher code quality
- providing more direct, more actionable feedback to the code (and changes) made by others.

For a team, and company, whose innovation advantage is the quality and originality of the software under development, seeing these immediate changes in leadership practices around the core work encouraged the research group that some kind of change in the innovation capabilities of the team would be observed – only time would tell whether these changes were for better or worse.

One of the major outcomes of this very first cycle were the nascent foundations of greater trust established across the group. Even with a simple approach to exploring each other's backgrounds and history, feelings of knowing each other better abounded, and therefore group members could predict and understand motives more readily. This in turn allows team members to become more comfortable with taking risks and trusting colleagues. These two fundamental leadership practices – dealing with risk, and building trust, would play out multiple times over the course of the many cycles undertaken by the team.

Greater detail in subsequent reflection and insight topics show how risk taking in particular changed, but even at this early stage, people now felt comfortable enough with their peers to risk their personal and professional positions and reputations by openly challenging the dictated path of the team, and demanding a say in their own destiny. This would have been unthinkable only a few days before the first cycle.

4.4.3.1.5 Insight from Actions and Adaptation of Subsequent Theory

The group were extremely enthusiastic to explore more about themselves, and experiment with the Action Research methodology. We discussed at length whether the effects of the first cycle, Personal Backgrounds, should be allowed to manifest over a longer term. This was attractive from a purely academic perspective, but many members of the team were anxious to take the next idea for a research cycle, and begin immediately

> "Let's strike while the iron's hot"
>
> (researcher's journal, 18 Jan 2012)
>
> "Knowing more about us (the DTech team members) has explained a whole bunch of mysteries. I want to know how the team got to this point!"
>
> (researcher's journal, 18 Jan 2012)

This final comment succinctly captures the actions from this cycle informing the theory of cycle 2. How did the team get to this point, what leadership practices had led to it, and came from it, and how was that influencing the innovation goals and desires of the team?

4.4.3 Cycle 2 – Team History

The second cycle occurred immediately following the first cycle in January 2012.

4.4.3.2.1 Theoretically Informed Initial Position

A common desire to explore the collective team's history was voiced – how it had evolved, what key decisions and milestones had been reached – to bring it to the current situation dealing with perennial launch issues and failure to innovate for XFA. The key leadership practice team members thought would be observed was engendering trust. It was thought that following the action, changes in accepting, dealing with, and initiating or volunteering for risk would also be observable. Many team members expressed the opinion that more risk was an integral part of being an innovation culture.

4.4.3.2.2 Plan for Action Research Cycle

A discussion was held on the best method to use to create and explore the team history. The discussion itself demonstrated that a verbal sharing of stories was useful, but perhaps too chaotic to allow longer-term capture of the data from the cycle. It would also prevent easy sharing and reuse of the history within the team, both to revisit points among current team members, and for sharing amongst future new team members who join.

A number of approaches were discussed, including video recording oral histories, using a shared online document to which each team member would contribute, or using a single large "canvas" to pictorially depict the key events and milestones for the team. None of these were seen as ideal. In demonstrating the flaws of a large canvas, one team member opined

> "If we do it on a huge piece of paper, we'll have mistakes or corrections scribbled all over it. A shared whiteboard would be better"
>
> (researcher's journal, 18 Jan 2012)

This triggered the thought of simply finding the largest whiteboard in the building, and testing its suitability. A survey of the building revealed a meeting room that possessed two adjacent whiteboards, totalling approximately 8 metres in length, shown in figure 4-2.

Figure 4-2. The whiteboards chosen to explore team history and its impact on innovation

4.4.3.2.3 Execution

One team member immediately noted that choosing the physical manifestation through which to explore the team's history and its effect on leadership and innovation had implicitly tipped the cycle into the execution phase. Many new (or newly observed) leadership practices had their genesis in this session, several of which are described in the following paragraphs. Overall, several key practices took seed at this time. First, the management authority and leadership of AS was directly challenged, both through the obvious aspects of AS not controlling or knowing how the history unfolded, but also in the nascent links and new social relationships that sparked in the room as more experienced team members committed to help new comers understand the wider context and reasons behind the state of DTech.

In more concrete terms, the act of describing history from the point of view of each team member as they joined the team provided an unexpected stage (in the dramatic sense). Each group member led their own part of the story, providing input and data, and having the entire remainder of the group as their audience at that point. To an outside observer that might have

entered the room at some random point, *anyone* in the group could have been the leader, because throughout the afternoon's storytelling, *everyone* was the leader at some point.

By the end of the afternoon, the history had been recorded as shown in figures 4-3 and 4-4.

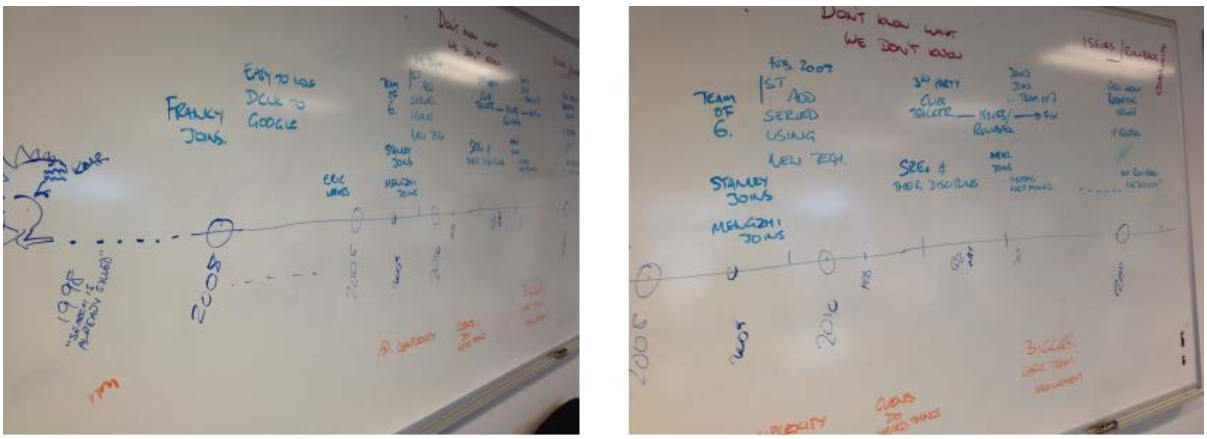

Figure 4-3. The highlights of team history from 2008 to 2011

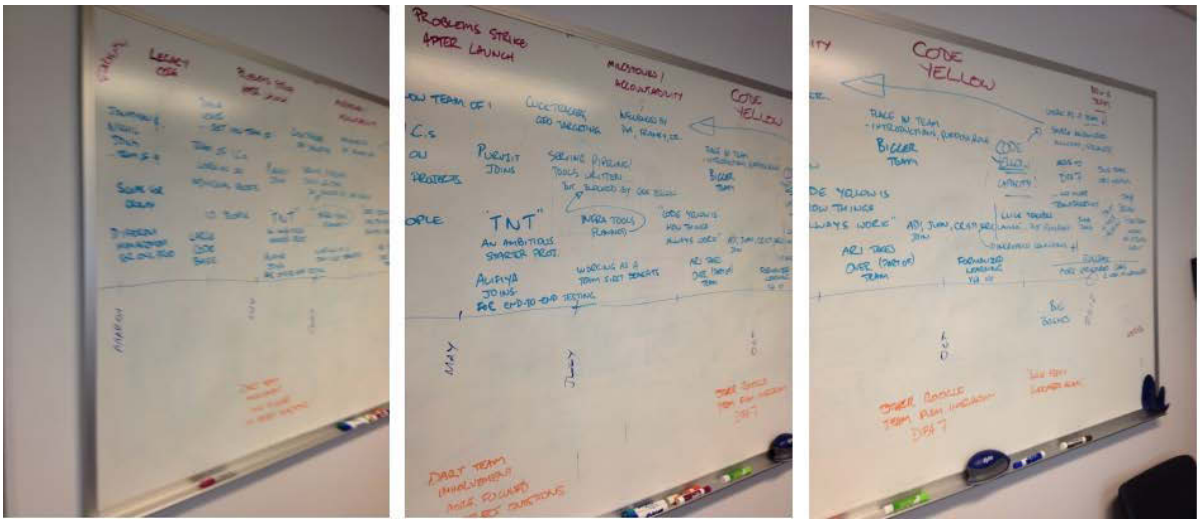

Figure 4-4. Highlights of the team history from 2011 to the point of this Action Research Cycle

While the content of the team history itself is fascinating, along with the anecdotes and stories used to embellish it, it was the manifestation of leadership behaviours during the process that was of far more interest from the research perspective. The behaviours exhibited had direct impact on this cycle, as well as the functional leadership structures used by the team in the following months, and the innovation effort and outcomes achieved.

At the beginning of the session, there was some confusion about where the history should start, and who should start the discussion. Ideas covered working back in time from the

present day, through to starting with the longest serving member of the team or merged company as a whole. Various team members initially deferred to FS as the manager to make the decision. Two or three group members spoke up at this point to stress that starting with the longest team member would be best, so as not to bias the retelling of the history in any way. Examples of bias about which they were concerned were “deferring to management” and “deferring to persons at a higher point in the organisation”.

FS was very keen to let go the mantle as manager and de facto leader, and suggested the group proceed with their overall preference. AS countered that the exercise was somewhat childish, and AS could simply tell everyone the history of the team. The impact of this statement was seen in some of the newly vocal team members reverting to silence. However, several others who had demonstrably become more engaged following the first action research cycle spoke up to reinforce the desire for the longest-serving team member to start. We would then proceed with each team member based on the next longest tenure, until all members of the team had spoken.

This was the process that the group ultimately deployed. Over a period of approximately 2 hours, the whiteboards were filled with key milestones and historical notes, dealing with topics such as team members joining and departing, the merger with ABC Company, the aborted launches, and crises being declared.

As the history unfolded, several very notable subjects had a clear impact on people's topic of conversation, and some of the reflection that followed.

First, many newer team members, and even some old team members, voiced their surprise and amazement at how many times attempts at innovating and renewing key parts of the technology had failed. This sparked healthy discussions about technical reasons, organisational factors, and more. More tellingly, newer members of the team realised (and vocalised) that they had previously assumed they were making mistakes in several key areas through inexperience or lack of talent on their part. Instead, the reality was that many of these areas, thought vital to the new capabilities the team wanted to embody in the system, had been tackled by numerous experienced and very talented team members before them, but they also had fallen short of the innovation goals. This seemed to be an enormous relief to the new team members, and also provided an additional channel of bonding and shared team culture with the more experienced team members.

> "It's like the soldiers who've all gone to war. Once they get back, if they recognise each other there's this unspoken acknowledgment of the horrors"
>
> (researcher's journal, 25 January 2012)

The parallels with armed conflict perhaps stretch the metaphor too far, but there certainly was a heightened degree of camaraderie and esprit de corps at the end of the exercise (with the exception of the groups engagement with AS).

The second notable change engendered during execution was the growing realisation and understanding within each team member of the wealth of sources of knowledge within the team. This covered historic knowledge of the system and its major components, the underlying technology building blocks used to build it, and target future innovations. It also exposed external technological and organisational expertise both about ABC Company, and other companies from which various team members had come to ABC Company.

The only person visibly agitated by the growing tone of inquiry and discovery was AS. He repeated the point that the exercise was fun, but shallow, and that the team members needed to liaise with him and his sub-team to ensure they could provide crucial technical and political understanding and input to the major pieces of work under way. Where many team members had deferred to similar statements of authority from AS at the beginning of the first cycle, by this point at the culmination of the second cycle, almost everyone was dismissive (in polite, often humourous ways) of AS's notion of being the gatekeeper to the collective knowledge and experience of the wider group.

We see some examples of the new-found trust and understanding in the data and statistics covering which team members were engaged in code development and review in the 3 months prior to the action research, compared with the three months following the inception of the action research. In the cases of many of the short-to-medium-term tenured staff on the team, they almost all greatly expanded the pool of peers they called on to perform code reviews, as shown in Table 4-7.

Table 4-7 Data on Peer Review engagement before and after Action Research

Team Member	Peer Reviewers prior to Action	Peer Reviewers from Action	Notes

	Research	Research onwards	
AK	0	0	(New hire, did not start contributions until later)
AE	0	0	(Not engaged as a Software Engineer, so never needed Peer Review)
BV	11	19	11 new Peer Reviewers engaged from team, 3 no longer used from outside team. Effectively using *every* team member.
CV	0	0	(New hire, did not start contributions until later)
EK	6	7	4 new Peer Reviewers engaged from team, 3 no longer used from outside team
FS	0	0	Team manager, infrequently writes code
JR	4	17	13 new Peer Reviewers engaged from team
MW	17	59	In her own words, "I decided the more we trusted each other, the more we could be the ambassadors for cross-team code, making connections – and got carried away"
NL	10	25	Expanded to use all team members, and build external relations with several other teams
PS	14	45	See MW comment.
AS	22	51	Even after leaving the Action Research following the second cycle, wider team trust still positively impacted AS's work
AP	4	6	Newer team member, expanding Peer Reviewer s within team
DK	11	31	Expanded reviewers to entire team, as well as outside reviewers
JR	14	23	Expanded reviewers to nearly entire team, as well as outside

			reviewers
JB	5	15	
MA	4	21	
PC	18	55	See MW comment.
PG	0	0	(New hire, did not start contributions until later)
SY	23	97	See MW comment.

We also see those team members considered experienced, and/or with long tenure, being asked to review code by many more team members, and also changing the set of team members they called on for review tasks. When discussing these basic figures with the team, group members were very forthcoming that this had been a conscious outcome of the initial Action Research cycles. It would take some time (not until cycle 8) to assess whether the change engendered, and the underlying practices of leadership that supported them, had actually led to demonstrably improved or greater innovation.

4.4.3.2.4 Reflection

Reflecting on the work in this cycle began during and towards the end of the actual execution. The nature of relating stories and sharing experiences about a group's history can't help but triggered the drawing of links and conclusions, and thinking about implications.

One of the most prominent, and explicitly stated, outcomes of the cycle was the realisation that simply talking about the team, its culture and composition helped foster deeper understanding and trust. This was evident in multiple instances of team members opening up about personal mistakes made a various points in the history of the team, and admitting launch and innovation failures. In discussion, almost all team members had felt some kind of shame or embarrassment, and expected to be criticised by their peers if they'd shared these topics. The reality instead was their peers had been accepting of the actions of the past, and were far more interested in what could be learned individually and collectively about these mis-steps. Several explained that they thought this increased the likelihood of success, and innovative impact, of the next attempt at product changes and enhancements.

> "Learning the history [of the team] was great, but I think the big benefit was that we actually talked! I had no idea of some of this, and more importantly, had no

> idea who to ask. I think sharing like this is much more important to us than we realise. It doesn't even matter what the topic is – just explicitly talking about who we are and how we got here should happen more, like whenever someone new joins the team"
>
> (researcher's journal, 25 January 2012)

An unexpected outcome of this cycle was the team's realisation of who held knowledge on a variety of technical and cultural issues within the team, and how the historic and current sharing practices impacted their work and their ability to innovate (covered in the literature for example by Hoegl and Schulze, 2005; Popadiuk and Choo, 2006; Leiponen and Helfat, 2010 and others). This was discussed in a qualitative fashion within the group. A recurring theme was the realisation that team members had naturally gravitated towards a mode of seeking information via their team leader or FS and AS (as managers), over time eroding the cross-team and interpersonal casual sharing of knowledge and expertise that might be considered more normal. Several new team members highlighted that they observed the team's culture, when they joined, was one of "asking permission of managers to share information and knowledge". This was significantly unlike other peer teams at ABC Company, or indeed ABC Company as a whole. The dominant culture is free and open sharing of knowledge and expertise.

FS expressed genuine shock that this inhibition to risk-taking had evolved to this point. He proclaimed to wide agreement that this absolutely should not be the case, and charging everyone to take ownership of the knowledge sharing culture that exists more broadly in the company. At the time it seemed like a simple thing to say in the context of the wider action research cycle, but it quickly became apparent that this simple leadership practice of acknowledging and promoting the open sharing of knowledge was significant step in changing the innovative direction of the team.

Between cycles 2 and 3, the data that was automatically collected about which team members interacted with which other team members was examined, and explored a significant fanning out of interactions from a code development and submission perspective. Examining individual instances of these new connections revealed a universal response that new trust had been established. Explicit discussion on free and open sharing of expertise and knowledge had let the research group broaden the interactions between team members. We

also observed that areas of the product whose code had historically been untouched was now actively seeing new work.

It is significant that at this point in reflecting on the cycle 2 work that AS let the group know he would be leaving the research group, as he had genuinely too many commitments on his time and needed to let something go. As the action research had been envisaged and communicated as something completely voluntary, with a clear path to easily withdraw without needing to provide reasons or justification, we accepted AS's choice. A few co-researchers did try to encourage him to stay and participate in future cycles over the coming weeks. Some weeks following the conclusion of the second cycle, some team members suggested that perhaps AS had left the research effort as he'd seen and felt the mood and behaviour of the team change. As a group, the second cycle had reached a conclusion that a key leadership practice from the experts on the team was freely sharing their knowledge, and that this had robbed AS of his traditional position of power as knowledge gatekeeper and broker or interface to his parallel team. In keeping with the tenets of Action Research, we openly asked AS for his input on this – he was free to see the notes and data on these discussions as part of the action research foundations, so we took a positive and mature attitude in seeking his position on this. AS did not comment further on the topic.

4.4.3.2.5 Insight from Actions and Adaptation of Subsequent Theory

The growing understanding of trust, and the increase in manifestations of such trust on team behaviour and activity, was a key insight guiding subsequent cycles. Individuals leading by example in revealing their flaws and past mistakes had had an enormously positive impact. From our reflections, it was clear that exploring and expanding trust by way of examining personal and team biographies and histories had begun to have a visible impact on the work being performed, and that the next cycle should take this approach to the logical conclusion – having looked at the past and present, it was paramount to look at how to employ these newly-understood leadership practices to make some deliberate choices about the team's future.

By continuing to build trust, and to freely expand the sharing of knowledge and expertise in the team, we should revisit where the team was going. Importantly, this should include taking the risk to challenge the current goals and priorities, and if necessary replace them in light of the new insights into what approach might better help the research group innovate.

4.4.3 Cycle 3 – New Priorities 1

The third cycle occurred in early February 2012. The team had had several weeks to consider both the outcomes of the first two cycles, and also had become more comfortable with the principles of Action Research.

4.4.3.3.1 Theoretically Informed Initial Position

A new-found sense of self-determination had emerged in the group, to the point that several group members were openly discussing the idea of where to focus the next action research cycle. Taking this momentum in to the cycle, the discussions gravitated toward the notion that for too long, the team had sought to implement a drawn-out development plan that had been part of the initial merger, which years later was serving their customers poorly at best, and leading to endless failed milestones and goals for the team in particular.

The group broadly discussed their hopes that this cycle would enable them to further explore leadership practices around their new-found (or rediscovered) trust, and building on that, explore their developing sense of camaraderie.

4.4.3.3.2 Plan for Action Research Cycle

Of particular interest to the group at this stage was the idea that they had followed a two-year old plan that many thought was now wanting. Even if many of them weren't recognised as "official" leaders (whatever that meant), they could do no worse if they determined to strike out on their own, and set their own goals and desired outcomes for the next-generation product. The company as rule prided itself on the wider culture of taking a risk and making mistakes, so long as one learnt from such actions.

> "Carpe Diem, or actually, Carpe Codex"
>
> (researcher's journal, February 15, 2012)

This was an in-joke made off-the-cuff, but that resonated with nearly everyone. The rough translation as accepted by the team being, Seize the Day, or actually, Seize the Code. As the humour transformed into planning for the cycle, determination grew to explore what changes should be made to how the wider team worked on the major software goals, and what those goals should be.

Discussion followed on how ambitious this cycle should be. A number of team members want to both establish new goals, establish any necessary new ways of working, and establish how, in detail, the group would take action to make these new goals a reality. In effect, they wanted to define the "what" and the "how" in one ambitious cycle. Ultimately agreement was reached to split the effort into the next two cycles. Cycle three would focus on what the new priorities for the team should be, in both software and organisational terms, leaving the "how" for cycle four. Even this smaller scope would still provide ample opportunity to explore leadership practices about what exactly would be the target for innovation over the coming year.

Many group members delved immediately into a low-level discussion about work practices, process and what had been inherited during the team merger. Criticism covered the parts they individually disliked or found stifling, or which seemed opaque from a new-comer's perspective. This expression of frustration was unguided and led to circular discussions and digressions. After noting this, we decided to be more focused on what the cycle should strive for, and the group developed the key phrase they would use for the remainder of the cycle.

> "What will I do differently tomorrow?"
>
> (researcher's journal, February 15 2012)

This became a particularly useful mantra as conversations and follow-up work activities occasionally drifted back to circular discussions or arguments. Critically at this point, the notion that the way things should change, and the priorities that would be adopted, would be done as a shared group commitment. This realisation struck even before discussion ventured in to the key development of the new priorities, as several people flagged how "mixed" understanding, and individuals working alone in what they thought was a common direction, but ultimately at cross-purposes, had adversely impacted the team in the years leading up to the Action Research.

I personally flagged at this point that adopting new priorities as shared priorities also allowed for better accountability, and for the team to support each other when facing adversity in implementing whatever priorities were decided. The researchers latched on to this, extending the idea to also ensure that individuals would make similar decisions to the group in the

absence of other members, and that the shared commitment would reduce the overhead of communication in future, easing the collaborative "tax" on shared work.

4.4.3.3.3 Execution

With notional ground rules in place, the researchers spent several hours discussing and brainstorming what should and should not be new priorities. The guiding principle of "What will you [I] do differently tomorrow?" was heard spoken aloud numerous times.

The group again selected a relatively low-tech way of tracking and recording ideas, consensus and agreed-upon priorities. Several large paper flip charts and markers were used, with group members effectively gravitating to where their interests and the topics being discussed intersected. An example can be seen in figure 4-5.

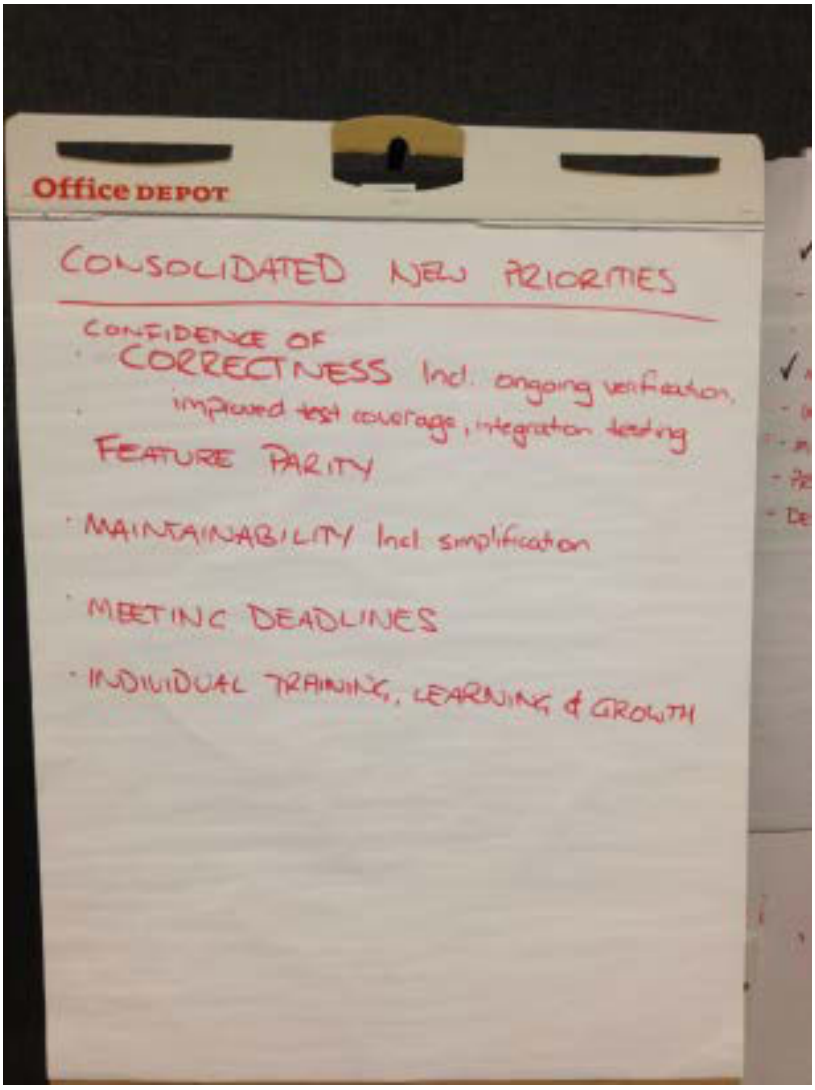

Figure 4-5. Developing set of new priorities as part of Action Research cycle 3

As discussions and writing continued, several repeated themes emerged. Without prejudicing the analysis of these themes, the full set of new priorities identified follows:

- Be pessimistic; more focus on testing correctness
- Communicate deadlines (soft or hard) and consequences better
- Take the deadlines (both estimation and meeting them) in a stricter manner / more seriously
- "I shall not spend time on unimportant (or too insignificant) stuff"
- Delegate more – give people opportunity to touch existing code
- Strive to adhere to deadlines better; keep maintainability in mind
- Focus more on deadlines; have authority to call people out on non-maintainable code
- More focus on correctness and different ways to check the actual correctness measured
- More stress on maintainability than deadlines
- Consider more initiative with interacting with team members to accelerate personal growth
- Communicate on the timely progress of work performed

Immediately upon completing the list of new priorities – and in fact, before its completion as themes began emerging – several researchers, notably PS, FS and MW, spoke of their concern that this new set of priorities was too ambitious. If the team had problems balancing the competing demands following the merger, surely this new set of priorities was just as demanding, if not more so.

An altogether unexpected response was provoked. Much of the remainder of the team engaged with this challenge to the new priorities, and highlighted two key points. First was the agreement that had been made earlier in the cycle that these priorities were to be shared priorities, owned by all the team collectively, and promoted and defended by the group. As one person put it, the whole team would "rise or fall on our collective drive to hit these goals." (researcher's journal, February 15, 2012).

The second response was emblematic of one of the priorities that had been suggested. To grow as individuals, the team needed to stop making the same mistakes of the past, and try new things. Even if new mistakes were made, they would be learning and growth opportunities. This would be demonstrating up front the commitment to this new goal in particular – though the entire set of new priorities would clearly benefit as well.

This unexpected spontaneous solidarity clearly raised the morale and spirits of everyone in the group. Discussions at this point started diverging into how these new priorities would be adopted and implemented, until several people spoke up that the plan had been to identify new priorities in this cycle, and determine how they would be implemented in the next cycle. The fact that a significant number of new priorities had been identified (and just defended) made several people propose a workable compromise between those who wanted to jump straight into doing work to hit these new goals, and those who still needed time to digest what this commitment would mean. The proposal was to take several days before embarking on the next cycle, to both let these new ideas grow, and also spend some effort communicating to other teams and colleagues affected by the new priorities the fact that the team would soon be changing direction, and that more information would be forthcoming.

While this meant the cycle drew to a premature end, most of the group agreed that what had actually been achieved was potentially far more valuable that what had been envisaged leading in to the cycle. The team didn't just have a set of new priorities, but also a rapidly developing new group dynamic and shared destiny that had previously been subservient to the historic goals of company mergers and past plans.

The most striking implications of these changes would not become apparent until well after the seventh cycle, where significant new innovative product development would become evident. Even at this early stage of cycle 3 (and the immediate successor cycle, 4), raw data indicated how the change in relationships, trust and shared priorities began to impact “the old-style work” and “the new-style work”.

The team had historically suffered from significant requirements to re-work or re-do software thought complete. This was shown in data, both at a higher/conceptual level of product management and product features being signed off and released to the public, but also at a lower level of individual pieces of software work being marked for “rollback” (effectively, removed, or reversed) and the back-log of new ideas and features, known as the burn-down chart, showing little or no progress despite years of effort. In the three months immediately following the initial cycles of this Action Research work, we see a dramatic change in the indicators of rollback and burn-down progress reported in the primary data from the team's tools and processes in Table 4-8, when compared to the three months prior to the commencement of Action Research.

Table 4-8 Data on rollback frequency and stories before and after Action Research

Metric	Before Action Research	After Action Research
Code Submissions	644	3537
Outstanding Stories	130	42
Rollback occurrences	18	46
% of Submissions Rolled Back	2.8%	1.3%

As researchers, we were acutely aware that Action Research is not geared to a positivist notion of measurement and control for data such as these, and so questioned how seriously we could trust the raw data and its implications. We agreed that we'd already discussed the fact that Action Research was the most appropriate methodology, due to the unique nature of the circumstances and work being done. We did revisit the same metrics a year later, at the conclusion of cycle 8, and saw an enduring change was reported for the whole time-period following the first 7 cycles of Action Research. The amount of re-work and rollback had remained at its new, lower percentage level, and the burn-down backlog of unmet features and requests had changed dramatically from a static list representing team and customer dissatisfaction, to a dynamic, growing, and increasing more ambitious list of new and innovative features for the product and the team.

4.4.3.3.4 Reflection

There was a definite sense of ownership, individually and collectively, over their new destiny. Previously-silent researchers had spoken up to say these were shared priorities, that would live or die based on what the team themselves decided and how they acted, and not some silent force from before their time.

The researchers set out to establish new priorities for the group. While those priorities were indeed created, more important achievements made this cycle almost serendipitously worthwhile. Our reflection led us to identify three broad changes that had begun in the team, that came in to sharp relief during this cycle.

When it came to setting priorities, too many areas or topics were unleashed, with too much content for each. This was an expression of pent up frustration at the historic failures and lack of control from the group, as well as enthusiasm for the proposed changes. There were concerns that there were so many new goals that this might mean too shallow effort on any one of them. It would make a real difference to the team's work and the software they were trying to produce. This would become evident in the fifth cycle, thankfully with beneficial outcomes we couldn't predict during this cycle.

The team setting their own priorities – not accepting those given to them by others – was remarkable for the fact that the team almost seized this for themselves, rather than meekly seeking out permission from other authorities or past managers/directors. Individual and collective acts of leadership were displayed multiple times in this regard.

A leadership practice began in this cycle, but grew to have profound impact on the team and its innovation efforts, around growing to support for each other, defending each other with a concerted front, seeking out strengths and knowledge in each other, and presenting a common face to the company. Collective ownership, collective responsibility became a demonstrated act from many in the team. This was observed over the coming weeks in the sheer number of external peer reviewers called to work with the team.

Overall, two levels of leadership practices were experienced that contributed to short and long term changes in the team innovation culture. The more tactical and immediate practices – and to some extent, symptomatic practices – were seizing control of the team's goal and priority setting, however over-ambitious that was, removing the dead weight of historic demands and directions that had stifled avenues for innovation. More importantly, a high-level, strategic set of leadership practices implicitly bloomed. These were shared responsibility, team understanding and collaboration that had lead to the new goals and priorities. This gave team members confidence that this process was repeatable in future, and that they could more confidently select the right piece of work at any given time, take risks, and make consistent decisions and efforts towards team innovation goals with or without the explicit input of other team members.

4.4.3.3.5 Insight from Actions and Adaptation of Subsequent Theory

This cycle principally concerned the high-level trust building and associated team development practices and consequences. Collective strength comes from many individual acts of leading by promoting, embracing, defending and defining the team and its work.

The group's nascent trust had clearly grown from earlier cycles, and the team was now starting to exert itself as a collective whole, greater than any individual efforts that had preceded it.

Having established a set of new priorities that were firmly grounded in what the team members themselves wanted and believed appeared to have broken the shackles of past work patterns. Even though it was acknowledged that our ambition had run ahead of us, we firmly believed that future cycles should embrace this new high bar, and that we should put concerted effort into determining how these new priorities would be implemented. Perhaps more importantly, future cycles should explore what this new collective will could be used to achieve.

4.4.3 Cycle 4 – New Priorities 2

Cycle four commenced on Monday February 20, being the start of the week following cycle three. This timing deliberately included a weekend to allow reflection on the part of group members following cycle three.

4.4.3.4.1 Theoretically Informed Initial Position

Translating the team's new priorities into actual plans for action, and observing results, had been strongly expressed, even during the previous cycle when agreement had been made (supposedly) to defer discussing the implementation of new priorities until this cycle. Almost the entire research group thought that different leadership practices would be observed compared to previous cycles. In particular, many thought that practices around championing change, and collaborating to deal with ambiguity and risk would be prevalent.

4.4.3.4.2 Plan for Action Research Cycle

Cycle 4 was very deliberately planned to explore how the researchers would pursue the newly stated priorities, and to be self-aware about how decisions were being made, who was making them, and what that said about existing and new leadership practices within the group. In

many respects the Action Research plan sat above a lower level of planning about actual work strategies and priorities. As a group, we stated that care must be taken to not conflate the two (at least as much as human nature would allow), and therefore we framed the cycle with two guiding phrases: “How will we approach our new priorities?”, and “How are our leadership practices evolving to answer questions like approaching new priorities?”

Even during planning discussions this distinction began to blur, as several days of reflection had led some group members to question whether there were too many potential new priorities to consider, and that we would become lost “down the rabbit hole” and forget the action research effort on our own leadership practices. One team member quipped that the very self-awareness vocalised was itself a new leadership practice heretofore lacking in the team. Before planning lost all structure and gave way to chaotic execution, it was agreed that being mindful of how these decisions were being made, by whom, and with what motivation, would be a worthwhile approach.

4.4.3.4.3 Execution

Execution for the cycle began with many researchers returning to the concern that we had generated far too many new priorities in cycle 3. Each time the conversations and interactions started around what approach to take for a given new priority, the topic was dragged towards relative priorities, and should we not instead start with a different new priority. Some ranking of priorities was attempted, but this too tended towards recursive “priority of priorities” discussions.

These circular discussions continued for nearly an hour, though to the team's credit they were free from hostility or acrimony. Eventually various team members began highlighting that we were returning to the same conversation points over and over, and that in the spirit of voicing their awareness of this (and self-awareness), shouldn't we stop and consider a different approach.

I raised the question of why were we apparently worried about relative priorities? Why did we not just record the first thoughts that came to mind for how to enact our new priorities, and see what happens? Responses ranged from a desire to not have implementation approaches in conflict or at odds, through to the realities of trying to work with other teams

who wouldn't necessarily segregate one new priority from another. Without some holistic approach, reactions to one new priority could colour reactions to others.

This gave rise to a broader discussion on risk, fear and ramifications. Team members were excited about the new priorities, but people did have anxiety about how the new priorities would survive actual implementation and work with other teams. Delving further into these anxieties, several newer team members asked how change and difficult issues/topics had been communicated to a wider audience in the past. FS, as manager, indicated it was often a shared responsibility between himself and AS by default, and that at times such communication of change had either not been timely, or had been overwhelmed by other factors.

PS at this point raised a crucial idea:

> "What if we decide how we are going to communicate our new priorities to ABC Company, and who will champion this across the team, and then rank the priorities? We get to solve what looks to me like another historic problem – let's all get out there and all be the voice of the team, not just [FS]." (researcher's journal, February 20 2012)

This switch in focus seemed to unblock the cycle. Ignoring for a moment the struggles with too many priorities, and their interdependencies, and considering instead that being able to describe the risk, fear and ramifications, and the ultimate consequences and communicate them clearly, provided a path forward in the cycle. This particular practice was termed "mastering communication, in good times and bad"

All of the team members were vocal in telling FS they would share the burden of communication. Several shared details of existing regular inter-team and inter-group meetings, and quickly developed a check-list of other company groups and stakeholders whom the team knew should be informed of the existence, and progress, of the team's new priorities.

Returning to the relative importance and ranking of the new priorities then became strangely anti-climactic. Many strongly held opinions from only an hour before evaporated, and a quickly spreading satisfaction occurred of "let's just roughly rank them, and include in our

communications that we can and will adapt priorities in traditional ABC Company 'iterate quickly and learn from mistakes' fashion" (researcher's journal, February 20 2012) .

Ultimately, the cycle resulted in tactical outcomes: The team as a whole would go forth to communicate the top five new priorities to all other affected teams, and concrete examples of communication leadership practices were evident from all team members, not just nominal managers.

4.4.3.4.4 Reflection

Overall, the research group did not consider this an exemplary Action Research cycle, though it was still useful. The cycle was notable more for the low level tactical issues addressed, than the higher level action research learnings. Even in that context, leadership practices fostering intra-team trust, and coherent, consistent external communications progressed.

A principal realisation was that the Action Research methodology, and the particular instances we were creating in our cycles, need time. Time for the outcomes and consequences of previous cycles to start manifesting, as well as time to allow the proper cyclic nature of Action Research to play out. In particularly reflection and input into the next cycle's theorisation. It is difficult to ask for patience when a team has been frustrated for so long at lack of progress and innovation. On the positive side, almost all team members acknowledged they were aware of this, and that the delay here differed from the previous work delays and derailments. This instance was driven and controlled by the team itself, and for larger purposes also under the team's control.

Practices of self-awareness were perhaps the strongest set of leadership practices observed in this otherwise unremarkable cycle – the self-awareness of all team members had risen, and the practices around self awareness, such as openly communicating, unflinchingly comparing and contrasting previous states to current states, and not allowing historic emotions to cloud current efforts, were all evident. We agreed that of themselves, self-awareness practices were only generally associated with innovation, but that the time we'd suggested should pass before more cycles would demonstrate whether this generic practice was in this instance a specific practice leading to innovation.

4.4.3.4.5 Insight from Actions and Adaptation of Subsequent Theory

The key insight was the recognition that we must allow time between cycles, particularly when substantial changes and challenges are the outcome. This work intertwines with the time humans require to build trust, and with the duration and follow-up on verbal and written communication inside and outside the team.

Action Research is not instant, nor is the practice of leading innovation. It was a lesson taken to heart, woven into planning the next cycle for one month later, to revisit the new priorities in the light of the communication effort underway.

4.4.3 Cycle 5 – Democratic Derailment

The fifth action research cycle occurred on March 21, 2012.

4.4.3.5.1 Theoretically Informed Initial Position

This cycle was framed as a chance to gauge how effective the cycles to date had been, and to explore what longer-term goals the team could strive for given the developing maturity, and broadening set of leadership practices being exhibited by a variety of group members. In light of the sobering aspects of the fourth cycle, several discussions also focused on how resilient the newly-found and/or newly-exercised leadership practices were to the realities of day-to-day work over a period of weeks or months. Of interest were whether trust patterns and relationships would revert to pre-Action Research types, and what practices gave energy and endurance to the changes the team was attempting.

4.4.3.5.2 Plan for Action Research Cycle

There was interest in the group in assessing how well each of the new priorities from the fourth cycle had progressed. Some fairly excited, and pointed, discussions were held on exactly how this could be assessed. Numerous positivist mechanisms were suggested, many parochial to the software development world such as “new lines of code”, “bugs closed”, “story points achieved”. Without discounting the value of such analysis, several of the stronger adherents of Action Research indicated that some of the leadership practices we were trying to observe weren't amenable to this type of data gathering (though could clearly be augmented with such data, and it was gathered nevertheless).

Greater insight into the leadership practices of all team members was sought. The ideas surfaced of the team members themselves assessing each other in terms of building and displaying trust, communicating the team's new vision, establishing buy-in and successfully advocating for change within and on behalf of the team. This transitioned into a discussion of the realities of such observation and associated analysis and understanding, at which point we self-identified that we were moving into execution.

4.4.3.5.3 Execution

Execution began by exploring the discussions on how enduring new and changed leadership practices might be observed and understood, as well as the underlying mechanics of the team and the software systems under development.

At this point, as the first team members reconvened to discuss their learnings, some of them began voicing frustrations that they weren't sure this was achieving the goals both of this cycle, and the overall Action Research effort. This triggered in several other group members the release of other pent-up frustrations, largely about new priorities that hadn't received as much attention in the month than had been hoped, and several cases of group members wanting even more dramatic, and dramatically different, change.

As a researcher, I was initially tempted to try to smooth the frustrations being expressed, and conferred with FS about doing just this. We realised that stifling the frustrations being voiced would be both toxic to team motivation and commitment to the research, as well as counter to the tenets of Action Research itself. If the group collectively decided that this was the path this cycle should take, we should abide by our initial research agreements, embrace this choice, and see where it led.

Discussion opened further, exploring the frustrations over some time. Many in the team saw great potential in the way the team was changing, but felt that the constant focus on what leadership practices were being exhibited, embraced, changed, or removed was robbing them of some spontaneity. As one team member put it.

> "We just need to blow off steam, goof off, shoot the breeze, get some outside stimulus, eat the red pill. You know, all that stuff that seems like a waste of time, but occasionally ends up with someone leaping out of the bathtub shouting Eureka!"

(researcher's journal, March 23 2012.)

With this kind of change in direction, the group was still mindful that much could be learned about who leads the group in times of stress like this, and how.

Group members began splintering into smaller discussions, of varying volumes, covering what was annoying, frustrating or aggravating them about either the team and the research, or indeed topics outside the research that were contributing to the feeling. No one clear common theme was apparent, rather each team member had different pain points (though there was some overlap). Topics voiced included

- The company's six-monthly performance cycle was culminating, taxing their time.
- The change in the team wasn't happening fast enough – what had happened was good, but they were anxious to get to "great".
- Other teams weren't meeting their delivery commitments, slowing down progress on some software
- Some new priorities' supporting activities weren't fully underway, leaving some anxious they'd be dropped or forgotten.
- The physical office space was being reorganised, and previous experiences hadn't been kind to the team

Interestingly, the final topic of physical space led to another discussion on whether any one individual or team in the company (or indeed wider software industry) could simply "think" their way to innovation, regardless of what leadership practices supported such innovative effort. The semi-rhetorical questions started flowing – did one have to live the life of the user, or at least walk in their footsteps, in order to bring completely alien, outside input, ideas and stimulus to bear.

A quick joke was made about physically acting out what users did, and what our systems were trying to achieve to improve and innovate the outcomes for these users. What started as a joke snow-balled, with a few team members physically getting to their feet, and moving around at the imagined cause and effect of users embracing the new software.

One team member who was known to be particularly restless and active at all times (having previously insisted on a “standing desk”, and being renowned for standing and walking around the room in our meetings and discussions) suggested the entire research group actually get up, and use this technique to explore the question.

Thus ensued a human-scale role-playing of the parts of the core systems under development. The actual low level tasks of the software mimicked by the people in the room aren't particularly important – to the casual observer it would have seemed to be a modified version of Twister played with a bizarre vocabulary of rules invoking various internet search terms, advertising names, and so on.

4.4.3.5.4 Reflection

After approximately half an hour of various derivative forms of the fun having run their course, the exercise gradually dissipated. Four notable observations were made by various group members as the day drew to a close.

First, everyone in the room was smiling. The week had begun as an exercise in reviewing progress, thinking about new priorities, and dealing with contemporary issues of frustration, exhaustion and more. At the end of the week laughter and camaraderie had replaced short tempers and workplace concerns.

Second, the initial Action Research premise for this cycle had been completely derailed. Interestingly, almost all participants viewed this as the strength of the Action Research methodology shining through. A particular cycle on new priorities had been planned, but instead the research participants themselves redirected the cycle's efforts to further their collective democratic will, and particular team and organisational issues that were most pertinent in the immediate point in time. None regretted the shift in this cycle to physically acting out the mechanics of the software being built – and a few even pointed out that we needed to be in a frustrated, annoyed and stressful mindset at the start of the cycle for this change to have taken place.

Third, finding and using sources of external stimuli are vital to innovation, even when they appear comic, or come from the strangest circumstances. Learning how to do the robot moves to mimic a computer has almost nothing to do with writing software, but is very much part of

feeding different stimuli to promote new thoughts, new ideas, and ultimately feed the individual and team with the raw materials of innovation.

Fourth, several of the newer group members expressed the revelations they had had during the fun and games, being able to visualise and understand parts of the system they had previously not understood, or ignored in the belief that those parts were too complex to understand with the current knowledge and expertise. The team had certainly tried traditional knowledge sharing and exchange, using mechanisms such as design documentation, operational procedures, detailed comments in code, and informal team talks on new or existing features. But as one team member pointed out, “some people learn visually, some through experimentation, and others kinaesthetically. For me, jumping around like a loon made it click” (researcher's journal, March 23 2012).

Change is hard on all participants. Leading change, especially leading it successfully, is perhaps the most exhausting practice any leader can embrace. The group was suffering change fatigue at the start of this cycle, and the radical shift in the way this cycle played out seemed to work through this change aversion and fatigue, and move further towards a new innovation-focused working team. Serendipitously, it also greatly refreshed and energised the team members.

4.4.3.5.5 Insight from Actions and Adaptation of Subsequent Theory

Perhaps the largest insight gained from this cycle was the realisation that specific goals around understand leadership practices for innovation could not be “forced”, and more generally, that no true Action Research cycle can be rigidly constricted to follow a pre-ordained path. If anything, there was value in being true to the fundamentals of Action Research methodology, and letting the democratic tenets override any preconceived restrictions or constraints.

Theorising also moved to consider what other constraints, restrictions and impediments existed, beyond those we had called out in the very early parts of this research work in cycles 1 and 2, and more recently in this cycle. Challenging accepted norms, the status quo, “business as usual” was central to thinking for the next cycle.

The notion that totally unrelated external stimuli and inputs are essential to innovation-focused teams and their processes was less a revelation, and more a reminder. ABC Corp

possessed many, many sources of such stimulus, and the team had unwittingly allowed their focus on their own issues and the software they develop to crowd out time and attention to these external sources.

If a leader can not only manage the stamina of those involved in change to see that change to fruition, but also intermingle the very goals of change – innovation – into the coping mechanisms used to deal with change, then they have grasped a significant and powerful practice.

4.4.3 Cycle 6 – Stop, Start, Continue

The sixth cycle commenced on March 29 2012.

4.4.3.6.1 Theoretically Informed Initial Position

The democratic uprising that occurred in the fifth cycle had many repercussions, one of which was reflection on from where the team had come, and if its new found purpose was being affected more subtly by the remnants of past practices and culture than imagined. Comments were made about "the dead hand" of the past reaching forward to try to claw the team back to its prior state of limited progress, and endless rework.

Several of the team indicated that they were unhappy with various aspects of prior projects being left unchallenged, especially those parts that had been dictated to them from the original merger several years before. We talked at length about whether this was a real or imagined impost, but eventually we agreed that the perceived reality was what we lived with, and therefore we should address (and construct) our future based on that.

FS highlighted that while he could push back on external product managers and other directors to free the team from historic commitments, that came at the risk of burning social capital and good will – both his own and that of the team – amongst the directors and product managers. Consequently we framed this cycle as one to explore broadening the leadership base of the group, what practices that entailed, and what that meant for the innovative capability and freedom of the team.

4.4.3.6.2 Plan for Action Research Cycle

Continuing from FS's theme, to push back on old commitments alone, even though for the best of intentions to enable new work and innovation to flourish, would include expending

considerable time, energy etc. personally. If the researchers were to expand the front of leadership, both to address this issue but also for the team's future benefit, it needed to be done in a way of the team's choosing.

We discussed what approaches to deploy, and what ideas people had. A few of the researchers suggested that those who felt most strongly about a given topic or prior commitment could champion the team's efforts. Some suggested that everyone should be involved in collectively taking responsibilities, which only garnered limited support when it was realised that not everyone agreed exactly which past practices and commitments were of concern. This led to asking how we could get an honest assessment of what should be dropped, what should be continued, and whether any of the new priorities previously identified weren't garnering the attention they deserved.

The company culture is strongly focused on protecting privacy and anonymity to ensure ideas and discussions are evaluated on merit. Some suggested using one of the technological tools available for commenting or taking input on ideas. This was countered by several people highlighting the unexpected benefits of indulging in a low-tech, socially interactive approach that had emerged in cycle 5. To this end, I suggested a technique I had seen used elsewhere, where people would write down their ideas under three headings: Stop, Start, Continue.

4.4.3.6.3 Execution

The three headings Stop, Start and Continue each signify activities or priorities that should cease, should be commenced by the team, or (notionally desirable or successful things) that should continue. This was done using a simple technique of placing individual ideas on post-it sticky notes, and anyone who saw a (near) identical idea to their own could simply place a "+1" sticky note next to the idea, or write "+1" on the original sticky note, to place an additional vote for that idea.

The process started slowly, with a few people wanting to sit back and see what other ideas were raised before placing their own ideas. There was a parallel discussion at this point about whether the ability to observe others place their ideas robbed them of anonymity. Multiple team members indicated that while this was strictly speaking true, the group was small enough, and almost everyone had voiced their strong opinions in the past, that who suggested what would be largely already known. FS and PS both spoke up to indicate that the team's

trust level was so much higher than its starting point months before, implying that it was a safe environment in which to let others know of one's direct concerns.

Half an hour elapsed with varying degrees of excitement and reflection among group members. After the initial slow start, there was a steady stream of people moving between each of the topics, placing sticky notes. Occasionally, someone would exclaim “a ha!”, and place something with emphatic physicality, which would trigger a rush of interest. As the time drew on, I asked if everyone had expressed everything they wished to place on the boards, so as not to artificially constrain the time available. When everyone indicated they had finished, we reviewed what had been placed under each heading, and discussion ensued.

An immediate issue occurred, where several topics – e.g. taking deadlines seriously, estimating time accurately, etc. – were seen by some as being synonymous. Several people asked if this really mattered, shouldn't we deal with each issue on its merits to ensure fidelity with an individual's concerns. Another dimension was voiced, framed in terms of the overall Action Research goals. Keeping similar items separate, or grouping them thematically or semantically, should be done through a lens of leadership practices. In particular, thinking about what approach improves the innovation culture, and the chance for actual new productive innovation to occur.

The discussions continued, but eventually gravitated towards grouping similar topics as we progressed, rather than leaving thematic/semantic grouping until later. Many of the ideas were well known, having been covered in cycles 3 and 4 when setting out new priorities, and it was clear that some people had raised these topics as they feared the commitment to the new priorities had waned, or had suffered from external push-back. There were a few genuinely surprising topics raised, the most notable of which was internal team composition, movement and sub-team makeup.

AK, PS and MW then raised the earlier point of who should be the person responsible for a given topic – the person who suggested it, the person who feels most passionately about it, or somebody chosen by some other random means. No one liked the idea of random allocation, and several volunteers came forward to take charge of a given topic. Openly polling the group, everyone was happy for volunteers to opt for a given topic, so long as there were no “unloved” topics thrust on someone unwillingly, and no one overcommitted to too many

topics. The fear was verbalised that several overloaded people should not overload themselves further with these commitments.

The finalised thematic grouping, and volunteers opting to champion a given topic are shown in Table 4-9.

Table 4-9 DTech Group's decisions on what to stop, start and continue as a group

Owner	**Topic**
JR	Stop ignoring email - mail from team-mates, and system alerts
AK	Taking initiative on individual learning
PS	Define each project's end-goal and translate into 2-week milestones
NL	Pairing people weekly to share knowledge
CV	Mixing sub-teams and membership
AK	Setting aside time to read code reviews and design docs

AK was gently criticised for volunteering for two topics, but highlighted that the individual learning topic would be comparatively little work for him, as he'd be pushing others to set and meet their own learning goals.

4.4.3.6.4 Reflection

First thoughts on this cycle were very matter-of-fact, and were indicative of the change that had gathered momentum across the team. This was a cycle focused on how to translate our learning and the team changes into concrete ways of changing behaviours, and ultimately boosting the innovative capability and sustainability for the team.

Quite a few researchers indicated strong beliefs that this cycle could not have happened earlier in our research. The group needed the radical transformation in intra-team trust, self-belief and control over team destiny which had emerged in the earlier cycles. Heightened trust levels were absolutely necessary to apparently-simple, but in reality quite ruthless actions. To be able to pointedly tell colleagues to stop ignoring communication safe in the knowledge that it wouldn't affect personal or professional relationships is only possibly in a culture of trust and respect. There was agreement around the group that suggested if this had

been tried months earlier, the result would have been acrimony and further dysfunction, not a healthy agreement to tackle the issue.

Also visible were some of the consequences of the decisions made in this cycle merging with those from the earlier cycles on new priorities. One entirely new product area was enjoying focus and attention in team members' development efforts, after having languished on the team's wish list for multiple years. This new product aims to provide a "validation" service to large brand-conscious advertisers, allowing them to set rules and preferences about advertisements for their products and the genre/content/tone of the content against which an advertisement is shown. More progress was made in the first "two-week cycle" shepherded by PS following this cycle, than in the entire multi-year history of the team. Later cycles would show how enduring this change, and new-found innovation impetus, would be.

4.4.3.6.5 Insight from Actions and Adaptation of Subsequent Theory

Change within the team and its environment had been attempted before. This cycle had approached it in a different way, building on the higher level theories and actions from earlier cycles, and focusing squarely on the practicalities of "How".

However, driving such change is more likely to show results – in leadership practices, and in resultant innovation – while the full force of the research effort is underway, and everyone's mind and effort is heavily focused upon it. But how could we know that we'd be more successful in adopting leadership practices on an enduring basis, and that our efforts at sustained innovation would actually stick this time?

These questions heavily influenced subsequent theorising. All felt that the next cycle must be framed around commitment. Were commitments being met? Were impediments arising? What could be done to break down obstacles, and ensure commitment translated into transformation, and higher innovative capacity and capability that endured long after the Action Research work completed.

4.4.3 Cycle 7 – Commitment

The seventh cycle commenced on April 3 2012, and ran for approximately one month.

4.4.3.7.1 Theoretically Informed Initial Position

The team was aware that the seventh cycle was likely to be the last, or next-to-last, effort to be made in this body of Action Research work. In some way, this framed some of the initial theoretical position. Specifically, the researchers had grown and developed as the Action Research Cycles progressed, becoming one group demonstrating deep trust, open communication, and most importantly sporting a culture of innovation. No one act or practice could be said to have directly contributed to the outward success and change seen. Rather, it was the building of a group that focused daily on what practices would foster innovation within the team, and between themselves and other groups that was seen as the greatest realisation and benefit of the work so far.

Crystalised to a single focal point, our initial theoretical position therefore was to explore what leadership practices made such change *endure*. It is fine to demonstrate a heightened capability for innovation and change while under the spotlight of greater than usual scrutiny, and in the presence of above-normal activity and generosity. But what would sustain the changes we'd seen, and prevent the group reverting to the systemic problems seen several months before?

In attempting to answer this, two phrases dominated discussion. We embraced them as positive ways to symbolise the key leadership practices we wanted to explore in this cycle: Commitment and accountability.

4.4.3.7.2 Plan for Action Research Cycle

Much discussion (and even argument) centred on how likely it was that the change we'd fostered would endure and be observable in one week, one month or one year. The group skewed slightly towards the positivist approach here, discussing signals, data points and the like that would demonstrate “the new normal” versus “the old normal”.

Many co-researchers voiced the idea that we should not wait to passively measure things after the fact. This was Action Research, they claimed, and therefore we should actively seek to plan actions that increased the likelihood of our “new normal” prevailing.

The researchers gravitated towards ideas of cross accountability, everyone defending the new normal, one consistent face shown to external groups and teams. A few researchers suggested

(in classic ABC Corp fashion) that we should actively track any and all instances where our new culture, priorities and approaches to innovation were challenged or threatened, either internally or externally. This would include techniques or approaches individuals or sub-groups used to defend our shift to controlling our own destiny and innovation outcomes.

Weekly check-ins would examine cases of commitment, accountability and defence, and seek to consolidate the position each time. In a month's time we would reflect on the cycle's activity. Throughout this planning, and the execution, the notion that leadership is emergent, and innovation must often combat counter-forces and adversity, was voiced many times. We fully expected to see leadership practices around shared ownership of the group's destiny, the mature group trust being exhibited in new ways, and group cohesion together with the new shared vision pushing innovation through.

4.4.3.7.3 Execution

The execution for cycle seven was straight-forward. Each DTech researcher would use their research journal to record any events in their weekly work that they perceived as challenging the team's changes, and the new commitment and momentum for innovation that underlined all of the new efforts.

Everyone was explicitly empowered to represent the team and its new approach, knowing they would be supported by team solidarity if their motives or the team's work were called in to question. Where a team member or team members thought it necessary, they could call in team peers to reinforce the unanimity of the team in the face of any challenge.

Weekly sync-ups were scheduled as part of the team stand-up meeting on Monday mornings, though everyone was encouraged to share the details of any event as soon as they'd recorded it in their research journal.

Over the course of four weeks, at least 13 cases of the team being challenged were recorded and discussed. In every instance so recorded, the shared accountability and team determination were evident. Details of the challenges, and researcher(s) responses are recorded in table 4-10.

Table 4-10 Challenges to the DTech team's new commitments to innovate, and team responses.

Person(s)	Date	Nature of Challenge	Commitment Response
PS	11 Apr 2012	Introduction of the 2-week development cycle	Explanation of team's new model and direction.
PS, FS	12 Apr 2012	Introduction of the 2-week development cycle	(Seeking support from manager, FS) – reinforcing team's new model and direction.
PS	6 Apr 2012	Deadlines changing in accordance with 2-week development cycle	Repeating historic approach would lead to repeat of historic failures. Team strongly believes in the new 2 week cycle, and success or otherwise will be quickly evident
MW	26 Apr 2012	Scope and demands for code quality in greatly expanded body of development work	The team has huge pent-up creative ideas and things they've always wanted to do. We are pushing heavily to try many new things – if a few fail, so be it, but we'll fail fast, and learn from the mistakes. This is the new team velocity, let us help you (other teams) adapt to it.
AS	17 Apr 2012	Old product changes appear stalled, in favour of new unproven areas of development	-
SY	4 May 2012	Significant new product development instead of dealing with historic backlog	This is the new normal for the DTech team
SY	18 Apr 2012	Bypassing managers external to the team to seek out new co-developers	Brokers, individual cross-team relationships, networking should be encouraged, not penalised
SY, FS	23 Apr 2012	Significant new product development instead of dealing with historic backlog	Team is striving to innovate for the future, providing greater benefits than simply matching historic features
FS	20 Apr 2012	Addition of the Validation project to teams work.	This team is now “getting things done” - Validation is a logical expansion
FS	23 Apr 2012	Challenging the team's chances of success, and external pressure to return to old ways.	Fortnightly progress, and new breakthroughs, are there for anyone to see – the data shows success is already happening, and the team is working to target where customers will be

			in the future
FS, PS, MW, DK	27 Apr 2012	Addition of the Validation project, and new ideas for the Reporting project, in the face of historic issues of project completion.	The change in the team and its innovative output over 1 quarter clearly demonstrated. We will use that momentum, new team trust and capability to revolutionise the market. The company benefits hugely, and the team is rewarded for their new working model with challenging projects, public recognition and more.
AK	4 May 2012	Funding for external training	Investing in the team's future, and its future success
AK	4 May 2012	Time allocated to learning and training vs “day job”	Investing in the team's future success, and the need to get new projects beyond current market expectations and practices – be ready to be where the client needs us in 12 months

4.4.3.7.4 Reflection

Without pre-empting the overall analysis of this thesis, early in the execution phase it was observed that the common themes of resistance to change outside the team, the testing of trust inside the team, and the resilience and determination of the team to reap the rewards of their research efforts and new approach to work.

Resistance to change from other teams manifested in two ways, both of which were addressed through the team's commitment to each other and their new priorities. A number of other teams clearly wanted the DTech group to revert to their previous existence, and not create ripples of change across multiple teams. Most of the group felt this wasn't malicious or detrimental, but more a reflection of the general fast pace across the company, and people adopting coping mechanisms based on known areas of stability. As the various group members met these challenges and explained the goals and innovation drive behind the changes, outside group resistance greatly eased (though never completely disappeared).

As expected in the planning for this cycle, the team witnessed that trust will eventually be tested, whether internally or externally. There was a belief in the team that the shared adversity of the group's history, and the changes over the preceding few months' Action Research had tempered and hardened the trust within the team, and to quote DK:

> "The other groups probably didn't know what was coming! We're not the push-overs we used to be" (researcher's journal, 4 May 2012)

FS made the most insightful comment in reflection. Everyone in the DTech group had used the opportunity, when challenged, to be a leader, and had harnessed the challenges to the group's changes as a way of leading in search of innovation. Other teams started conversations resisting change, and by the end of the conversations had been co-opted in to being co-conspirators in the very change they'd been resisting.

The research was showing concrete results, in the team's culture, and directly or indirectly in the actual work being performed, with large and small scale innovation translating into clear achievements. As well as the various data samples and journal entries showing the changes over time, milestones of the team's new innovation intent and success were apparent. The team's first steps at taking on the new Validation project had progressed to the point of full adoption, and another project with the wider DTech area, Customer Reporting, was now actively being discussed as something to move from the product burn-down "wish list" to an achievable goal within the calendar year.

4.4.3.7.5 Insight from Actions and Adaptation of Subsequent Theory

The focus on commitment had demonstrated that leadership can emerge from any point. The old team approach of being told to meet historic demands and not question whether there was a better way was at an end. Instead, the team's new culture was providing the environment for team members to demonstrate the practices that would allow innovation to flourish, in a number of unpredictable but tangible ways. The research group had (re)discovered that practices that most contribute to sustainable innovation are not those directly forcing innovation, rather those that foster first trust and from there all the associated dimensions of teamwork, culture, shared identity, drive to change, selection of rewards, and more.

Extending the notion of not forcing changes and/or innovation, we realised that the successes observed reached all the way back to the early foundation work done in the first two cycles of

this Action Research. Just as the benefits of those cycles had taken time to mature and translate into visible leadership practices fostering innovation, so too would the benefits of the later cycles. Allowing for the passage of time would be needed for the new practices to become second nature and habit, and for the individuals and team as a whole to allow these changes to translate into real new innovation and innovative capability. In that sense, time became the key adaptation of the developing theory. We would need to allow time to pass before returning to our Action Research to determine its outcomes, successes, learnings and failures.

4.4.3 Cycle 8 – Where Are We Now?

The eighth and final cycle happened on January 18, 2013.

4.4.3.8.1 Theoretically Informed Initial Position

A year had passed since the initial discussions and first action research cycle with the research team. At the conclusion of the seventh cycle, insight had been gained into both the leadership practices that were promoting and supporting innovation in-the-moment, but also a realisation that we sought enduring change and culturally "baked-in" leadership practices that would foster a continuous culture of innovation.

These culture-defining leadership practices were exactly those sought to reflect upon in this cycle. What had been evident over the past year, who had demonstrated these practices, and what links with, and impact on, innovation in the team and on the product had been seen?

Expected observations included seeing what in-the-moment positive attitudes had translated into longer term momentum around innovation, and how leadership practices contributed to both the innovative outcomes of the team, and fed back into the culture to further amplify innovation as a positive feedback loop.

4.4.3.8.2 Plan for Action Research Cycle

After a short time reminiscing over the work done in the previous year, some researchers started recounting their perceptions of practices observed, and related success or failure at product innovation or team change. Several others including myself interjected that we should establish the plan for this cycle before getting too far into an ad-hoc discussion. FS suggested adopting a more formal version of the story approach already evident. Each person

should prepare their perspective on one or more changes in the team culture, or released product, and the link to the new or changed leadership practice that had helped bring that change to fruition.

Several concerns with this approach were voiced. First, some people may feel influenced or biased based on hearing the opinions of people presenting before them. Second, some people might be inclined to just agree with an earlier point, effectively only offering a “me too” anecdote. Lastly both of these effects and others might lead some team members to stay silent on topics and practices that didn't contribute to innovative outcomes, or even hindered them.

I suggested a simple change to FS's idea, to mitigate these issues in the plan. Each person would write down the leadership practice and related product innovation or team change, but instead of presenting one's own material, we'd collect all of the stories together, and then randomly assign another team member to present each topic.

We also discussed taking account of changes in team composition in the year that had passed since the beginning of the Action Research work. Table 4-11 shows new team members (and new members of closely related teams), and those that had left the team, either to join other parts of the company or having left the company all together.

Table 4-11 Change in DTech team composition over the 2012 year of Action Research.

New Team Members	**Departed Team Members**
LS	AE
MG	BV
PM	NL
ST	PS
YM	AP
YL	DK
KT	JR
PW	MA
JS	PC
PM	PG

CC	
RH	
AD	
ES	

There was instant support for the idea of asking the new team members for their perspective, with the added benefit of asking for their perspective on leadership practices and associated innovative outcomes that seemed novel and/or that they hadn't experienced elsewhere inside or outside the company. Also of benefit was the fresh perspective of some of the new starters, who had varying levels of explicit awareness of the prior Action Research cycles, and could provide a degree of objective input and reflection.

4.4.3.8.3 Execution

Over the course of the morning, team members first recorded their observations and thoughts on demonstrated leadership practices in the team, together with the related innovation or team culture consequences. Once collected, the random sharing technique was used to circulate the observations with the group.

Two predictable team dynamics surfaced during this process. First, people naturally wanted to start discussing and challenging the observations as they were read, rather than waiting to hear from all the recorded observations. Second, many team members were not shy in claiming ownership for the notionally anonymous observations. In doing so, even more in-the-moment conversation was sparked, almost entirely positive, and leading to some interesting reflection in the midst of execution.

> "It's a sign of a healthy culture that we can be honest about these feelings, and have a lively discussion about it without acrimony. That wouldn't have happened a year ago. There's your cultural leap right there!" (researcher's journal, May 4 2013)

Table 4-12 captures the synopsis (without any attempt at interpretation) of each person's observations on leadership practices, and innovation and team culture.

Table 4-12 Observations on Leadership Practices, Innovation and Culture after one year of Action Research (new team members denoted by asterisk).

Team Member	Observed Leadership Practice	Innovation or Culture Observation
AD*	Everyone is a leader, acting for the team	Winning the Reporting project
AK	Trust, commitment to ourselves	We realised we had by far the most ability to fix our problems, by simply seizing power and worrying about forgiveness later.
CC*	Everyone is a leader, proving our abilities to the company every day	Starting the Reporting reboot
CV	Commitment to change, enduring innovation culture	“What's next?”, rather than “What's left?”
EK	Commitment, we are creators	We made Validation happen
ES*	Trust, commitment and being a team	A shared vision for what we're doing, that we tell the world
FS	Trust and commitment now drive our innovation	My team has taken charge of its own future
JB	Everyone is a leader, commitment to doing bold new things	We now shoot for the moon, we don't wait to be told what is and isn't possible.
JR	Hunger for innovation, we take the lead wherever we work	A team with ambition, not just a to-do list.
JS*	Trust is the key. We all lead innovation when we trust each other	My ideas were heard and used in Validation – innovation was not just an abstract, I was part of it.
KT*	Commitment to grow, embrace change and uncertainty. From change comes opportunity for innovation	The team is committed to constant learning – the experienced team members share everything they know.
LS*	Such high integrity. We absolutely trust each other, and act for each other.	One of the best teams I've worked on at ABC Corp – we act as a family and a team.
MG*	When we commit, we do it.	I was told this was a great place to work – I can work on literally any piece of code I think important. That's great.
MW	Our efforts really paid off – we act as one committed team, and we lead innovation from the front	Validation project

PM*	Commitment to getting things done, acting for the team	Fearless drive to solve problems
PW*	*(not provided/recorded)*	*(not provided/recorded)*
RH*	Trust and self-knowledge. We know our capabilities, and all know how to commit to ambitious goals that are just crazy enough.	Building Validation and the market for such products.
ST*	*(not provided/recorded)*	*(not provided/recorded)*
SY	We commit, we create	Two great new products (Validation and Reporting)
YL*	We invest in our own growth, and know it will pay off for innovation in the future	Never stop learning
YM*	Trust in each other, every person acting as a leader for the team	This team shares everything – successes and failures – and grows every time.

It was clear the line had already blurred from execution into the reflection stage when participants were eagerly highlighting commonalities and major leadership practices.

4.4.3.8.4 Reflection

The group focused heavily on the team's evolved culture of looking to "possible futures", the concrete large innovation outcomes (Validation and Reporting), and were unanimous in citing the deeply-held trust and peer accountability as both a huge change, and a central leadership practice that had led to the dramatic changes in the team over the course of a year.

Trust was acknowledged as the foundation of all the change the team had seen over the year. This manifested itself countless times in various environments, with all team members both old and new adopting a model of deep peer trust, and commitment to each other whenever the team or individual spoke or acted for the team. The trust-centred leadership practices were recorded numerous times, and spoken of proudly: support in meetings, email threads, design discussions, acting with complete trust and integrity when collaborating in efforts with other teams, dealing with change aversion in other groups, standing up for new priorities when the team's new approaches were challenged.

Delving deeper, it was acknowledged by many researchers that trust as a foundation was not necessarily a startling new discovery. What had been discovered were the specific on-the-

ground practices this team required to reach this level of trust. Key moments and leadership practices were raised. First, the efforts in the earlier cycles to put aside work pressure and actually get to know the individuals in the team personally, and the team's history and background. Later, the near-universal drive to seize control of the team's destiny, at least in the area of deciding what the team's priorities would be, and how those priorities would be translated into practice. The acts of commitment seen through latter cycles were also highlighted as leadership practices that provided the crucial long-term support to allow the trust within the team to strengthen and grow in a real-world context.

We then reflected on the ambitious research statements made when first embarking on the Action Research process. In seeking to find the leadership practices that led to innovation – either through fostering, nurturing, protecting or through other means – we had set out to find how leaders create the environment in which sustained innovation flourishes. Earlier samples of data describing where team members were working on software code, and with whom, had given a small indication of what was to come. Those hundreds of small events and actions could be seen with a year's hindsight rolling up into the two substantial new projects the team had embraced.

The Validation product was now seen as ground-breaking, simultaneously demonstrating technical innovation, and attempting to forge a new market where no such one had previously existed. The nascent Reporting product was seen as both having great scope for innovation, and reward/recognition of how the team was now perceived by other groups at ABC Company. The group was no longer “just the people re-writing the DTech system”, it was now a team recognised for being able to do new things.

FS stated openly his pride of the fact that it was no longer him alone (or in the early part of our Action Research, FS and AS) as the only leader. Everyone on the team had demonstrated acts of leadership, and use of a growing set of leadership practices. Establishing trust, sharing team vision, acting for the team in a selfless fashion, and a healthy adoption of one of the company's informal and irreverent mottos: It is better to ask forgiveness than permission.

4.4.3.8.5 Insight from Actions and Adaptation of Subsequent Theory

From the material in this cycle, reflections upon it, and similar reflection on the many cycles that had occurred in the previous year, we established a set of leadership practices that had

shaped this group over the past 12 months, and directly contributed to the complete change in product development and release, and associated successful innovation in the product the market in which it operated.

The key practices experienced are:

Establishing trust in each other above all else. Conceptually this is very easy, but in reality seeking out and enacting the individual words and deeds that lead to trust forming and growing are the at the core of the "practice" element. For the DTech group, the leadership practice of trust started with deliberate acts of knowing – knowing the person, knowing the team, knowing the history and culture. The leadership practice of trust grows with acts of sharing and honesty – honesty in what do we each actually want versus what are we apparently seeking or doing? What do we honestly seek to achieve as a group, and how do we prioritise it? It was absolutely evident from the DTech group that being absolutely honest about setting priorities was not easy – at least three Action Research cycles and countless hours of effort outside of the research setting over a number of months were required. But the effort was rewarded with productive change and actual innovation.

The practice of trust evolved into a complementary practice of commitment and accountability. This practice manifested both as intra-team commitment to setting new priorities, and adhering to them, but also into a wider sense of team solidarity and commitment, withstanding pressures to undo team changes and cultural shifts from external parties. Commitment and accountability became a self-reinforcing cycle, as each instance of the leadership practice would strengthen the belief in the team that they had achieved enduring change, and unlocked sustained innovative capability that was previously thwarted by historic factors.

The third significant leadership practice identified by the group was a somewhat self-referential one. The team coined this the "Everyone is a Leader" practice. This was seen as perhaps the most team-specific of the major practices over the life of the Action Research, with many feeling it was a direct result of the history of the team where many years of being told what to do had left team members feeling powerless and demoralised. Building on the trust and commitment practices, the Everyone is a Leader practice manifested repeatedly as any team member, no matter their level of experience or supposed level of superiority, can and did step up to lead smaller groups and the whole team at times.

The Everyone is a Leader practice was used in at least two differing styles. First, when standing up for new priorities before anything had been achieved as the team shifted from its historic position. It was not left to just FS to demonstrate the leadership required outside the team to drive the changes to success: each team member stood as a leader emerging as circumstances required to ensure the cultural changes driving the new innovative direction succeeded. Secondly, the practice was demonstrated in the later cycles as team members of all levels pushed for and seized the opportunities to work on the Reporting and Validation and validation projects. Numerous other teams within ABC Company sought these projects, but the transformed DTech team took charge of these in part because each team member lobbied and worked towards that goal on their own initiative, not waiting for permission or approval.

It was natural to feel a sense of finality at this point in our research, as we had no further cycles planned. However, members of the extended team that had come into existence in the previous 12 months took no time to seize the opportunity to ask for follow-on research focusing on their establishment and growth. Discussions have been held with the growing Reporting and Validation sub-teams about conducting further research with them, though such research will not be presented in this thesis due to time constraints.

Chapter 5 – Data Analysis and Discussion

5.1 Introduction

Approaches to data analysis are wedded to the ontologies and epistemologies that inform the research paradigm in which any specific enquiry is located (Coffey and Atkinson, 1996). The establishment in Chapter 2 of action research as the methodology for this research thus pre-empts the framework for data analysis, resulting in two dimensions of data analysis: the analysis of action-generated data within each spiral of action research; and an overall analysis of data generated across numerous spirals of action research. As can be seen in the strategic narrative of the action research spirals described in Chapter 4, action research involves intra-spiral analysis in order to ensure mission-pertinent, self-reflectively generated, emergent strategy. Similarly, in order to generate new explicit, or more abstract, knowledge, analyses of the data that span all spirals of the action research, is also required. This second-order analysis seeks to engage with the research question posed in this thesis; namely, what are the leadership practices that underpin innovation in high-technology environments and how do these practices shape the innovation outcomes of the organisation? As Reason and Bradbury (2001, p.42) point out, both forms of analysis create significant challenges for the researcher-as-participant role of action researchers:

> The [action] researcher's role is to organize systematic reflection as a co-worker while identifying with the aims of a project.

They (Reason and Bradbury, 2001, p.43) go on to argue that

> The researcher who participates in research with the community cannot claim the traditional [positivist] researcher's distance.

With respect to the analytical challenges posed by the nature of action research data, and the implications of the political nature of human endeavour as espoused by the constructionist research paradigm in which action research is located, useful guidance is offered by Zuber-Skerrit (1992, p.2) with respect to the nature of rigorous, high-quality, action research:

- *Critical* (and self-critical) collaborative enquiry by
- *Reflective* practitioners being

- *Accountable* and making the results of their enquiry public,
- *Self-evaluating* their practices and engaged in
- *Participative* problem-solving and continuing professional development

Further to these principles of action research, Zuber-Skerrit and Fletcher (2007, p.419) argue that rigorous high quality action research should:

- deal with a real, complex problem;
- ensure that participation is "true" in the sense of being voluntary, enthusiastic and collaborative
- enable some form of observable action
- contribute to the body of knowledge (within spirals and upon completion)
- focus on one central proposition, and provide evidence in support of all claims.

The strategic narrative presented in Chapter 4 outlines the real and complex problems with which this research dealt. It also demonstrates the true participatory nature of the action research spirals, and describes the observed actions within the two research groups. This analysis chapter, therefore, will focus on a higher-order analysis, seeking to articulate what new contribution has been made to the body of knowledge on the leadership practices that underpin innovation in high-tech environments.

5.2 Summary of Data Sources

In conducting this data analysis, in addition to the strategic narrative of Chapter 4, I have relied on a range of primary data sources from the action research spirals themselves, as well as on supporting business artefacts and records to which I was granted access for the purposes of this research.

These data sources include:

- The researcher's journal of writings, notes, diagrams, and candid photos captured through the course of the various cycles. Excerpts and quotations from this journal

have been used to clarify, enhance and reinforce the insights and learning presented throughout chapters 4 and 5.

- Several hundred emails between research participants; specifically about the action research spirals but also on their day-to-day work and innovation efforts.

- Several thousand software code 'change lists', which comprise both the code written as part of developing software products, and the comments and discussions captured in the source control system relating to these changes.

- Design documents and other materials used in the design and build of software components.

- Project planning documents, project feature requirements documents (known as backlogs and burn-down charts), project feedback documents and other project-related material.

It is important to note that while a range of quantitative data has been collected and used, it is meant only to expand and support the key qualitative data gathered and presented in this thesis. As discussed in the methodology chapter (Chapter 2), action research is open to the full range of data and not restricted to the use of quantitative data.

5.3 Analysis of Leadership Practices Emerging from the Research

The outstanding insight generated by the data collected over the spirals of action research within each of the two groups, is that *social innovation precedes technical innovation.* This is something upon which the literature on business and technical innovation is silent. The only reference to this insight that was found is that within the territorial development literature, where researchers such as Moulaert, MacCallum and Hillier (2013) and González, Moulaert and Martinelli (2010) argue for transformation of social/power relations, and modes of governance, amongst regional actors as a requisite antecedent for the manifestation of technical innovation in a region.

The social innovation that occurs in the research settings of this study is the consequence of the emergence, in response to action-generated insights, of a high-level set of leadership practices that engendered trust within the stakeholder community. The generation, and

leveraging, of this key intangible resource was ensured by the gradual emergence of other, more specific, everyday social practices. What was striking about all of these leadership practices, when observed through the lens of promoting innovation, is that none of them were directly related to the technical or mechanical work of the software development within the organisation in question. Rather, they were all part of a set of practices that transformed modes of governance and power management; forms of ownership of processes; personal and collective identities; and stakeholder relationships in a manner reminiscent of that within the 'communities of commitment' referred to by Kofman and Senge (1993, p.19), where learning is 'not about tools and techniques' but 'about who we are'. Once such a social order was in place within these high-tech environments, the data shows that technical innovation flourished.

We see an example of this 'trust engendering' action in Group One's tackling cross-boundary relationships in dealing with the substantive issues (Group One; cycle two; planning phase and execution phase - Pair and Group Forming/Leadership Confidants). In the second case, group governance shifted from a historic (and now distant) diktat, to the establishment of a 'negotiated order' wherein the group wrested agency for decisions affecting the DTech technology from distant product managers (Group Two; cycles two and three; planning, execution, reflection and insight phases - New Priorities). With growing trust and mutual understanding a consequence of the innovative new social order, technical innovation in the DTech domain was rapidly realised (Group Two; cycle 8; planning, execution and reflection phases - Where Are We Now?). It was this transformation of interpersonal power relationships - and the consequent access to vital intangible capital resources such as trust, commitment, resilience and ideas - that enabled the realisation of technical innovation, that was the central achievement of the two action research groups explored in this research.

Four specific leadership practices can be identified from the data with respect to the social innovation that facilitated the achievement of technical innovation. While some of these practices are referred to in the prevailing literature, they are referenced in abstract terms that limit insight into the behavioural and contextual origins of these practices. In the following explication of these four practices, I have used more colloquial terms for them with the view to making their manifestation in everyday social interaction more recognisable and, thus, useful.

5.3.1 Seeing self-in-the-other and other-in-the-self

The literature reviewed in Chapter 2 offers many abstract concepts in relation to team formation where innovation is the desired outcome. These include the concept of *requisite variety*, which advocates selection of members from heterogeneous backgrounds and knowledge pools (Peltokorpi, *et al.*, 2007; Fong, *et al.*,2000; Leiponen and Helfat, 2010)), and the injunction to recognise, identify and solicit key knowledge custodians and brokers (Cillio, 2005; Peltokorpi, *et al.*, 2007). Conspicuously absent, however, from the literature is an adequate discussion of the psychology of interpersonal dynamics which deals effectively with interpersonal perception in the highly politicised environments of workplaces. Questions about how team or group members recognise the 'other' in their work environment, and how that recognition affects their own identity, motivation, agency and, thus, contribution towards the innovation agenda, are rarely raised in the literature (two exceptions are Contu and Willmot, 2003; and Coopey, 1995).

Within the extant business literature, interpersonal identification and perception is subsumed under the concept of *emotional intelligence*, which Goleman (1998) defined in terms of self-awareness, self-regulation, and empathy for others. Similarly, Anderson, Chen and Miranda (2002) observed that the recognition of significant others in a person's social context contributes greatly to a person's performance in that context. Others, such as Flora (2005), recommend mirroring behaviour as a way of developing emotional intelligence.

In this action research aspects of self-awareness and awareness of others began to emerge with Group One in the initial cycle on questioning of pathways to leadership, and again from cycle 3 onwards. There was growing realisation that interpersonal struggles and conflict affected many in the group – best characterised by the very vocal claim of one group member that 'it's not just me' (Group One, cycle 3, reflection). This nascent recognition of self-in-others contributed to deliberate efforts to unblock perception; renegotiate relationship; and re-establish effort and determination across the group. In this way individuals who had viewed their frustrations as unique to themselves, and the lack of organisational support as particular to them, saw in others the same thwarted desire and blunted effort. These transformed interpersonal perceptions impacted the social context of each group as members began to confront the commonality of their personal experiences and situations. In this way, powerful *identity resources* were generated and leveraged, which led to the accrual of greater social

capital – *trust* in particular – that enabled access to members' commitment to a shared and collectively-valued cause. As each member identified with others (saw the self-in-others), the consequent resources of empathy and generosity of spirit facilitated the capacity for intense collaboration and a form of 'fighting for excellence' (*creatively abrasive* discussion and debate) that generated valuable ideas and the resilience necessary to realise those ideas in the contested 'political' environment in which innovation must manifest. Similarly, the practice of seeing the 'other-in-the-self' contributes greatly to self-awareness and, in the context of collaborative endeavour, to the realisation of personal responsibility for, and commitment to, the group's shared mission. Personal defences and rationalisations, and/or passionate commitment to task, become transparent to the self in the perceptual reflections of others' behaviour.

Within the action research spirals of Group One, members commenced the process as like-minded acquaintances but gradually developed the identity of a 'significant other' in the eyes of the other members, as described by Anderson *et al.* (2002). This perceptual transformation opened the door to new emotional and intellectual connections between members; connections that greatly accelerated technical innovation within the group. Two aspects of the action research reflected particular novelty with respect to the phenomena of emotional intelligence and mirroring behaviour:

1. A higher-order practice of accepting the risk of trusting a comparative stranger.

2. The practice of deliberately seeking collective and personal understanding of the responsibilities embedded in the acceptance of risk.

This could be considered as a form of collective empathy that allows a group to appreciate not just the shared responsibilities when taking on risk but, also, the impact that risk has upon focus, drive, energy and the ambition to innovate. Interestingly, this recognition of self-in-the-other also helped foster another of the leadership practices particularly evident in Group One: that of *intellectual humility*. This practice is discussed next.

5.3.2 Intellectual humility

During the course of the action research within Group One, the participants coined the term 'leadership confidant' to describe the practice of confiding in their peers, their frustrations, anxieties, problems, ignorance and lack of understanding as being factors that were impeding

or limiting their contribution to the collective attempts at innovation. In effect, the manifestation of this practice of exercising appropriate intellectual humility, as a precursor to insightful learning, was both a consequence of other practices that initiated the transformation of power relations, and a contributor to the deepening of this social transformation. By undermining any need for hubris and/or competitive ego battles with respect to personal knowledge bases, this practice enhanced the generation and leveraging of the high-trust environment in which group members were able to tolerate personal vulnerability in order to become open to learning. The term 'leadership confidant' offered the group a linguistic reminder of its acceptance of this practice and it continues to be used as part of the cultural terminology of this group. In this analysis and discussion, I will cast this 'leadership confidant' practice in the more formal description of intellectual humility. This notion has very limited currency in the business leadership literature although it is implied in some texts as being necessary to counter the arrogance and hubris that is often a consequence of the failure of leaders to reflect critically on their practices. For example, Hoekstra *et al.* (2008) outlines the tension between the notion of leadership humility and contemporary demands for leadership perfection. Similarly, Shapiro (1987) presents the potential consequences of leaders hiding their flaws and failings when joining new organisations. The wisdom of allowing one's knowledge to be questioned by self and/or others, with its potential consequences, can be traced all the way back to Socrates (Plato, 2013). In this research, while the members of Group One did not face death as a consequence of their questioning of the leadership, as Socrates did, from a career and reputation perspective the stakes were high.

The literature review of Chapter 2 showed many sources describing knowledge creation, and notions of how to form a team with knowledge access/custodianship/use in mind (see, for example, Nonaka and Takeuchi, 1995). Also included was a small sample of the broad body of literature on leadership styles and approaches that set innovative intent. Other literature covers the need to admit ignorance in order to innovate, such as the problem generation discussion of Root-Bernstein (2003). In several cases, this is seen as the driver for one particular instance of innovation. Some authors use this as the complement to the notion that describing a problem accurately is in fact the crux of successful innovation.

Where the practices of Group One seem novel, or at least rare, is in the use of intellectual humility not just to spur one round or instance of innovation but to encourage the practice of ongoing admission of ignorance as a positive contributor to the capacity of the group to

create the new knowledge that underpins its innovative capabilities. Emerging from new perceptions of self and other group members (transformed identities), the confession of ignorance in order to be open to learning from others is shown to be a consequence of growing personal and collective maturity and interactive sophistication. In this respect, the ongoing meetings of the group demonstrated that, as technical innovation commenced, ignorance gave way to insight and (what had appeared to be intractable) problems became negotiable. Furthermore, this process never stopped – *new* or previously unacknowledged areas of ignorance continued to bubble to the surface, ripe for further examination in the leadership confidant setting.

The group's practice of intellectual humility embraced the doubt in members' minds, and they used this as the starting point for the 'shared inquiry toward knowledge' (Hoekstra, 2008, p.164). Collectively owning the associated risk, they turned this questioning of their own knowledge bases into a positive, constructive part of the innovation challenge: embedding this approach in a social contract was a powerful motivator and liberator (from fear).

The practice of intellectual humility allowed the group to admit the complexities and difficulties involved in innovation. Such admission runs counter to some of the cultural norms around leadership within the company, and more broadly in the technology industry, where leaders are expected to continuously demonstrate an unrealistic level of perfection of *knowing* or, at least, the pursuit thereof. We see in Group One how the willingness to admit imperfection of knowledge (within a cohort of apparent, though somewhat sympathetic, strangers), allowed the desire to learn and understand to manifest, leading to the creation of innovative new technologies and knowledge bases. This practice created new insights for group members - in particular the realisation that it is not enough to be a domain expert with vast amounts of technical knowledge. One must also be able to share what one knows in ways that expose what one *doesn't* know, and open oneself to the risk and vulnerability that comes with acknowledged ignorance. This practice can only be enacted in a context of high-trust; admission of ignorance, of lack of understanding (or dissatisfaction with the current understanding), within highly competitive conventional organisational contexts could be self-destructive. As Kofman and Senge (1993, p. 20) comment, '… only with support, insight, and fellowship of a community can we face the dangers of learning meaningful things'. By creating a social environment in which practices such as intellectual humility can be executed without fear, social innovation lays the relational foundations for technical innovation and

meaningful knowledge creation.

An additional dimension to the practice of intellectual humility became apparent as the two groups of research concluded. Each group experienced an epiphany that addressing collective ignorance through action research is a fruitful practice in the promotion of innovation and learning. Both groups discovered in their own way that embracing action research, and, through it, embarking on a course of self- and collectively-reflective learning and discovery, they had opened up an entirely new repeatable mode of investigating problems and facilitating innovation. Most importantly, they had discovered a way of transforming the organisational context in which they sought such innovative outcomes. As researchers, we had seen an example of Zuber-Skerrit's (2002) suggestion of admission of ignorance as a component foundation of the action research methodology becoming manifest in the groups' utilisation of this methodology, and in the outcomes of its application.

5.3.3 Negotiated Order

In the first and second action research spirals of Group Two, we see the seeds of the leadership practice of creating a 'negotiated order' begin to emerge. Given the historic tensions around priorities issued by fiat, we see a triggering moment in the remonstrations of manager AS, which results in an entirely different outcome to that demanded by him. AS's departure from the research group at the end of spiral two leads directly to the significant changes witnessed in spirals three and four, where Group Two seizes control not just of the prioritisation process but also of the bases of power that support strategic decisions governing innovative intent. This establishment of a democratic order, and one negotiated between the members of the group, lays the decision-making foundations with respect to the group's on-going approach to innovation.

It is possible that this occurred due to Group Two being an intact team (or a close collection of collaborative intact teams) – something that would be achieved by any such team. Some situations described in the strategic narrative bear similarity to Strauss' (1978) 'negotiated order' with respect to collective decisions about what work is to be done; the division of labour required to achieve it; who the actors are; and what form and manner accountability will take. In this action research, however, the negotiated order went far deeper than Strauss' relatively superficial issues requiring collective decision-making; in Group 2 the group empowered itself to question fundamental aspects of its existence, role and agency within the

organisation. The nature and significance of outcomes of the actions that emerged from the new negotiated order, demonstrate the genuine transformation of power relations within the team as each spiral of action research was enacted. These include:

- The decision to discard the old priorities and strike out on the group's own path. The group insisted on establishing their own priorities and exercised a high degree of rigour and critical thought in appraising the initial set of priorities. This is clear in the evidence that begins with the challenges to AS's notional leadership position in Group Two's cycles one and two, and culminated in the theoretical consideration and planning phases of cycle three where the manifestations of rediscovered trust and esprit de corps translated into the epiphany of having nothing to lose by seizing self-determined priorities as an innovation bedrock.

- The critical scrutiny of choices; consideration of all opinions; and continuous negotiations on the current set of priorities in an ever-changing work context. This led to the group discovering its 'collective voice' when declaring the initial set of priorities to be too ambitious; and its 'collective agency' in determining a realistic subset of priorities that was attainable. By achieving consensus on critical issues, the group avoided falling back into a state of dysfunction. This is most tellingly demonstrated by the sheer volume of research time spent critically questioning the number, scope and ambition of the priorities the team set for itself across Group Two's cycles three and four, and the ultimate realisation at the conclusion of the execution phase of cycle four that even the "modest" set of five top priorities was still a gargantuan endeavour to undertake.

- The group recognising the evanescent nature of social reality; that states-of-flux are a consequence of the emergent strategy (typical of action research) appropriate within a dynamic operational context.

- The tolerance exercised by the group as its composition changed through necessity and as two successful closely related sub-teams were spun-out of it when required. The agility of the group (in membership and function) became possible as a consequence of the intangible resources (personal flexibility and readiness to transform) generated and leveraged by the negotiated order. The creation of the Validation and Reporting sub-teams as described in Group Two's cycle eight is a

testament to the enduring innovative capability - capable of expanding beyond the team's unspoken ambitions - created in the social milieu, rather than a punishment through fracturing the group.

The leadership practices that underpinned the negotiated order established the rules of engagement through which the group tackled subsequent challenges, ambiguous situations, and the politics of change. Negotiating order was a continuous aspect of the action research process, with full participation ensuring the grounding of this process in democratic ideals.

5.3.4 Intelligent Caring

Another practice to develop within both groups participating in the action research was that of direct-but-empathic communication among members. Members learnt, through each action research spiral, the value of constructively honest critique. Recognising the need to 'fight for excellence' in their strategic intent to innovate technically, participants developed the capacity for interpersonal confrontation that enhanced rather than diminished the group's performance. Similar to the colloquial term of *tough love*, where difficult conversations are held as an act of caring for the development of the individual as well as the achievement of the collective mission, the practice of *intelligent caring* emerged in each group as a form of service to the group. A significant example of this practice occurred when Group Two members demanded a clearer set of prioritised goals without seeking to lay blame on others for previously missed targets.

Even under the stress of AS's emotional outbursts, and subsequent departure from the group, members managed the task of re-setting priorities and goals in a mature, collaborative way that made no excuses for their lack of progress up to that point. The group's collective rejection of AS's command (during the first two spirals of action research) to 'just do their job' and, instead, to question and challenge his imposed list of priorities was conducted with the sensitivity and courage required not to jeopardise the group's innovative aspirations. This collective readiness to 'fight for excellence' rather than engage in blame attribution and victimisation, bears similarities to the form of constructive confrontation championed by Grove (quoted by De Long and Fahey, 2000) in his description of the culture at Intel. The level of analysis, debate, reflection, and, above all, vocal critique of the group's actions within each action research spiral, reflected the strength of commitment and depth of caring within the group with respect to each other, and to the group's strategic intent to innovate. De Long

and Fahey (2000, p.124) paraphrase Grove's assessment of this style of culture as 'ferocious arguing with one another while remaining friends'. While, in this research, the emotional level was intense without being ferocious, we see perhaps the best empirical example of intelligent caring in spiral five of Group Two's action research, where individual frustrations did not manifest in accusations and negative questioning but, rather, took the form of productive humour and physical role-play, in acting out alternative business processes and design. No research plan could have predicted the innovative outcomes of these processes. The technical innovation that followed was a direct consequence of the transformed power relations within the group – relations that empowered members to attack problems and explore solutions with mature communicative competence, and without recourse to personal or ad-hominem attacks and/or appeals to higher authorities.

We also see a dimension of intelligent caring in the collective humility exemplified by Group One in their practice of openly admitting ignorance as a path to collaborative learning. Rather than judging individuals' performance negatively, the group took collective responsibility for understanding the bases of its failure and for moving forward through constructive collaboration and learning. The genesis for this path to shared learning and discovery occurred in the second cycle, where the many participants who first admitted their issues and frustrations were met with a caring, constructive response, rather than the expected criticism or public disapproval. This collective response epitomised the higher-order emotional intelligence described by Goleman (1998), where empathy for others is channelled to productive support and collaboration. The subsequent caring and support in the consultation sessions of cycle three revealed an enduring capability built by the team to further their innovative goals.

5.4 Technical Innovations Achieved Through the Action Research

In the research cycles described in chapter four's strategic narrative, the primacy of social innovation was conveyed in the recorded events of many examples and interactions. Those significant breakthroughs in the social context were the foundation for, or happened in conjunction with, a range of technical and organisational innovation driven by the Action Research. While some aspects of innovation observed might have emerged through other means in the absence of this Action Research work, a number of the key product and technological innovations are directly the result of the research, and the precise way in which they emerged here is as a consequence of the overall Action Research efforts.

These directly-identifiable innovations are confirmed by the many Action Research participants themselves, and also the wider organisation at ABC Corp in discussions held with peers and colleagues who worked at company during the Action Research work, with varying degrees of distance from the Action Research participants. While many smaller innovations were apparent, the four most prominent technological innovations were in the areas of Network Management, Software Security Mechanisms, the genesis of the Validation product, and the rebuilding of the Reporting product.

5.4.1. Technological Innovation in Network Management

The middle cycles of Group One included the genesis of different minor and major innovations. The most notable of these was the BWM management system originally envisaged by AMC of Group One, and carried through to successful prototyping, development and use with the collaboration of his other Group One confidants, and the wider support of teams and resources from the company.

At its core, the BWM system, as developed by the team members involved, acts almost as a market for network bandwidth for online systems. In providing online services to customers, ABC Corp's networks are always under higher and higher demand, leading to perpetual cycles of saturation, contention, provision of new capacity, and a subsequent spiral of new demand. The BWM system incorporated a novel market for real-time calculation of the maximum utility – and at its most basic, revenue generating value – when the last fraction of spare capacity was sought by multiple competing services. Rather than allocating this capacity at random, those services that would return the most value on the marginal network capacity available were allocated that capacity.

A complementary innovation was the technology built to feed this data back to service owners and designers, allowing them to consider the use of network bandwidth for return-on-investment forecasts. Here, software development teams could calculate if the human effort and cost in making their software services more network-efficient would see the desired marginal revenue return in times of network saturation.

This innovation was not without adverse consequences, particularly to nascent projects or high-risk early-stage test products trying to co-exist in such a blended technology-and-market environment. The principle consequence noted was the effect of starving new products or features that were so young that they were yet to establish a revenue base, or other forms of

value important to the company. This left the teams working on these projects at an initial disadvantage when attempting to "bid" for the remaining marginal capacity within the network. Pleasingly, both the members of Group One and related groups throughout ABC Corp recognised this side-effect, and set out to adapt to this new change. The work to solve the newly-introduced factors is outside the scope of this research, however the same participants from Group One joined with other colleagues from ABC Corp to demonstrate sustained innovation by treating this area as a great opportunity to continue the leadership and innovation practices (re)discovered through the Action Research.

5.4.2 Technological Innovation in Software Security Mechanisms

Group One's other major innovative development was the creation and development of an entirely new approach to embedding security mechanisms, protocols and standards within ABC Corp software products. The team members involved tackled the traditional approach of various teams taking patterns and templates for the design of security mechanisms and reimplementing them in their respective specific projects. While historically some of the norms of software engineering had led teams to acknowledge the modular reuse notions espoused in the field, the reality was that many more re-implementations, subtle modifications and customisations were performed than simple re-use of code. This had lead to differences in behaviour, capabilities, and arguably the actual security mechanisms supposedly being developed.

The team from Group One successfully designed, built and deployed a set of security services architected to be consumed by the various software products at ABC Corp. Instead of each team reinventing the wheel, they would simply reference the single, rigorously designed and tested implementation running as a service. Services provided included key and certificate management and verification, password and passphrase management and policy enforcement, encryption services, and more.

This innovation was notable not just as a new piece of software performing previously well-understood tasks, but because it changed the nature of software development within ABC Corp, changing company-wide practices from a common design philosophy re-implemented countless times by numerous groups, to an approach of providing software security mechanisms and policy implementations as service building blocks, built once to be reused more easily and at much lower overhead to the previous approach.

At the time of the Action Research cycles in late 2011 and into 2012, there were doubts about whether the radical change in approach would be adopted more widely by the company, sufficient for it to benefit from the costs otherwise involved. At the time of completing this thesis in 2014, the new approach to security-as-a-service has been adopted broadly across ABC Corp, and is the de facto standard for all new software development projects.

5.4.3. Technological Innovation in the revolutionary DTech Validation product

In reinventing themselves as a team, and seizing ownership and control of their priorities, Group Two was able to focus on a key new piece of technology targeting the needs of the very large advertising buyers in the market: both global content and publishing companies, as well as the advertising agencies, brokers and buyers who represent them. A constant concern amongst these companies is the reputation of their brand, and the effects of placing inappropriate or competitor information on their properties (websites, newsletters, etc.).

Vetting advertising material is not necessarily a new concept. But the scale at which the DTech team demanded, and the speed required for leading publishers and content producers, was daunting. At its peak, any system serving the market would need to make millions of validation assessments *every second*.

The technology innovation driven by the DTech team included a combination of prescriptive rules and preferences provided by the publisher and content generation clients, together with the teams innovative development of a machine-learning pipeline, trained to assess advertising for validation and optional exclusion. Over and above *what* the software performed, the engineering expertise injected by the DTech team meant that individual validation decisions could be performed in under 200ms, from the moment the intent to display content and a possible ad was initiated, through the assessment and validation process, to packaging the advertisement for delivery with the content by the publisher or advertiser systems. This speed of operation is as ground-breaking as the scale of the validation capability itself.

The development and successful launch of the Validation project was seen as a technological breakthrough in the industry. Hitherto, such real-time validation was considered a problem too hard to solve. By cracking both the scale and speed aspects of the challenge, the DTech team opened a new market for publishing and advertising systems, and at the time of completing this thesis in 2014, ABC Corp is the only company to be able to offer this service

in real-time to the satisfaction of the market, despite several attempts by competitors to enter the arena.

5.4.4. Technological Innovation in the dramatically changed DTech Reporting System

The success of the DTech team in launching the Validation product was the genesis of an enduring, sustainable technology innovation pipeline within the group. The team's next area of major attention was in the problems associated with the reporting tools and technologies.

The crux of the problem tackled was the difficulty in providing customisability and user-governed selection of criteria when generating reports on advertising campaign effectiveness, return on investment, conversion rates, and so forth. In all, the DTech systems monitor and track data on some 300 to 400 different variables involved in the advertising and publishing realm. Attempting to demonstrate the effect, correlation or causation of any one, or combination, of these variables continuously ran into the challenge of the end-user needing to sift through all possible variables and combinations to find results of interest. Users found juggling the number of variables overwhelming and confusing, and questioned whether they should invest further (in both time and money) if measurement and reporting outcomes were so hard to master.

The innovation achieved by the team wasn't in providing a reporting tool per se, nor the ability to report across the vast array of data available. Such systems existed already, including within DTech. The key technical innovation from the team was the decision to attempt an interface that no longer relied on lists and grouping of variables in text form. Instead, the concept of visual "thematic overlays" was trialled, where an end user could create one or more base combinations of variables on which to assess the impact of advertising, along the lines of a given theme. These were then automatically converted to appropriate combined visualisations – charts, histograms, scatter plots, etc. Subsequently, different sets could overlay each other in semi-translucent layers that enabled rapid visual identification of patterns, correlations, and provide input into more rigorous assessment of causation or meaning.

An innovative control mechanism was included, to introduce confidence values (e.g. P-value, etc.) along with any combination of variables. This colour-coded numeric display ensured users did not mistakenly believe visual similarity seen in the new interface, on its own,

indicated actual verifiable causation or relationships that weren't supported in the underlying data.

The final area of the Reporting project on which the team began innovating at the conclusion of the Action Research project was taking the new visual interface, and extending it to include forecasting functions. Users of the reporting system could take forecasts as were common in other systems, use the new graphical presentation methods (which again is not a novel thing), and lock in future timelines and ranges for variables, which would then update in real-time with live data from advertising markets and placements. This work was still under active development when the Action Research concluded.

Group Two splitting out reporting wasn't necessarily innovative – reporting using software tools is almost as old as the IT industry itself. The cohesive approach to displaying the effect of the hundreds of variables contributing to the outcome was innovative, and the control and forecasting capabilities then built and deployed are considered significantly ahead of competitors in the market.

5.5 Contribution of Findings to the Answering of the Research Question: What are the Leadership Practices for Innovation Realisation in High-Tech Organisations

The most significant contribution of this research to our understanding of the leadership practices that facilitate innovation within high-tech environments is that *social innovation is an important antecedent of technical innovation*. While various aspects of social and political behaviour have been recognised as contributing to, or on the contrary inhibiting, an organisation's innovation capabilities (see, for example, Dovey and McCabe, 2014) these have been articulated as abstract concepts rather than in specific behavioural terms. Thus, for example, Orlikowski's (2002) identification of the importance of a 'shared identity' with respect to a group's capacity to innovate, does not articulate the everyday behaviours that contribute to the achievement of shared identity. In this research, the practice of 'seeing-the-self-in-the-other' and the 'other-in-the-self' makes clear the behavioural foundations of the creation of a shared identity. The strategic narrative of the action research (Chapter Four) makes explicit the relational process whereby identification with 'the other' and empathy for 'self' and 'the other' leads to the gradual formation of a shared identity that, then, enables

other social practices pertinent to creative and innovation endeavour, to manifest. In this way the dialectical nature of the four leadership practices highlighted by this research is demonstrated in that each of these practices creates and is created by, the other practices. For example, the transformed power relations achieved by the creation of a *negotiated order* facilitates transformed interpersonal perception among group members (it enables *seeing-the-self-in-the-other* and *'the other-in-the-self'*) and this order is itself simultaneously re-constituted by these transformed perceptions of self and other. A particular strength of action research is that the insights that lead to the generation and leveraging of the leadership practices that facilitate social innovation (and, thereby, technical innovation) emerge 'organically' from everyday social interaction that is mission-driven and critically self-reflexive. This means that it is not social interaction 'in general' but a particular form of social interaction, guided by specific leadership practices, that underpins successful innovation. Similarly, Orlikowski's (2002) highlighting of face-to-face interaction as an important factor in successful collaboration does not specify the nature of the face-to-face interaction necessary for it to lead to innovation. In this action research, the nature of the practices that enable face-to-face interaction to achieve innovative outcomes is articulated with much greater specificity. In particular, the practice of intelligent caring, whilst challenging to execute, is a vital facilitator of the kind of face-to-face interaction necessary for the group to manage the politics of social settings in order to ensure the realisation of creative ideas in innovative outcomes.

In order to innovate, group members have to concede ignorance of the new domain if they are to learn what they need to learn to innovate successfully. Within hierarchical and competitive social environments the readiness to accept the vulnerability that such a concession creates, is a challenging assignment for anyone, irrespective of his/her position in the hierarchy. However, without conceding ignorance, learning becomes difficult if not impossible. In this research, the leadership practice of *intellectual humility*, once achieved by each group, became a vital enabler of individuals' capacity to learn. Within the safety of a trusted group, where the practice of *seeing-the-self-in-the-other* and the *other-in-the-self* eliminated the fear of failure (as this practice transformed the perception of the 'failure of one' into that of 'the failure of all'), learning became viewed as an obligation to the group. This resulted in committed learning, with practices such as *intelligent caring* fuelling creatively abrasive debates and discussions within both groups as they 'fought for excellence'; a consequence of which was rapid progress in finding solutions to what had been viewed previously as

intractable problems.

At the core of the four vital-to-innovation-realisation social leadership practices identified in this research, were the intangible capital resources that were generated from the founding of constructively collaborative social relationships. By far the most important of these resources was *trust* as it underpinned all of the leadership practices outlined in this chapter. The interesting aspect of this resource (and all other relationship-based intangible resources) is that it is potentially available free of charge to any group. Its generation, and leveraging to innovative effect, depends entirely on the quality of the relationships achieved by a group. As this research shows, facilitative of this achievement is a set of leadership practices. Furthermore, unlike tangible resources, this resource of trust was not depleted through use; on the contrary it was enhanced through use in that the more the groups effectively leveraged their mutual trust, the more it was generated. In this respect, action research is shown to be an important vehicle for the generation of relationship-based intangible capital. As reflected in the strategic narrative of this research (Chapter 4), it is courtesy of the intangible social resources engendered by the action research spirals of theoretically-informed-action leading to action-informed-theory (that, in turn, informed each subsequent spiral of action) that the strategic intent of the two research groups was realised in innovative new technical products, services and practices.

Chapter 6 – Thesis Conclusion

This chapter reviews the work of this thesis and summarises the challenges and contributions it presents. It also comments on the limits of the research performed and suggests areas for possible further examination of the subject of leadership practices for innovation.

In framing this conclusion, Brown and Duguid's (1991, p.40) observations are particularly relevant.

> We... suggest that practice is central to understanding work. Abstractions detached from practice distort or obscure intricacies of that practice. Without a clear understanding of those intricacies, and the role they play, the practice itself cannot be well understood, engendered (through training) or enhanced (through innovation).

Seeking understanding of practices that influence innovation capability, and specifically leadership practices, was my principal motivation for undertaking this research. In turn, the sharing of the understanding gained from the research findings, and contributing to our collective understanding of this complex topic, was another important motivation for undertaking this thesis.

6.1 Research Questions and Approach

Traditionally research on technical innovation has been conducted within Research and Development (R&D) functions that operate within the positivist research paradigm. The assumptions underpinning this research paradigm have constrained such research to purely technical processes, thereby eschewing social and political dimensions of the innovation phenomenon. Similarly, as the review of literature in Chapter Two shows, much of the traditional research literature on leadership is located within a positivist paradigm with the consequences of leadership being viewed as a set of traits and competencies held by specific individuals charged with the responsibility for sustainable organisational success. As a consequence of its paradigmatic assumptions, this research literature has had little-to-nothing to say about the contingencies that may impact this complex phenomenon that we refer to as 'leadership'. In Chapter Two, the 'practice turn' in leadership literature is also reviewed, opening up a far broader discourse on the complexity of the concept of leadership, and taking the discussion thereof away from individual competencies towards a more social and *situated*

understanding of leadership. Similarly, research literature that is located in a constructionist research paradigm, within its assumptions of an inter-subjectively constructed and sustained social reality, is covered in Chapter Two. This opens up a discourse around the role of politics (human interests, values, interpretative biases, etc.) in the processes of innovation and, in particular, the reasons why the rhetoric of innovation substitutes for its practice in many organisations.

As a consequence of the literature review, a research question was crafted, namely *what practices of leadership underpin repeatable, valuable innovation in one global high-tech organisation?* Given the nature of this question, I chose to locate this research within the constructionist paradigm and to utilize action research as the research methodology. This was based upon my ontological assumption that a 'high-tech organisation' is a socially constructed phenomenon that, through everyday communication and other interactive processes, is inter-subjectively experienced and apprehended. Furthermore, the epistemological assumption of this research is that much of the knowledge that I was seeking could only be accessed through action (*doing*). My assumptions was that such *knowing* would manifest as knowledge embedded in contextual and action format – and access to it would require in-the-moment experience of collective practices aimed at innovation outcomes. In Chapter Three I outlined the reasons for my methodological choice of an action research methodology in considerable detail.

6.2 Thesis Findings

The major finding of the research was that, in both action research settings, *social innovation preceded technical innovation*. Chapter Four shows that each of the two teams under study struggled to innovate technically because of social and, in particular, governance dysfunction. It was only once the relational environment was able to support direct and 'creatively abrasive' interaction among team members that technical innovation began to manifest. In particular, the building of inter-personal trust was a critical innovation-related achievement. In this respect, the results point to the need to manage the politics of innovation by crafting group power relations in ways conducive to constructive relationship building and effective communicative practices. Chapter Five indicates that four leadership practices, in particular, were viewed to have influenced the technical innovation outcomes. These practices, briefly outlined below, were collectively developed and leveraged in each team and laid the foundation for significant technical creativity and innovation:

6.2.1 Seeing Self-in-the-Other and Other-in-the-Self

This research shows that a critical leadership practice is that which facilitates interpersonal empathy and mutual identification. This practice generated significant *identity resources* - intangible capital resources such a trust and commitment - that underpinned the resilience of the two research teams as they sought collectively-cherished outcomes through aligned action. Such resources enhanced the absorptive capacity of these teams as members projected themselves into the situation of 'the other' and thereby became able to enhance their communication skills (particularly listening skills) and reduce the 'stickiness' of the tacit knowledge being explored through the collective action. This also led to the groups becoming more open to innovative risk-taking and more capable of bouncing back from some adverse circumstances experienced along the path to their technical achievements.

6.2.2 Intellectual Humility

A second leadership practice that emerged from the action research was that of mutual openness to the correction or counsel of others, irrespective of status or role. Team members began to exercise a form of humility that allowed them to open themselves to learning from others; to admit to not knowing and to trust that such an admission would not be exploited for competitive advantage by team members. This practice eliminated hubris, ego clashes, personality games, and other forms of destructive politics from the social context of the innovation effort and set the stage for the collective focus on insightful learning.

6.2.3 The Creation of a Negotiated Order

Thirdly, the development of an authentic 'negotiated order' was fundamental to shaping the social environment in which parallel or consequential innovation occurred. Each team only began to gain traction in their innovative efforts once they claimed ownership of the governance, and direction, of their action research. This practice – of creating a negotiated order wherein the principles of interpersonal interaction and engagement were collectively established – enabled direct and open communication to flourish in the interests of mission achievement. An important aspect of this practice was reaching consensus on the team's mission and the interpersonal framework (or 'rules') for effective collective action. In this respect, the choice of an action research methodology greatly facilitated the manifestation and effectiveness of this practice.

6.2.4 Intelligent Caring

Lastly, this leadership practice – termed intelligent caring - framed interpersonal confrontation in positive terms, and enabled each team to deal effectively with the difficult political and personal issues that periodically stalled progress on technical innovation. Thought of as 'tough love', this practice re-framed confrontation as a form of caring; one in which the interests of the person/group being confronted are being honoured and addressed empathically. As such, it endorsed the value placed on that individual/group by the rest of the team and appealed for the confronting action to be viewed as an invitation from the team to re-engage with it constructively in the collective interest. Through this practice, potentially toxic issues were addressed without endangering team solidarity, as may have been the case if negative approaches to failure and adversity, such as the assignation of blame and the enactment of personal victimisation, had been condoned. In this way, the personal passion that often fuels innovative action in groups was managed in ways that demonstrated inter-personal care and respect without compromising the innovation intent of the group.

6.3 Technological Innovation Developed in Parallel to the Research

This research was immensely fortunate in being able to explore the notion of leadership practices contributing to sustained or repeated innovation, while actually witnessing exactly the innovation I as researcher have often found so elusive. Four flourishing new technologies were developed across the two research groups, and these technologies benefit quite literally tens to hundreds of millions of internet users today.

The BWM and security technologies created as part of the action research within Group One benefit the largest number of users, benefitting many millions of the public using ABC Company's internet services. While not an obvious or visually explicit part of any new experience, the intangible benefits for these users are coupled with explicit benefits for ABC Company. Its internal networks are safer, and its ability to maximise the utility of its communications networks are greatly enhanced. Informally within the company, it is estimate this efficiency has deferred the need to build or acquire additional network capacity, saving in the order of tens of millions of dollars.

More obvious to the public are the Validation and Reporting breakthroughs achieved by the DTech co-researchers in Group Two, in their action research cycles. Both new technologies for part of a wider publicly-offered service from ABC Company, which based on 2012 public

figures published by the organisation, serve over 1.2 million separate customer organisations - each with one or more users. This translates into visible, usable innovation from the DTech group being used by millions of software users, contributing to the more than US$42 billion in revenue the wider publicly-offered service generates in revenue annually. This is a powerful reminder of the scale of impact achieved by the co-researchers in their innovative efforts during this piece of research.

6.4 Limits of the Research and Scope for Further Exploration

The goal of many organisations in the high-technology realm is to become serial innovation engines (for example, as covered in Christensen 1997). This is both a worthy goal and an industry survival imperative. I believe that the findings of this research, and the complex practices recounted in the strategic narrative located in Chapter 4, illustrate a rich new avenue for exploration by high-technology organisations seeking to develop sustained innovative capabilities. This, however, would require such organisations to complement their traditional R&D approach with research located within the constructionist and interpretivist research paradigms. This is a challenging proposition for the leaders of such organisations, most of whom have been educated in the positivist tradition and would view such alternative research as 'subjective' and therefore unacceptable.

As mentioned in Chapter Three, constructionist research is *situated research* and accesses knowledge that is context-bound. As such, the results of this research cannot be generalised with confidence to other settings although the insights generated by it may be useful to those attempting to create a sustained capability for technical innovation. One encouraging aspect of these results is the similarity of findings - in particular that social innovation precedes technical innovation – to those of some of the territorial development research being conducted in the Basque country of Spain (see Karlsen and Larrea, 2014). While the research settings vary considerably the notion that technical innovation is tied in complex ways to situated socio-political practices, that has emerged from these very different research settings, seems worthy of further research. Furthermore, the complexity of these practices may be better addressed by constructionist research which offers higher degrees of validity (that is, confidence that the complexity of the phenomenon under research has not been compromised by the methodology) to those offered by positivist research (where the 'operationalised'

phenomenon under research has been reduced to its simplest form for methodological purposes).

Following Coghlan (2003), the form of 'insider action research' conducted for this thesis faced three significant challenges; first was the problem of pre-understanding where I had to attempt to bracket my assumptions about many internal aspects of the research; secondly, there was the problem of role duality, where I faced the difficult task of maintaining my normal organisational role in addition to that of part-time researcher; and, thirdly, where I had to navigate complex organisational politics while trying to serve the action research mission. While I am confident that, in managing these challenges, the authenticity of the research was not compromised, the possibility exists that, in some aspects of it, this may have been the case.

6.5 Thesis Contributions

In line with the principles of action research, this research effort has delivered a significant practical outcome for my organisation (where the research was hosted) in the highly-prized technical innovations that it has spawned. Secondly, through the documented research process, new insights on the relationship between technical innovation and leadership practices have been gained and made available to the broader research community and the high-tech industry. This research has shown clearly that, within two different research contexts, technical innovation only manifested once social innovation - especially the transformation of power relations within the research setting - was achieved. This achievement was a consequence of, in particular, four leadership practices; the development and expression of which is documented in considerable detail in the form of a strategic narrative of the action research process. Furthermore, this research highlights the issue of an appropriate choice of research paradigm - and respective sets of ontological and epistemological assumptions – in researching the complex process of technical, and other forms of, innovation.

Appendix A: List of References

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