SOCIAL CAPITAL
AND
ORGANISATIONAL RESILIENCE

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy

BY

NOEL JOHNSON

JUNE 2010
Acknowledgements

Thank you to Dominic Elliott and Paul Drake for supervision and support through the roller coaster ride. Moods, feelings and emotions, have been stretched in many directions – it has not been easy for me either. Thank you to my wife Lesley for your love, support, and encouragement.
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**Acronyms and Abbreviations**

BCM – Business Continuity Management

CAS – Complex Adaptive System

CBT – Complexity Based Thinking
CMF – Construction Management Framework
CMT – Community Management Team
ECI – Early Contractor Involvement
HA – Highways Agency
JTR – Journey Time Reliability
KPI – Key Performance Indicator
MAC – Managing Agent Contractor
MWF – Managed Works Framework
c – contractor
r – respondent
Social Capital and Organisational Resilience

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Abstract

Over recent years, natural and man-made crises and disasters have raised an awareness of the need for organisational resilience. Many organisations are now part of complex supply networks, and developing good business relationships can be central to supply network resilience.

The aim of the research is to gain a fuller understanding of how organisations can exploit their social capital for building resilience. Although previous research has shown social capital to influence the resilience of place based communities, bringing the constructs together in an organisational or business community context has received little attention.

The research has three objectives: 1) Identify ways in which organisations exploit their social capital for resilience; 2) Explore how four emergent ‘enabling conditions’ (time and continuity, interaction, interdependence, and closure and brokerage) help organisations exploit social capital for building resilience; and 3) Develop a reflective framework to help organisations consider how they can exploit their social capital for building resilience.

The focus group is a community of construction contractors working in partnership for the UK Highways Agency. Working within the so called Construction Management Framework, a concept very different from traditional ‘aggressive’ frameworks, the research explores how contractors have developed good working relationships, collective behaviours including resource sharing and information exchange underpinned by the community’s espoused values, equal status, and peer pressure. Observed, is the contractor community’s willingness and ability to collaborate in order to improve performance and achieve shared goals. The research identifies many examples of the contractor community maintaining positive adjustment under challenging conditions – resilience.
Chapter One

Thesis Introduction

Background

The aim of this research is to gain a fuller understanding of how organisations can exploit their social capital for building resilience. Social capital has been defined as the features of social organisation such as the networks, norms and social trust that facilitate coordination and cooperation for mutual benefit (Putnam, 1993). Broadly, resilience has been defined as the maintenance of positive adjustment under challenging conditions (Weick et al., 1999). Organisational resilience implies a capacity to adapt or evolve with changing environmental conditions (Sutcliffe and Vogus, 2003; Lengnick-Hall and Beck, 2003); an ability to balance exploitation and exploration (March, 1991); and the ability to sustain competitive advantage (Robb, 2000).

The research has been a parallel study to an investigation of better practices in Business Continuity Management (Elliott and Johnson, 2010). BCM has been defined as:

“... an holistic management process that identifies potential impacts that threaten an organisation and provides a framework for building resilience and the capability for an effective response that safeguards the interests of its key stakeholders, reputation, brand and value creating activities” (Business Continuity Institute, 2008).

As the Business Continuity profession matures and establishes itself as a ‘necessary discipline’ the requirement to measure levels of business continuity capability, maturity, and resilience, has become a priority for politicians, organisations, consultants and the wider business continuity industry. Dominant mindsets driving the development of BCM have evolved from a technocratic mindset of the 1970’s through an audit mindset in the 1980’s, a value mindset in the 1990’s, to a prediction of ‘normalisation’ in the new millennium (Elliott et al., 2002, 2010). However, pressures on organisations in all UK sectors to evidence performance may help to explain why current approaches to benchmarking business continuity appear to be as much about auditing for compliance as they are about achieving the defined goals of
the Business Continuity Institute (BCI), or progressing towards ‘normalisation’ (Elliott and Johnson, 2010).

Auditing lends itself to tangible elements easily observed or measurable. A problem with auditing business continuity is that little if any attention can be given to less tangible aspects associated with organisational culture. Organisational learning is shaped by organisational culture (Pauchant and Mitroff, 1988, 1992). The related crisis management literature recognises a socio-technical systems perspective to becoming ‘crisis prepared’ (Turner, 1976, 1978; Perrow, 1984; Pauchant and Mitroff, 1988, 1992; Linstone and Mitroff, 1994; Reason, 1997). Although a derivative of crisis and disaster recovery management, the business continuity industry does not appear to have learned from the earlier research and remains rooted in an auditing mode that affords little attention to the role the social element can play in developing and maintaining resilience.

**Research Justification**

In the broader disaster management field, research has shown social capital to be a key component in a community’s coping ability following natural and man-made hazards. Communities with high levels of social capital have shown resilience when faced with the effects of earthquakes (Shaw and Goda, 2004), floods (Buckland and Rahman, 2004), power outages, and domestic water supply contamination (Murphy, 2007). Although social capital has generated interest in the context of ‘place based’ community resilience, there appears to be little if any research that explores the role of social capital in building resilience in organisational contexts.

Building resilience in organisations and business networks has become a critical issue for stakeholders. Although globalisation and increasingly complex business networks have presented opportunities for many organisations, the trend can also increase vulnerability.

“In today’s uncertain and turbulent markets, supply chain vulnerability has become an issue of significance for many companies. As supply chains become more complex as a result of global sourcing and the continued trend to “leaning down” supply chain risk increases. The challenge to business
Today is to manage and mitigate that risk through creating more resilient supply chains.” (Christopher and Peck, 2004)

For example, in 2000, a small fire at a sub-supplier in Ericsson’s mobile phone supply network resulted in business interruption costs calculated at over $200 million and had great impact on Ericsson’s decision to withdraw from the mobile phone terminal business (Norrman and Jansson, 2004). In the UK, the economic impact of fuel protests in 2000, and the outbreak of foot and mouth in 2001 served to raise awareness of supply chain vulnerability (Peck, 2005). As part of a major thrust by the UK government to develop national resilience against perceived threats from climate change, pandemic and terrorism, the Civil Contingencies Act 2004 places duties on certain organisations to make plans for protecting supply networks as part of their Business Continuity Management process. With this influence, it is likely that many organisations with or without out a legal duty, but as an integral element of a business or supply network will experience pressure from network stakeholders to develop resilience.

The term ‘supply chain’ can be interpreted in many ways, but is defined here in its broadest sense as:

“the network of organisations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate consumer.” (Christopher, 1998)

Supply network performance is often considered in terms of physical or technical characteristics associated with ‘just-in-time’, leanness, and agility. In pursuit of a fuller understanding of supply network resilience, this research adopts a socio-technical systems perspective and argues the need for a greater understanding of the ‘socio’ or relationships component of supply networks.

The influence of organisational and inter-organisational relationships in terms of efficiency and performance is generally well documented, but there is little if any research to show the influence relationships can have on supply network resilience. This presents an opportunity to bridge the gap and make an original contribution to knowledge.
Research Questions

The overarching aim of this research is to explore social capital and resilience in organisations. To meet this aim there are three emergent objectives:

1) Identify ways in which organisations exploit their social capital for resilience
   - Identify ways social capital can facilitate positive adjustment under challenging conditions
   - Identify ways social capital can facilitate the trade-off between exploiting known certainties and exploring new possibilities implicit in building resilience
   - Identify ways social capital can facilitate Weick’s (1993) four potential sources of resilience
   - Identify ways by which formal and informal relationships can compliment resilience building
   - Identify ways social capital can contribute to sustainable competitive advantage

2) Explore how four emergent ‘enabling conditions’ help organisations exploit social capital for building resilience
   - Time and Continuity
   - Interaction and Participation
   - Interdependence
   - Closure and Brokerage

3) Develop a reflective framework to help organisations consider how they can exploit their social capital for building resilience.

Methodology

A decision to employ qualitative research methods has been influenced by several factors. First, the quantitative methods of benchmarking resilience in the BCM
industry provide limited understanding of better practices and the industry may benefit from richer qualitative support. Second, both social capital and resilience constructs can be difficult to measure. For example, social capital speaks of trust and neighbourliness, both of which are difficult to quantify (ERSC, 2007). Third, neither social capital nor resilience has unified definitions. Variation in the meaning of resilience within and across disciplines may render quantitative research findings of limited use. Fourth, in terms of research philosophy, although positivism and social construction are not totally synonymous with quantitative and qualitative methodology respectively (Easterby-Smith et al., 2002), the aim here is to explore the different constructions and meanings that people place upon their experience. The aim is to achieve this through case studies employing qualitative methods of data gathering and analysis. Suited to a social constructionist philosophy, grounded theory (Strauss and Corbin, 1990) has been employed for data analysis and theory development.

The first event to present as an opportunity for case study was a flood prone industrial park in Gloucestershire in 2007, where the social capital within the trader community helped the community through a period of severe flooding affecting much of the industrial park. A second case study - the reconstruction of a crash site following the derailment of a passenger train in Cumbria in 2007, focused on the social capital within Network Rail’s community of contractors who assembled to reconstruct the site remarkably quickly and safely. Although these two case studies provided encouraging links between social capital and resilience, they are considered preliminary studies as the breadth and depth of data collection was insufficient for a full and rigorous research project. However, the findings from the preliminary studies suggested a business ‘community’ may be a suitable setting to undertake the main study.

The main case study is focused on a community of construction contractors who work in partnership for the Highways Agency (HA) in maintaining the strategic road network in England. Contractor relationships in the Construction Management Framework (CMF) are different, more collaborative when compared to traditional Managed Works Frameworks, which the respondents typically describe as a ‘cut throat environment’. In the CMF, evidence of good working relationships,
community identification, shared goals, and resource sharing appear to be conducive to the resilience of the contractor community.

**Contribution to Knowledge**

The main contribution of this research is to **add new knowledge**. Having identified an undeveloped ‘space’ between the social capital and resilience constructs in an organisational context, the research seeks to exploit this opportunity and add new knowledge to the knowledge base.

The research makes a contribution in **deepening the understanding of existing knowledge**. In the broader field of disaster management, social capital has been shown to be a resource linked to the resilience of ‘place based’ communities when faced with effects of natural and man-made hazards. This research thus transfers elements of existing knowledge from the disaster field to the organisational field.

The research also makes a contribution in **tackling problems that interest practitioners and policy makers**. For example, the BCM industry recognises a need for supply network resilience. Elliott and Johnson (2010), suggest currently used objective benchmarking methods are limited in helping practitioners and policy makers tackle supply network resilience. By adopting a subjective approach, and through a social capital lens, the research will compliment the current objective methods and contribute to tackling problems – supply chain/network resilience.

**Summary of Chapters**

The thesis comprises eleven chapters. This first chapter has provided some background and context for the research. Parallel to broader ongoing research seeking better practices in BCM, an opportunity has been identified in bringing together social capital and organisational resilience – an area currently underdeveloped. Broad research questions are posed along with rational for the selected research methodology. Areas are identified in which the research makes a contribution to knowledge.
Chapter Two provides a review of relevant resilience, adaptive capacity, and social capital literature. Whilst reviewing the resilience literature it was felt that a review of the adaptive capacity literature, a concept closely related to resilience, would provide a fuller understanding of resilience. Although this endeavour exposed much similarity between adaptive capacity and resilience constructs, it ultimately led to the application of a ‘complexity-based thinking’ perspective for a fuller understanding of the ‘adaptive’ element of resilience. The primary purpose of the literature review is to identify gaps in the knowledge base where an original contribution can be made. The literature review also provides the basis and justification for elements to be included in the development of analytical and reflective frameworks.

Chapter Three describes and justifies the qualitative methodology employed for the research. The aim has been to describe the research as a journey with emphasis on reflexivity, in particular, the problems experienced when attempting to follow ‘wrote instructions’ of a given research method. The methodology is exposed to recognised evaluation criteria.

Chapter Four presents the findings from two preliminary case studies and the main case study. Both preliminary studies exhibit some evidence of social capital being exploited for resilience. The findings influenced a decision to seek a suitable business community for the main case study. The focus community is described and analysed how three dimensions of social capital – structure, cognitive processes, and relationships influence the community’s resilience.

Chapter Five is a ‘bridging chapter’ which revisits a ‘complexity-based thinking’ perspective in preparation for analysing the following four chapters; each of which comprises an emergent theme or ‘enabler’. Collectively, these four ‘enablers’ (Chapters’ Six to Nine) contribute to an ‘enabling infrastructure’ for exploiting social capital for resilience.

Chapter Ten summarises and interprets the findings from the previous four chapters to address the research questions, including the development of a reflective framework to help organisation’s consider how they might exploit their social capital for building resilience.
Chapter Eleven offers conclusions and suggestions for future research opportunities. Figure 1.1 presents an overarching framework for the thesis.
Overarching Framework – Exploring Social Capital and Resilience in Organisations

Main Case Objectives

- Identify ways in which organisations exploit their social capital for resilience
- Explore how four emergent 'enabling conditions' help organisations exploit social capital for building resilience
- Develop a reflective framework to help organisations identify how they can exploit social capital for building resilience

Meeting objectives

Chapter Four - case studies identify ways in which organisations exploit social capital for building resilience

Chapter Six to Nine - explores four emergent themes forming part of an 'enabling infrastructure' for the exploitation of social capital for building resilience

Chapter Ten - Questions from the four emergent 'enablers' are compiled into a reflective framework to help practitioners and policy makers develop resilience through social capital.

Research contribution - adding new knowledge, transferring existing knowledge, and tackling problems that interest practitioners and policy makers

Figure 1.1 Overarching Framework – Exploring Social Capital and Resilience in Organisations
Chapter Two

Literature Review

Resilience

Definitions or descriptions of resilience may be drawn from several fields including materials science, ecology, developmental psychology, organisational studies, and the wider social sciences. Perspectives from different fields suggest some difference of opinion regarding the meaning of resilience and how it is operationally defined. Broadly, resilience refers to the maintenance of positive adjustment under challenging conditions (Weick et al., 1999).

In materials science, resilience can mean the ability to absorb energy in the elastic range (Nash, 1998). In soils science, resilience defines the ability of soils to recover from different external stresses that may occur through agricultural and industrial land use, and is measured by the rate and level of recovery (Seybold et al., 1999). Ecologist Holling (1973) proposed resilience as a measure of the ability of systems to absorb changes and still persist. In this context resilience envisions ecosystems as constantly changing and focuses on renewal and reorganisation processes rather than stability or equilibrium. From a socio-ecological systems perspective, Walker et al., (2004) define resilience as the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain the same function, structure, identity and feedbacks. There is a distinct difference between the materials science equilibrium view of resilience and the ecologist’s view of renewal and reorganisation.

More in line with renewal, a developmental psychology perspective is useful for understanding the development of resilience in organisations. From this perspective resilience develops over time from continually handling risks, stresses and strains, where an entity not only survives and thrives by positively adjusting to current
adversity, but also, in the process of responding, strengthens its capability to make future adjustments (Sutcliffe and Vogus, 2003).

Organisational studies exhibit the tension between equilibrium seeking and renewal focused perspectives of resilience. Wildavsky (1988) described resilience as the capacity to cope with unanticipated dangers after they have become manifest, learning to bounce back, a view that reflects Meyer’s (1982) study of how hospitals adapted to an unexpected doctors’ strike. Here the term resiliency was used to refer to an organisation’s ability to absorb a discrete environmental jolt and restore prior order. Lengnick-Hall and Beck (2003) argue resilience extends beyond ‘bouncing back’ and suggest resilience is an organisation’s transformational capability comprising a complex blend of perspectives, behaviours, processes and contexts. An example of beyond ‘bouncing back’ or transformational resilience is evident in the case of Sandler O’Neill and Partners following the attacks on the World Trade Centre in 2001. Formerly of the South Tower, the company lost almost forty percent of its people and the majority of physical assets and records. Yet despite the massive losses they began trading again the week after the attack. Within one year the company was doing better than ever with record profits and revenues and new highly desirable lines of business (Freeman et al., 2004). A key element of the resilience shown by Sandler O’Neill was the company’s ability to re-engage a mass of retired people and ex-workers, including many volunteers, to fulfil important roles knowing that these people had a good working knowledge of the company’s business. The good relations with staff and customers extended to the company’s reputation, as on Wall Street, Sandler O’Neill and Partners were known as a ‘relationships’ firm.

Other examples where organisations appear to have transformed crises to advantage include Odwalla Inc in 1996, where a girl died from drinking apple juice contaminated with E. coli bacteria, and Johnson & Johnson’s Tylenol poisoning crisis in the 1980’s which led to the death of seven people in Chicago. Both of these events were managed in a way that not only dealt effectively with a tragic situation, but also enhanced organisational core capabilities enabling them to thrive (Lengnick-Hall & Beck 2003, p.3). One challenge is to understand why and how some organisations manage to thrive and enhance core capabilities when faced with crisis and others fail, or at best return to equilibrium. Table 2.1 presents a collection of resilience definitions from various fields. The choice of fields is an attempt to reflect
the differences between the equilibrium focused perspective in materials science, the organic or renewal perspective of socio-ecological systems, towards a view that recognizes scope for improvisation, customized responses, and transformation.

Table 2.1 An indicative representation of resilience definitions from various fields.

<table>
<thead>
<tr>
<th>Contextual Domain</th>
<th>Resilience Definition or Description</th>
</tr>
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<tr>
<td><strong>Materials</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ecology</strong></td>
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<tr>
<td>Holling (1973)</td>
<td>Resilience determines the persistence of relationships within a system and is a measure of the ability of these systems to absorb changes in state variables, driving variables, and parameters, and still persist.</td>
</tr>
<tr>
<td><strong>Socio-ecological</strong></td>
<td></td>
</tr>
<tr>
<td>Adger (2000)</td>
<td>…the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change.</td>
</tr>
<tr>
<td>Walker <em>et al.</em>, (2004)</td>
<td>… the capacity of a system to absorb disturbance and reorganise while undergoing change so as to still retain essentially the same function, structure, identity and feedbacks.</td>
</tr>
<tr>
<td><strong>Organisational</strong></td>
<td></td>
</tr>
<tr>
<td>Wildavsky (1988)</td>
<td>… the capacity to cope with unanticipated dangers after they have become manifest, learning to bounce back</td>
</tr>
<tr>
<td>Robb (2000)</td>
<td>Able to sustain competitive advantage over time through its capability to both deliver excellent performance against current goals and effectively innovate and adapt to rapid, turbulent changes in markets and technologies.</td>
</tr>
<tr>
<td>Sheffi and Rice (2005)</td>
<td>…supply network resilience can be achieved either through creating redundancy or increasing flexibility</td>
</tr>
<tr>
<td>Sutcliffe &amp; Vogus (2003)</td>
<td>… an ability or capacity to absorb strain and preserve (or improve) despite the presence of adversity, or an ability to bounce back from untoward events.</td>
</tr>
<tr>
<td>Lengnick-Hall &amp; Beck (2005)</td>
<td>… a unique blend of cognitive, behavioural, and contextual properties that increase a firm’s ability to understand its current situation and to develop customised responses that reflect that understanding</td>
</tr>
<tr>
<td>Weick <em>et al.</em>, (1999)</td>
<td>Maintenance of positive adjustment under challenging conditions</td>
</tr>
<tr>
<td>Weick &amp; Sutcliffe (2001)</td>
<td>Intelligent reaction and improvisation. To be mindful about errors that have already occurred and to correct them before they worsen and cause more serious harm.</td>
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</table>
Resilience appears on one hand to be an ability to absorb shocks and recover from interruptions and restore prior order. On the other hand, resilience is an ability to positively adapt to change and transform experiences or situations to advantage, and emerge stronger and more resilient from doing so, as did Sandler O’Neill & Partners (take a punch, stand up, adapt the game plan, and/or transform the game).

**Managing the Resilience ‘Trade-off’**

Recognising the tension between equilibrium and renewal that resilience appears to demand, scholars have noted the need for ‘trade offs’ in terms of the ways organisations attempt to build and maintain resilience. Drawing on organisational learning theory, Sutcliffe and Vogus (2003) argue positive adaptation over the long term, which they interpret as evidence of resilience, requires organisations to manage the trade-off between ‘growing’ (enhancing variation, innovation) and ‘building competence’ (efficiency, honing existing competencies). March (1991) contends a central concern of studies of adaptive processes is the relation between the exploration of new possibilities and the exploitation of old certainties.

“Exploration includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Exploitation includes such things as refinement, choice, production, efficiency, selection, implementation, execution. Adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits. They exhibit too many undeveloped new ideas and too little distinctive competence. Conversely, systems that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in suboptimal stable equilibria. As a result, maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity.” (March, 1991, p71)

With much similarity, Robb (2000) depicts a resilient organisation as a hybrid entity with an ability to sustain competitive advantage comprising two integrated domains of activity. A ‘performance system’ capable of delivering excellent performance
against current goals, and an ‘adaptive system’ enabling the organisation to effectively innovate and adapt to rapid, turbulent changes in markets and technologies. An organisation that is overly performance-driven towards current goals can become rigid or disabled when faced with unanticipated events or change. An organisation that is overly adaptation-driven may be rich in creativity, innovation and improvisation ability, but may have difficulty in forming the structures necessary to deliver consistent, repeatable, excellent performance. For example, in 2003, although well drilled in their crisis management plan, a top brand hotel chain operating in the Mediterranean failed to deal effectively with an outbreak of food poisoning affecting guests in several five-star hotels and four-star resorts. Staff performed as per the crisis management plan, and in this regard the ‘performance system’ functioned well. However, as the crisis evolved the organisation was unable to produce the necessary adaptations to meet changing circumstances not anticipated in the plan. In this regard the inability of the ‘adaptation system’ failed the response. Substantial amounts of money were paid in compensations to avoid legal action from guests and tour operators and the reputation of the hotel chain a received a major blow (Paraskevas, 2006, p.897).

Team and Community Resilience

Although this review is focused on organisational resilience, Weick’s (1993) reanalysis of the 1949 Mann Gulch fire, where all but three members of a team of fifteen fire-fighters perished during the fire identifies four potential sources of resilience that make groups less vulnerable to disruptions of sense-making:

- **Improvisation and bricolage** - the capacity to improvise and to apply creativity in problem-solving. Weick cites Bruner (1983: 183), who argues that creativity is figuring out how to use what you already know in order to go beyond what you currently think.

- **Virtual role systems** - preserve intact in each person’s mind a conception of the system of which they are a part. Each person mentally takes all roles, so that even in situations of peril and disruption everyone is able to maintain a shared vision of risks, goals, and possible actions. This allows people to both
fill in for an absent member (one who is either physically or cognitively absent) and to refer to that conception in order to continually align their actions with the shared goals of the group.

- **Attitude of wisdom** - the capacity to question what is known, to appreciate the limits of knowledge, and to seek new information. The role system best able to accept the reality that ignorance and knowledge grow together may be one in which the organisational culture values wisdom. Wisdom is an attitude rather than a skill. Wisdom avoids extremes of both confidence and caution. Both the cautious and the confident are close-minded which means neither makes good judgements. It is this sense in which wisdom, which avoids extremes, improves adaptability.

- **Respectful interaction** - consists of respecting the reports of others and being willing to act on them; reporting honestly to others; and respecting one’s own perceptions and trying to integrate them with others.

Weick’s (1993) potential sources of resilience may be useful in identifying and analysing how the research focus community (project team or group of construction contractors) go about building and maintaining resilience.

**Resilience Summary**

Although there is no unified definition for resilience, Weick *et al.*,’s (1999) broad definition – ‘the maintenance of positive adjustment under challenging conditions’ provides a useful template for identifying resilience. A key implication for managers attempting to build and maintain resilience seems to be linked to perceptions of resilience - as equilibrium or transformational phenomena. Scholars recognise this as a trade-off and suggest organisations build resilience by focusing on competence *and* growth (Sutcliffe and Vogus, 2003), exploitation *and* exploration (March, 1991), and sustaining competitive advantage by managing performance *and* adaptation systems (Robb, 2000). Weick’s (1993) four potential sources of team resilience may be useful in identifying and analysing how the research focus communities go about building resilience. Together these elements form an analytical framework for resilience (Figure 2.1).
The literature suggests a capacity to adapt or evolve with changing conditions is a key element of organisational resilience. The Adaptive Capacity literature may provide a fuller appreciation of how organisations might go about developing and managing the ‘adaptive’ element of resilience.

**Adaptive Capacity**

Researchers have studied adaptive capacity in a range of contexts. For example, The Intergovernmental Panel on Climate Change refers to adaptive capacity as the potential or capability of a system to adapt to climate change stimuli or their effects or impacts (IPCC, 2001). In this context, adaptive capacity influences the vulnerability of communities and regions to climate change effects and hazards. Reference to organisational adaptive capacity can be traced back to Bowden’s (1947) research of post war workers. More recently Staber and Sydow
(2002) explore organisational adaptive capacity in hypercompetitive business environments characterised by extreme turmoil, complexity, and discontinuity.

**Perspectives on Adaptive Capacity**

In a socio-ecological context, Walker *et al.*, (2002) define adaptive capacity as an aspect of resilience that reflects learning, flexibility to experiment and adopt novel solutions, and the development of generalised responses to broad classes of challenges. Folke *et al.*, (2003) identified four dimensions of adaptive capacity:

- learning to live with uncertainty
- nurturing diversity for reorganisation and renewal
- combining different types of knowledge for learning
- creating opportunities for self-organisation

Armitage (2005) adapts Folke *et al.*, ’s (2003) four dimensions for socio-institutions. In a socio-institutional context, adaptive capacity depends on the attributes of individuals, organisations, and institutions that might foster learning when faced with change and uncertainty, such as a willingness to learn from mistakes, engage in collaborative decision-making arrangements, and encourage institutional diversity.

“Efforts to foster adaptive capacity in socio-institutional systems should emphasize those attributes that support innovation in ideas, practices, and management strategies” (Armitage, 2005, p.707).

Researching the post-war (WWII) adaptive capacity of workers, Bowden (1946) notes a negative influence in part due to two inter-related factors. First, increasing division of labour (loss of ‘rounded’ craftsmen in favour of job simplification and specialists), and second, a decline in the civilizing process. He refers to adaptive capacity as the ability and inclination of the individual or group to maintain an experimental attitude towards new situations as they occur and to act in terms of changing circumstances. Implicit in ‘division of labour’ and a decline in ‘civilizing processes’ is reduced social interaction, which is an indication that social capital may be influential in building and maintaining adaptive capacity and resilience.
“Relationships among employees have become more impersonal, technical, contractual; each employee has necessarily become concerned more about his specific job than about his relationships to the surrounding situation” (Bowden, 1947, p.527).

Adaptation versus Adaptive Capacity

Staber & Sydow (2002) discuss ‘adaptation’ and ‘adaptive capacity’ as two approaches to organisational effectiveness and survival in hypercompetitive environments. They argue the conventional ‘adaptationist’ approach is reactive, underpinned by strategies of cost cutting and rationalisation based on current ‘best practice’. A risk with the adaptationist approach is that organisations can become too well adapted (Granovetter, 1979) or rigid (Sutcliffe and Vogus, 2003; Lengnick-Hall and Beck, 2005) to cope with change. In contrast, adaptive capacity refers to “a dynamic process of continuous learning and adjustment that permits ambiguity and complexity. …Whereas adaptation reflects equilibrium seeking behaviour and maximises fitness to existing conditions, adaptive capacity refers to the ability to cope with unknown future circumstances” (Staber and Sydow, 2003, p.410). Staber and Sydow conclude by suggesting the question to ask is not whether adaptive capacity is a good or bad thing but rather, what levels of adaptation and adaptive capacity are optimal and under what conditions; a question that further supports the notion of managing ‘trade-offs’ for building resilience. Table 2.2 offers examples of definitions and descriptions of adaptive capacity as contextualised in socio-ecology and organisations, the two areas that speak the most of adaptive capacity.
Table 2.2: Definitions of adaptive capacity from various fields

<table>
<thead>
<tr>
<th>Contextual Domain</th>
<th>Adaptive Capacity Definition or Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-Ecological</td>
<td></td>
</tr>
<tr>
<td>Folke <em>et al.</em>, (2003)</td>
<td>Learning to live with uncertainty; Nurture diversity for reorganisation and renewal; <strong>Combine different types of knowledge for learning</strong>; Create opportunities for self-organisation</td>
</tr>
<tr>
<td>Organisational</td>
<td></td>
</tr>
<tr>
<td>Armitage (2005)</td>
<td>… depends on the attributes of individuals, organisations, and institutions that might foster learning in the context of change and uncertainty, such as a willingness to learn from mistakes, engage in collaborative decision-making arrangements, and encourage institutional diversity.</td>
</tr>
<tr>
<td>Bowden (1947)</td>
<td>… the ability and inclination of the individual or group to maintain an experimental attitude towards new situations as they occur and to act in terms of changing circumstances</td>
</tr>
<tr>
<td>Staber &amp; Sydow (2002)</td>
<td>… firms with an adaptive capacity mindset support ambiguity, diversity, and <strong>continual learning</strong> rather than an optimal end state… adaptive capacity proposes that the organisation must be reinvented continuously, using feedback from its environment</td>
</tr>
</tbody>
</table>

Continual learning along with a mindset and conditions that are supportive for learning is at the core of adaptive capacity. This comes as no surprise; organisational learning and adaptation are among the literatures that speak most directly to understanding organisational resilience (Sutcliffe and Vogus, 2003). However, to engage specifically in researching the relationship between organisational learning and adaptive capacity is beyond the scope of this research and may detract from the primary aim of exploring how social capital can be exploited for building resilience. The relationship between organisational learning and adaptive capacity is noted as a potential future research pursuit.

Although adaptive capacity definitions frequently refer to adapting to change and uncertainty through diversity, experimentation, flexibility, feedback, and learning, there is less in the discourse as to how organisations might go about achieving these attributes or qualities. With exception, Staber and Sydow (2002) contend three inter-related organisational features influence adaptive capacity:
• Multiplexity (for example, actors from various departments meeting in multiple settings);
• Redundancy (usually viewed as resource slack reflected in the presence of surplus employees, unused productive capacity, overlapping jurisdictions, broad job descriptions, tolerance for mistakes, parallel communication channels, or idle information); and
• Loose-coupling (for example, loosening of control or decentralisation)

“Business environments in many sectors of economic activity are characterized by extreme turmoil, complexity, and discontinuity… The problem is that adaptive capacity is characterized by considerable ambiguity and complexity, with contradictions that are difficult to manage and with payoffs that are rarely immediate” (Staber and Sydow, 2003, p.408-409).

Acknowledging adaptive capacity is characterised by considerable ambiguity and complexity invites a complex adaptive systems perspective for further insight into resilience building.

**Complex Adaptive Systems**

Viewing adaptive capacity from a Complex Adaptive Systems perspective may provide a richer appreciation of how organisations can exploit their social capital for developing adaptive capacity and resilience.

“When managers and policy makers hear about complexity research, they often ask, “How can I control complexity?” What they usually mean is, “How can I eliminate it?” But complexity… stems from fundamental causes that cannot always be eliminated. Although complexity is often perceived as a liability, it can actually be an asset… Organisations and strategies can be designed to **harness and take advantage of the opportunities provided by complexity**” (Axelrod and Cohen, 2000, p.xii).

Organisations, business communities and networks can be complex phenomena. Their interacting social, technical, economic, and political influences can challenge understanding and prediction. There is increasing recognition from range of
managerial contexts including conflict resolution (Hughes, 2004), health care (Kernick, 2002) and information technology (Rouse, 2000) that traditional styles of management and the Newtonian theories upon which those styles are based, are unsuitable for managing in the twenty first century. For example, discussing the demise of linearity in the health services, Kernick (2002) argues:

“The emphasis moves away from the features of normal science (analysis, prediction and control) to focus instead on the configurations of relationships among the systems components and an understanding of what creates patterns of order and behavior among them” (Kernick, 2002, p.121).

Complex adaptive systems (CAS) are one part of an emerging knowledge in complexity science. The term ‘complex adaptive system’ refers to a system that emerges over time into a coherent form, and adapts and organises itself without any singular entity deliberately managing or controlling it (Holland, 1995). CAS are characterised by several features that, until recently, organisation and management theorists have tended to ignore or assume away (Rouse, 2000, p.144):

- They are nonlinear, dynamic and do not inherently reach fixed equilibrium points. The resulting system behaviors may appear to be random or chaotic.
- They are composed of independent agents whose behavior can be described as based on physical, psychological, or social rules, rather than being completely dictated by the dynamics of the system.
- Agents’ needs or desires, reflected in their rules, are not homogeneous and, therefore, their goals and behaviors are likely to conflict - these conflicts or competitions tend to lead agents to adapt to each other’s behaviors.
- Agents are intelligent, learn as they experiment and gain experience, and change behaviors accordingly. Thus, overall system behavior inherently changes over time.
- Adaptation and learning tend to result in self-organizing and patterns of behaviors that emerge rather than being designed into the system. The nature of such emergent behaviors may range from valuable innovations to unfortunate accidents.
- There is no single point(s) of control. Systems’ behaviors are often unpredictable and uncontrollable, and no one is “in charge.” Consequently,
the behaviors of complex adaptive systems usually can be influenced more than they can be controlled.

This research is focused on business communities and supply networks. Choi et al., (2001) argue the need to recognise supply networks as a complex adaptive system, and propose that many supply networks emerge rather than result from purposeful design by a single entity. Their quote from a manager of a leading automaker suggests it is not enough to manage a supply network as a simple linear system:

“A few years ago, our engineer mapped a supply chain of a small assembly [by] tracing it all the way back to the mine. From that exercise we demonstrated the benefits of supply chain management, and we set out to manage the supply chain as a system. Frankly, we have not been able to do it. The problem was, as soon as we came up with a strategy for managing the chain, the chain changed on us – we got new suppliers and new relationship configurations. It took a lot of effort to map one supply chain, and we could not possibly map it every time something changed” (Choi et al., 2001, p.352).

By thinking of a supply network as a CAS, managers and researchers may interpret network behaviour in a more complete manner and develop interventions that are more likely to be effective (Choi et al., 2001, p.352). With caution however, Mittleton-Kelly (2003, p.26) points out, “complexity is not a methodology or a set of tools (although it can provide both). The theories of complexity provide a conceptual framework, a way of thinking, and a way of seeing the world”. Complexity is an emerging field and has elements common to a wide variety of disciplines in both hard and social sciences. There is no one theory of complexity and numerous schools of thought have emerged within the complexity sciences. These schools have tended to be separated into three broad approaches: reductionist complexity science, soft complexity science, and complexity-based thinking (Richardson and Cilliers, 2001). Although most of the complexity science literature explicitly acknowledges the break from a Newtonian or mechanistic approach, reductionist complexity science still relies on a positivist method that emphasises universal commonalities more than idiosyncratic differences between systems (Richardson and Cilliers, 2001). Soft complexity science asserts a sharp distinction between social reality and the natural world. Therefore, any complexity theory
originating in nature can be used only metaphorically to enrich our understanding of social interaction. A third approach ‘complexity-based thinking’ accepts the limitations to transferability implied by complexity theory in favour of a radical epistemological shift that recognises the contingent nature of all knowledge (Richardson and Cilliers, 2001). In essence, complexity-based thinking requires that we abandon the quest for exact knowledge or universal absolutes and seek instead the limitations and boundaries of our knowledge, by whatever means are appropriate for the situation at hand (Gilpin and Murphy, 2008, p.34).

How can the logic of complexity inform exploiting social capital for adaptive capacity and resilience building? To develop the adaptive capacity of an organisation or business network, organisational architects and managers may adopt a complexity approach to guide “the identification, development, and implementation of an ‘enabling infrastructure’ which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

At this juncture, although seemingly abrupt and incomplete, there is a deliberate departure from the complexity perspective. The reader is urged to note the notion of an ‘enabling infrastructure’ as described above. Following the main case study, Chapter Five, a ‘bridging chapter’, revisits ‘complexity-based thinking’ and identifies four emergent themes as part of an ‘enabling infrastructure’ for exploiting social capital for building resilience. The next section reviews social capital.

**Social Capital**

Receiving considerable attention during recent years, social capital has been applied in many fields – sociology, political science, economics, and organisational theory (Adler & Kwon, 2002). Social capital has been defined as an asset that inheres in social relations and networks (Leana & Van Buren 1999); understood roughly as the good will
that is engendered by the fabric of social relations and that can be mobilised to facilitate action (Adler & Kwon, 2002). The concern here is how social capital can inform the development and maintenance of organisational resilience.

There is much consensus that the development of contemporary social capital is rooted in the works of Pierre Bourdieu, James Coleman, and Robert Putnam. For Bourdieu (1984) ‘capital’ can present itself in three fundamental guises – economic, cultural and social, which are convertible within a social structure from one form to another. Bourdieu sees this process as a means of social stratification, whereby elite members of society can reproduce and maintain privilege. A common example is the exploitive use of ‘inside’ knowledge in school choice and placement (ESRC, 2007). Pelling (1998) notes the Guyana local elite used their ‘connections’ to increase their disaster resilience at the expense of those with less resources and power. On one hand, Bourdieu exhibits a Marxist elitist bourgeois oppression perspective of social capital, on the other hand a neo-liberalist fear of state control.

For Coleman (1988), an exponent of rational choice theory, social capital is less tangible than other forms of capital (financial, physical and human), but residing in the relationships between them is a collective property of corporate actors as well as persons. Coleman (1988) identifies three forms of social capital: (1) obligations and expectations, which depend on the trustworthiness of the social environment, (2) information flow capability of the social structure, and (3) norms accompanied by sanctions. He emphasizes two types of social structures that are especially important in facilitating various forms of social capital. The first is one that creates closure in the social network so that all actors are connected in a way that obligations as well as sanctions can be imposed upon its members. Closure does not necessarily need to be formal as in a legal system where illegal opportunism results in punishment. The behavioural norms in which expectations and obligations are embedded can be via informal unwritten rules. For example, Cohen and Prusak (2001, p.28) note how transactions within a diamond merchant community in Manhattan are sealed not by contract or receipt, but by trusted verbal agreement or handshake. The majority of the merchants belong to close-nit orthodox Jewish communities; their personal and work lives closely intertwined. In addition to being permanently banned from the industry, a dishonest merchant would be ostracised by friends, neighbours, and family, cut off from his religious and social community. Second, Coleman sees the creation of
social capital as largely unintentional processes, emerging mainly from activities intended for other purposes. The latter he terms ‘appropriable organisation’. Appropriable organisation suggests that organisation created for one purpose may provide a source of valuable resources (equipment, information and knowledge) for other, different purposes.

Putnam (1993), attributed with popularising social capital, found that patterns of social interaction can help explain why some communities function much more effectively than others. Investigating Italian regional governments he found that in successful regions citizens are engaged by public issues and not by patronage. Social and political networks are organised horizontally rather than hierarchically. In successful regions people trust each other to act lawfully, and ‘civic communities’ value solidarity, participation and integrity. Putnam (1993) refers to social capital as features of social organisation such as networks, norms, and trust that facilitate coordination and cooperation for mutual benefit. Putman suggests social capital supports good government and economic progress in several ways. Networks of civic engagement:

- foster sturdy norms of generalised reciprocity - trust lubricates social life;
- facilitate coordination and communication and amplify information about the trustworthiness of others;
- embody past success at collaboration and serve as a cultural template for future collaboration

Since these influential contributions, social capital has been applied in many contexts. The focus here is on organisations and business communities. In this context, social capital has been shown to strengthen supplier relationships (Uzzi, 1997), regional production networks (Romo & Swartz, 1995), inter-firm learning (Kraatz, 1998), the creation of intellectual capital (Nahapiet and Ghoshal, 1998), network knowledge transfer (Inkpen & Tsang, 2005), organisational commitment (Watson and Papamarcos, 2002), supplier development, commitment and performance improvement (Krause et al., 2006). Although each of these research areas may be linked with an organisation’s resilience, there does not appear to be
specific research that brings together social capital and resilience in an organisational or business community context.

The central interest in social capital appears to be in the notion that networks of social relationships give rise to collective action that might not have been possible without them. However, conceptually, the notion of social capital is contested on several grounds. For example, social capital refers to characteristics of trust and neighbourliness that are difficult to quantify (ESRC, 2007). Social capital may give rise to negative as well as positive externalities. Both the Ku Klux Klan and the Mafia achieve co-operative ends on the basis of shared norms, and therefore have social capital, but they also produce abundant negative externalities for the larger society in which they are embedded (Fukuyama, 2001). Acknowledging social capital’s meteoric rise across the social sciences over the last two decades, Fine (2010) argues social capital has become a ‘buzz word’ that can mean ‘anything you like’.

“...social capital tends to overlook the traditional concerns of much social science, especially history, through lack of consideration of power, class, conflict and so on, as well as failing to situate itself within a systemic understanding of society and social change, especially where the economy is concerned” (Fine, 2008, p.443).

Fine (2010) cites Johnson and Percy-Smith:

“[s]ocial capital is the contemporary equivalent of the philosopher’s stone. Just as alchemists pursued the secrets of turning base metal into gold, academics, policy makers, and politicians have allegedly unpacked the mysteries of effective communities and collectives... However, we would argue that the social capital debate lacks the level of minimal agreement about the meaning of the key operational concept to sustain meaningful debate and dialogue. Indeed, the status of social capital as a concept should more accurately be characterised as chaotic, while at times it operates as little more than a warm metaphor or a vaguely suggestive heuristic device. (2003, p.332)
According to Fine (2010), social capital is to social science as McDonalds is to Gourmet food (p21). He sees social capital as the degradation of social theory through McDonaldization.

Definitions of Social Capital

Definitions of social capital vary according to whether the focus is on the substance, sources, or effects of social capital, whether the focus is primarily on the relationship an actor maintains with other actors (reflecting internal bonds) or the structure of relations among actors within a collective (reflecting external bridges), or both types of linkages (Adler & Kwon, 2002, p.19). Schuller (2007) suggests bonding social capital refers to links with others who are broadly similar in kind; bridging social capital refers to the links a community has with others that are different, to whatever degree. Social networks configurations have been considered in terms of vertical and horizontal links. The link between the state and society has been referred to as vertical, whilst horizontal links refer to the links that span group, community, or organisational boundaries (Adger, 2003). Table 2.3 offers definitions of social capital relating to internal (bonds), external (bridges) or both types of linkages.
Table 2.3 Definitions of social capital relating to internal (bonds), external (bridges) or both types of linkages (Adapted from Adler & Kwon, 2002, p.20).

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Social Capital Definition or Description</th>
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<tbody>
<tr>
<td><strong>External</strong></td>
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<tr>
<td>Bourdieu (1985)</td>
<td>“made up of social obligations (connections), which is convertible in certain conditions into economic capital and may be institutionalised in the form of a title of nobility… the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of mutual acquaintance or recognition”.</td>
</tr>
<tr>
<td>Burt (1992)</td>
<td>“friends, colleagues, and more general contacts through whom you receive opportunities to financial and human capital.”</td>
</tr>
<tr>
<td><strong>Internal</strong></td>
<td></td>
</tr>
<tr>
<td>Coleman (1990)</td>
<td>“Social capital… is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of social structure, and they facilitate certain actions of individuals who are within the structure”.</td>
</tr>
<tr>
<td>Putman (1995)</td>
<td>“features of social organisation such as networks, norms and social trust that facilitate coordination and cooperation for mutual benefit”.</td>
</tr>
<tr>
<td><strong>Both Internal/External</strong></td>
<td></td>
</tr>
<tr>
<td>Nahapiet &amp; Ghoshal (1998)</td>
<td>“the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilised through that network”.</td>
</tr>
<tr>
<td>Woolcock (1998)</td>
<td>“the information, trust, and norms of reciprocity inhering in one’s social networks”.</td>
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</table>

Two patterns emerge from the various definitions of social capital. These more or less relate to models of social capital based on ‘public’ or ‘private’ goods and mirror what Adler & Kwon (1998) recognise as internal ‘socio-centric’ or external ‘egocentric’ perspectives respectively. For Nahapiet & Ghoshal (1998), social capital is a resource that is jointly owned, rather than controlled by any one individual or entity, or as Leana & Van Buren (1999) suggest “… an attribute of the collective, rather than the sum of individuals’ social connections” (p.541).

Nahapiet and Ghoshal (1998) identify three inter-related dimensions of social capital: structural, cognitive, and relational. The structural dimension concerns the shape of networks in terms of network ties and configuration, and may be considered as the
‘impersonal’ aspects of a network. The cognitive dimension speaks of shared codes, language and narratives that provide actors with representation, interpretations, and systems of meaning. The relational dimension of social capital refers to trust, norms, obligations, and identity, and may be considered the ‘personal’ aspects of network relations. Figure 3.2 shows Nahapiet and Ghoshal’s (1998) social capital framework.

Figure 3.2 Nahapiet and Ghoshal’s (1998) social capital framework

For this research, Nahapiet and Ghoshal’s (1998) three dimensions of social capital have been employed as an analytical framework. This is because (1) the model has been developed from an organisational perspective, (2) the combined internal and external appreciation of social capital, is suited to both internal group dynamics, for example within a firm, and external relationships that may exist in for example, business community supply networks or contracted arrangements, and (3) as noted by Maurer and Ebbers (2006, p.263), it offers a reasonable and comprehensive conceptualisation of social capital that accommodates the major concerns of the extant literature. A recent Google search (May 2008) showed Nahapiet and Ghoshal’s (1998) paper had drawn 2076 scholarly citations, giving an indication of the credibility of their social capital framework.

Worthy of note is that social capital, in some ways, is related to the broader organisational culture literature.
“Culture as a set of basic assumptions defines for us what to pay attention to, what things mean, how to react emotionally to what is going on, and what actions to take in various kinds of situations” (Schein, 2004, p.32).

Organizational culture has been defined as a complex set of values, beliefs, assumptions, and symbols that define the way in which a firm conducts its business (Barney, 1986). Louis (1983) contends culture has pervasive effects on a firm because a firm’s culture not only defines who its relevant employees, customers, suppliers, and competitors are, but it also defines how a firm will interact with these key actors. Values, beliefs, and assumptions that define the way a firm goes about its business may also be seen as elements of the cognitive dimension of social capital. And with whom and how a firm interacts may be seen as elements of structural and relational dimensions (respectively) of social capital.

Weick (1987) identified organizational culture as a source of High Reliability Organization – the name given to a group of ‘exotic’ organisations such as nuclear power plants and aircraft carriers operating under challenging conditions, yet experience fewer than their fair share of problems. And in a crisis management context, Pauchant and Mitroff (1992) argue an organisation’s culture influences crisis proneness or preparedness, and that this disposition may be determined by assessing a combination of factors:

- Organisational plans and behaviour
- Organisational structures
- Collective beliefs and assumptions
- Individual beliefs

Again, the cross-over between organisational culture and the structural, cognitive, and relational dimensions of social capital is evident. But in a similar way that social capital may give rise to negative as well as positive externalities, Turner’s (1978) descriptions of organisational culture suggest:

“Part of the effectiveness of organizations lies in the way in which they are able to bring together large numbers of people and imbue them for a sufficient time with a sufficient familiarity of approach, outlook and priorities
to enable them to achieve collective, sustained responses which would be impossible if a group of unorganized individuals were to face the same problem. …this very property also brings with it the dangers of collective blindness to important issues, the danger that some vital factors may be left outside the bounds of organizational perception” (Weick and Sutcliffe, 2001, p.120).

Although social capital has received considerable attention during recent years, and has been applied in many fields, there does appear to be close links with the broader theme of organisational culture.

**Better Connected for Advantage**

Although there is tension in perspectives of social capital as to whether the construct represents a private or public good, there are also conflicting views as to how the implicit advantage of social capital can be exploited. Social capital is a metaphor about advantage (Burt, 2005, p4; Coleman, 1998, S98). The metaphor is that people who do better are in some way better connected (Burt 2001). Disagreements emerge over what being better connected actually means. Coleman argues advantage is leveraged through closure in the social network. All actors are connected in a way that obligations as well as sanctions can be imposed upon its members (Coleman 1988). The closure argument claims social capital is created by a network of strongly interconnected elements. But closure can create structural constraints on what people know and can control, as actors may have limited exposure to wider networks (Walker et al., 1997). For Burt (2001), advantage can be exploited through weaker connections or ‘ties’ in a social structure. Weak connections between groups or firms represent ‘structural holes’ in a social structure that can create competitive advantage for actors whose relationships span the holes. The constraints of closure present opportunities for brokers to seek partners with whom they can form unique or non-redundant relationships that bring new information and the possibility of negotiating between competing groups (Walker et al., 1997). It is unlikely that an organisational or inter-organisational network would be completely closed or dependent on bridging structural holes. There are likely to be areas that exhibit more closure and areas that exhibit more openness with opportunity for brokering relationships for advantage.
According to Burt (2005), a typical generic network features clusters of dense connections linked by occasional bridge connections between clusters. Burt (2000) suggests any contradiction between network closure and structural holes can be resolved in a more general model of social capital. He suggests brokerage across structural holes is the source of value added, but closure can be critical to realizing the value buried in structural holes.

“Brokerage is about coordinating people between whom it would be valuable, but risky, to trust. Closure is about making it safe to trust. The key to creating value is to put the two together, building closure around valuable bridge relations. Closure is valuable when it spans a structural hole” (Burt, 2005, p.97)

Discussing the constraining and enabling effects of networks structures, Gargiulo and Benassi (2000) contend actors are faced with a trade-off between safety which they associate with cohesive networks, and adaptability which they associate with structural holes. This will be dependent upon contextual conditions, for example, Walker et al., (1997) suggest structural holes theory may apply more to networks of market transactions than to networks of cooperative relationships. In terms of a research agenda, Gargiulo and Benassi (2000) suggest rather than hoping to find an ideal balance between cohesive networks and structural holes, scholars should fully assume the existence of a trade-off that is inherent to the dynamic of social structures and investigate how successful individuals and organisations actually deal with the trade-off.

Emergent research question

- In what ways do successful organisations manage the trade-off between closure and brokerage for sustaining competitive advantage and thus resilience?

**Social Capital Summary**

This section provided a review of relevant social capital literature and provided rationale for selecting Nahapiet and Ghoshal’s (1998) framework comprising
structural, cognitive, and relational dimensions for use in this research. Two opposing views – closure (Coleman, 1990) and structural holes (Burt, 2000) were discussed in terms of what being ‘better connected’ for advantage actually means. As with resilience, scholars (Gargiulo and Benassi, 2000) contend, dependent on contextual conditions, actors are faced with a trade-off between safety which they associate with cohesive networks, and adaptability which they associate with structural holes. Nahapiet and Ghoshal’s (1998) framework and recognition of the trade-off for advantage between closure and structural holes will be employed in an analytical framework for the analysis phase of this research.

The following chapter provides a detailed account of the Methodology employed in this research.
Chapter Three

Methodology

This chapter provides an account and justification for the methodology employed in this research. A brief outline of the debate concerning the most appropriate philosophical position for social science research is given. An ethnographic study underpinned by social constructionist philosophy best describes the methodology with emphasis given to continuous reflexive evaluation. After recapping on the research problem, consideration is given to the research setting, access, and field relations including promptness, avoiding the role of critic, the potential stresses and strains of fieldwork, and data collection. Theory development is a variation of grounded theory guided by Easterby-Smith et al., (1991). Lastly, the research is guided by Lincoln and Guba’s (1985) criteria for evaluating qualitative research.

Philosophical Position

There has been much debate over the most appropriate philosophical position i.e. positivism versus phenomenology (Easterby-Smith et al., 1991) or naturalism (Hammersley and Atkinson, 1995) for social science research design. The major tenets of positivism can be outlined as:

- physical science, conceived in terms of the logic of the experiment, is the model for social research
- universal laws – positivists adopt a characteristic conception of explanation, usually termed the ‘covering law’ model
- neutral observation language – positivists give priority to phenomena that are directly observable; any appeal to intangibles runs the risk of being dismissed as metaphysical speculation (Hammersley and Atkinson, 1995, p.4).

Central to positivism is a view that the social world exists externally, and that its properties should be measured through objective methods rather than being inferred subjectively through sensation, reflection or intuition (Easterby-Smith et al., 1991, p.22). In contrast to positivism, naturalism proposes that as far as possible, the social
world should be studied in its natural state, undisturbed by the researcher. Naturalists reject the idea that the social world can be understood in terms of simple causal relationships underpinned by universal laws. This is because human actions are based upon, or infused by, social meanings: that is, by intensions, motives, beliefs, rules, and values (Hammersley and Atkinson, 1995, p.7). Any hope of discovering ‘laws’ of human behaviour is misplaced, it is suggested, since human behaviour is continually constructed, and reconstructed, on the basis of peoples’ interpretations of the situations they are in *(ibid, p.8)*.

This research is concerned with obtaining a qualitative understanding of how organisations can exploit social capital for building resilience. With a view that all organisations are social constructs, social constructionist philosophy, a variant of phenomenology or naturalism best describes the philosophical position for the research. Social constructionists propose ‘reality’ is determined by people rather than by objective and external factors. The task should not be to gather facts and measure how often certain patterns occur, but to appreciate the different constructions and meanings that people place upon their experience (Easterby-Smith *et al.*, 1991, p.24). Table 3.1 shows contrasting implications of positivist and social constructionist research.
Table 3.1 Contrasting implications of positivism and social construction (Easterby-Smith et al., 2002).

<table>
<thead>
<tr>
<th></th>
<th>Positivism</th>
<th>Social Construction</th>
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<tbody>
<tr>
<td><strong>The observer</strong></td>
<td>Must be independent</td>
<td>Is part of what is being observed</td>
</tr>
<tr>
<td><strong>Human interests</strong></td>
<td>Should be irrelevant</td>
<td>Are the main drivers of science</td>
</tr>
<tr>
<td><strong>Explanations</strong></td>
<td>Must demonstrate causality</td>
<td>Aim to increase general understanding of a situation</td>
</tr>
<tr>
<td><strong>Generalisation through</strong></td>
<td>Statistical probability</td>
<td>Theoretical abstraction</td>
</tr>
<tr>
<td><strong>Research progresses through</strong></td>
<td>Hypotheses and deductions</td>
<td>Gathering rich data from which ideas are induced</td>
</tr>
<tr>
<td><strong>Units of analysis</strong></td>
<td>Should be reduced to simplest terms</td>
<td>May include the complexity of whole situations</td>
</tr>
<tr>
<td><strong>Concepts</strong></td>
<td>Need to be operationalised so they can be measured</td>
<td>Should incorporate stakeholder perspectives</td>
</tr>
<tr>
<td><strong>Sampling requires</strong></td>
<td>Large numbers selected randomly</td>
<td>Small numbers chosen for specific reasons</td>
</tr>
</tbody>
</table>

The research methodology has been influenced by at least two inter-related factors. First, at the surface, dissatisfaction and being generally unconvinced that recent quantitative research, more likened to positivist persuasion, has provided a sufficiently rich understanding of the organisational relationships/resilience interface. In practical terms, a review of the relevant literatures has already suggested social capital and organisational resilience are difficult to quantify. Second, and more fundamental, is the acknowledgement of an attraction towards the appropriateness of social constructionist philosophy rather than positivist philosophy in social science research. The philosophical stand here is that behaviour is constructed on the basis of people’s interpretations of the situations they are in. In an attempt to develop a fuller understanding and a better chance of responding to the research questions, ethnography provided an opportunity to ‘get in there’ and observe what was going on in as many ways as possible.
Ethnography

With this backdrop the research approach here is an ethnographic case study. The term “ethnography refers primarily to a particular method or set of methods [which] in its most characteristic form involves the ethnographer participating, overtly or covertly, in peoples’ daily lives for an extended period of time, watching what happens, listening to what is said, asking questions – in fact, collecting whatever data are available to throw light on the issues that are the focus of the research” (Hammersley and Atkinson, 1995, p.1). Ethnography, with its characteristic researcher participation is different from traditional positivist or naturalist empiricism. In both positivist and naturalist research design, traditionally there has been an effort to separate the researcher from the phenomena being researched. Any involvement or influence by the researcher is seen to contaminate the research in some way. Both approaches fail to recognise the fact that social researchers are part of the social world they study. The tension between positivism and phenomenology (social construction) is seen in the broader debate of what is science and what is not science. In social science the gradual demise of positivism has borne post-empiricist assumptions that have in common an understanding of social science as a reflexive relation to an increasingly contingent world (Delanty & Strydom, 2003).

Reflexivity implies that the orientations of the researcher will be shaped by their socio-historical locations, including the values and interests that these locations infer upon them. Reflexivity represents a rejection of the notion that social research is, or can be, isolated from the wider society and from the particular biography of the researcher, in such a way that its findings can be unaffected by social processes and personal characteristics (Hammersley and Atkinson, 1995, p.16).

Reflexivity asks that rather than attempting to isolate the influence a researcher might have on the research or vice versa, “… including our own role within the research focus, and perhaps even systematically exploiting our participation in the settings under study as researcher, we can produce accounts of the social world and justify them without placing reliance on futile appeals to empiricism, of either positivist or naturalist varieties” (Hammersley and Atkinson, 1995, p.22). For example, research texts note how surveys can have a poor response rate. Rather than simply accepting this and sending out more surveys to raise potential response
numbers, reflexivity would seek to understand why the response levels were low or high to gain a fuller understanding of the research setting. In this research, with the exception of one individual who stressed how busy he was at the time, there were no refusals to take part in interviews and no refusals to requests to attend meetings for observation purposes. Further, documentary evidence was offered without request, helping to gain an understanding of the focus community. This could be for several reasons. One conclusion ultimately drawn was that the community being researched were proud and were keen to share their experiences. The framework within which the focus community functions provides sufficient time to allow people to reflect and discuss their work experiences as part of a continual learning culture. The culture seemed to extend to welcome this research, which seemed to be received as an opportunity for the community to improve. In terms of reflexivity, this itself said something about the receptive community culture and was an important part of the research.

The research problem has been discussed in the opening chapter, but to recap, development of the research problem started with the idea that although there is much call for establishing and maintaining good inter-organisational relationships for building organisational resilience, exploring how social capital might be exploited within and between organisations for building resilience had received little attention. Although business relationships forms part of the process of Business Continuity Management (BCM) as a means of developing resilience, research by Elliott and Johnson (2010) shows that little attention is given to business relationships. That which is, tends to be restricted to a quantitative account of the firms in a supply chain that participate in BCM and falls desperately short of any understanding of how those links or relationships might be exploited for resilience. Bringing the two concepts together presented an opportunity for an original contribution to knowledge to be made.

**Research Setting**

The setting for the main case study has been influenced by the findings from two preliminary case studies. The findings suggested some sort of community would be a good setting to undertake a full and rigorous study of how organisations can exploit
social capital for resilience. The setting for the main case study is a community of construction contractors who work in partnership with the Highways Agency in the North West of England. The main study is significantly different to the preliminary studies. Rather than researching how social capital can be exploited in terms of responding or adapting to a specific event (post facto) such as an episode of severe flooding or a train crash, the aim of main study is to explore how a community of contractors can exploit their social capital through day-to-day activities, for example, the ways that actors are ‘tied’ formally and informally within the community and how this influences collective action and an ability and willingness to share resources.

**Suitability and Feasibility of the Research Setting**

An initial meeting with a contractor/manager provided an opportunity to discuss the suitability of the research setting. At this meeting, resilience and social capital constructs along with potential benefits from research participation were discussed in context. The meeting resulted in initial mutual agreement regarding the suitability of the research setting. The contents of a ‘follow-up’ email after the initial meeting are presented in Appendix One (p. 267).

In terms of assessing the suitability of the research setting, and developing rapport with the contact, the email contents suggest how directly engaging with the manager to discuss the best way to go about the research informed the research rather than attempting to isolate the researcher from the researched in an attempt to remain a ‘neutral vessel of cultural experience’.

An opportunity to research a contractor community undertaking a motorway/railway bridge refurbishment project over a three month period made the research setting feasible with a definite time period to work to in terms of collecting primary data and reasonable assurance of access. After this, the contractors would disperse to other projects elsewhere.
Access to the Research Setting

The ‘gatekeeper,’ with whom initial contact was made, asked approximately ten contractors if they would be willing to participate in the research. There were no rejections and initial physical access was secured for attendance at a project ‘setting the scene’ meeting and fortnightly progress meetings that are held on site. Although access in a physical sense was secured, access in terms of acceptance by a focus community can be a different challenge. It may be difficult for a researcher to ascertain the level to which he or she has been accepted in terms of conducting the research. Intuitively, the focus community seemed to have no concerns. This intuition stems from the welcoming manner of the community and their willingness throughout the duration of the project to engage in conversations. Also, some of the ‘soft’ language used by community members suggested openness rather than guarded views or opinions. Some contractors suggested key people in different parts of the network with whom to make contact. In a way, this can be seen as purposeful or theoretical sampling assisted or guided by the community itself. Reflexively, this is an example of how the research process can influence the orientation of the research. Reflexively, this was reassuring as it added weight to the notion that there was in fact an active community or network in which to conduct the research.

Hammersley and Atkinson (1995) note gatekeepers as well as allowing or obstructing access can attempt to exercise control by blocking certain lines of enquiry, or ‘shepherding’ the fieldworker in a particular direction. Gatekeepers can also allow observation to take place at certain times and not others to ensure the setting is observed in desired light. It was quickly learned that the contract framework within which the focus community operate was within the last six months of its seven year term. One manager suggested this was an uncertain time for some of the community members. As they were currently tendering for the next framework, relationships may be more tense than usual as there is an element of competition in the tendering process. However, this did not seem to affect the willingness of the various actors within the community in engaging in the research. Reflexively, this seemed to suggest an embedded willingness within the community to share information about the community even during times of possible tension.
Field Relations

The focus community are used to participating in internal research. A Community Management Team frequently asks the community to complete questionnaires regarding various aspects of performance. However, when the gatekeeper and the community manager learned of the ethnographic approach and some of the ‘social’ areas of interest they seemed bemused by the qualitative approach and voiced wishes of ‘good luck with all that intangible stuff’. Intuitively, it was as though, because they were more familiar with hard research methods more readily associated with civil engineering, the qualitative nature of this research presented no threat. On the other hand, some of the engineers that did participate were keen to learn of the likely outcomes and benefits that might emerge from the research. This was an early indication of tension in mindsets that mirrored buy-in or scepticism with the community approach to contract procurement. Reflexively, this helped to develop some of the subsequent inquiry which explored that tension.

Although there may have been a perception that the research presented no threat to the community there remained a need to inform the community of the likely benefits or outcomes from the research – in other words what was in it for them. An email that was sent to the original gatekeeper (and others) that suggests some of the likely benefits is shown in Appendix 2 (page 270). In terms of reflexivity, transparency at the researcher/focus group interface seemed to reinforce the developing rapport with the community and their willingness to engage.

Promptness

It was quickly learned that the focus group is used to working to tight time schedules and anticipated that to retain the level of acceptance would demand promptness, for example, attending meetings regularly and on time. This of course was necessary to observe behaviour and collect data. But intuitively, it felt as though any report of failure in promptness or a failure to attend scheduled meetings would have travelled quickly within the community and jeopardised further access and participation. From a reflexivity perspective this intuition was of a community with effective communication links. Again, although this intuition shaped the researcher behaviour
by reinforcing promptness, it also provided some reassurance that the research setting was suitable, as communicative network links or ‘ties’ influencing resilience are central to the research.

The experience of learning of the ‘promptness’ in the focus community may be linked to Schutz’s (1964) stranger. Schutz notes how areas of ignorance of a host society previously of no importance come to take on great significance. Overcoming them is necessary for the pursuit of important goals, perhaps even for the stranger’s [researcher’s] very survival in the new environment (Hammersley and Atkins, 1995, p.8).

**Avoiding the Role of Critic**

In attempting to make sense of what was happening in terms of free-riding within the community, possible causes and solutions were discussed with the Community Manager – a role with sufficient influence to act as a gatekeeper. This was a mistake. This may have been perceived as researcher/critic and seemed to unsettle the rapport. A subsequent discussion with the Community Manager was necessary to clear the air. Nevertheless, in terms of reflexivity the lesson as Hammersley and Atkinson (1995, p.77) suggest is it may be advisable to distance oneself from the role of critic [at least until after full and rigorous analysis of the whole data sets].

**Stresses and Strains of Fieldwork**

Although the participant observation role resulted in minimal stress and strain, there was a time when the ‘feel’ became unsettled over a confidentiality issue. After making contact with a Highways Agency manager to learn more of new contract framework tendering conditions, the manager became very interested in the stories regarding network relationships that were being collected as part of the research. Ultimately, the HA are ‘the client’ whom the contractor community serve, and are thus in a powerful position. The manager suggested the stories would be useful as part of the process for evaluating contractors for the new contract framework. However, these stories had been given on an agreement of strict confidentiality.
Disclosure of the stories would have broken that confidence and most likely the rapport that had been carefully nurtured with many of the contractors within the community. This was explained to the manager who was assured that he would be invited to a presentation and the end of the research project where he would learn of the main outcomes. The experience however, was unsettling as the HA manager could have influenced gatekeepers to restrict further access and research. In terms of reflexivity, it is evident that researcher involvement in the research setting could have had a negative influence on the continuity of the research. However, in terms of ethics, honesty and confidentiality should retain primacy.

Data Collection

Theoretical social roles for fieldwork can range from complete participant to complete observer (Junker, 1960). With no knowledge of the construction industry, complete participation was an unlikely option. In any case, in a complete participation role, there may be no guarantee of securing the desired theoretical sample of managers. On the other hand, complete observation, whilst most likely suitable for observing group meetings, lacks the participation element sometimes needed to capture respondent views and opinions. Complete observation limits the extent that the socio-historic background of the researcher might be exploited. The role adopted here may best be described as an ‘interrupted involvement’ variant of participant observer (Easterby-Smith et al., 1991, p.100). Rather than continuous longitudinal involvement, an ‘interrupted involvement’ role recognises the researcher moving in and out of the focus organisation to deal with other work, conduct interviews or observations across a number of different organisations. In addition to the brief discussion above, the role was adopted because of several related factors:

- The fortnightly frequency of on-site progress meetings
- Arranging interviews interim to the on-site meetings
- Dispersed geographical locations of firms/participants
- The distance between the research setting and the researcher’s home along with family commitments would have hindered full access to the setting.

Although full access was not discussed, it is unknown whether the outcomes
would have been different. This may be recognised as a limitation of the research.

Another factor influencing this role was an agreement with a gatekeeper to observe the community for the three month duration of a specific construction project. On one hand this helped with maintaining some ‘distance’ from the community; on the other hand it enabled sufficient closeness to organise interviews at short notice with members of the community. Hammersley and Atkinson (1995, p.112) note while ethnographers may adopt a variety of roles, the usual aim throughout is to maintain a more or less marginal position, thereby providing access to participant perspectives but at the same time minimizing the dangers of over-rapport. Here, this was achieved in the main by a combination of the fortnightly frequency of observation at progress meetings, and interviews being pitched at both first and second tier contractor levels. The reason for both first and second tier interviews was to gather data at the formal community level (first tier) and the extended community level. This may have helped as a means of ensuring that ‘over-rapport’ was not the case at any particular tier.

**Documentary Data**

Internal and externally generated documents were gathered as part of the data collection process. The internal documentation included a ‘community manual’ which describes the structure of the community and details the many processes and procedures employed by the community. This was a useful capture as on one hand the manual contains the standard practices that enable the community’s ‘performance system’ to function. On the other hand, the manual contains the practices that guide the community’s ‘adaptation system’, for example the promotion and recording of innovations. Both of these systems must function simultaneously for organisational resilience (Robb, 2005). The community manual forms an integral part of everyday life for the community and helped to throw light on the culture of the community and also helped to guide the research interviews. Other internal documentary data included the previous three years annual reports and a DVD of the business strategy plan for 2009. Although these documents may be ‘loaded’ to show the community in
good light, they were a useful capture of community performance goals, the culture promoted to achieve those goals, and how success is measured.

External documentation was limited to two academic journal articles and a handful of trade articles. Although the former in particular focused on the performance and measurement of the contractors working within the framework, none of the documentation addressed with any detail the role of relationships within the community or how those relationships might be exploited for the resilience of the community. This reconfirmed the research topic was addressing a gap in the research base where an original contribution to knowledge could be made.

The documentary data was informative in terms of the recent history and helped to shape other data collection i.e. listening at progress meetings and the content of the discussions that followed. Again, from a reflexivity perspective, the research orientation was influenced by the research process itself.

**On-site Progress Meetings**

A total of six on-site fortnightly progress meetings were held during the project. All of these meetings were attended, each with duration of around three hours. The meetings were chaired by a project manager representing a Managing Agent Contractor (MAC). Attendees included representative engineers/managers from each of the four specialist contractors involved in the project, representatives from various departments of the MAC, and representatives from the HA (client). The number of attendees at the meetings was usually twelve to fifteen. The ethnographic role at these meetings was of ‘complete observation’. However, the attendance did enable the establishment of rapport with the community, some of whom were later interviewed.

From a reflexivity perspective, the combinations of exposure to the community were a useful influence on the direction of the research. For example, posters and pictures adopted by the community and positioned around the site offices to promote the community culture seemed to have strong symbolic meaning; meaning which came out later in the conversations with participants.
Interviews

As the structure of the community became known, the aim was to interview actors from various positions and levels. Through purposeful sampling, the aim was to interview at least one manager from all four specialist contractors working on the project and some of their supply chain partners with varying degrees of experience of working within the community contract framework. However, as the research progressed, purposeful snowballing of contractors who were not part of the project but part of the community enabled broader data collection. The members actually interviewed included two members from the Community Management Team, two from the MAC, seven from the specialist contractor level (at least one from each specialist), and seven from the supply chain partner level. This equates to a total of eighteen interviews with average duration of about 90 minutes.

In terms of reflexivity, the Community Management Team members were able to give a ‘big picture’ perspective which did influence the subsequent inquiry. For example their emphasis on peer pressure within the community stimulated the direction of the following interviews with many of the community members. The community manager did appear guarded over elements of a story where one firm helped another firm financially when they went into receivership. This is perhaps understandable given the sensitive nature of the story. However, a fuller story was persuaded from another interviewee with knowledge of the event.

The community ‘navigator’ (now retired) is a man with whom there is consensus in the community to have been instrumental in inspiring the conception of the current community style contract framework. As this was ‘his baby’ there could have been an effort by him to steer the research in a particular direction to be seen favourably. With this in mind, areas of the discussion were pushed towards contentious issues such as sanctions being imposed on members for not abiding by community rules. Intuitively however, there seemed to be no constraint on him voicing his views. Rather than defend the framework to the hilt, the retired community navigator seemed willing to discuss both strengths and weaknesses of the community. Perhaps this echoes Balls (1994) findings. He found interviewing government ministers who had left office more effective since they were more likely to feel free to provide inside information (Hammersley and Atkinson, 1995, p.138).
Interview Content Formulation

Originally, questions were developed from the experience and knowledge gained from the preliminary case studies. The perception was that the questions would further evolve and become more contextually honed as the research progressed. However, it became apparent that the best way to proceed was to explore a few topics or issues and try to engage the respondent in broad discussion instead of posing lots of specific questions. The former is more naturalistic and seeks meaning from the participant’s world. The latter may be informed by the literature, but there may be no certainty that the right questions are being asked. Whilst the literature should not be ignored, Hammersley and Atkinson (1995, p.103) contend some researchers setting out on fieldwork may feel a sense of betrayal, experience a panic of self-doubt, believing themselves to be inadequate research workers because their observations do not fall neatly into the sorts of categories suggested by the received wisdom of ‘the literature’. The approach adopted here was for example, to ask the participants to talk about the benefits of being part of the community, the differences between the focus contract framework and traditional contract frameworks, and to encourage respondents to give examples of different kinds of positive adjustment. This approach seemed to unravel into lots of stories of experience giving contextual meaning. Although the term ‘interview’ is used throughout this methodology, the ‘feel’ was more of ‘loosely steered conversations’.

Recording and Organising Data

As the ethnographic role at the fortnightly progress meetings was observation rather than participation, field notes as well as digital recordings were made. The note taking enabled the capture of thoughts and ideas in real time reducing the possibility of anything being forgotten. The digital recordings of the meetings were later transcribed (as best as possible as the group dialogue was difficult to decipher) to aid the analysis process. Digital recordings were also taken during the individual interviews negating the need for detailed note taking and enabling the full attention needed for guiding the interviews. However, hand written notes of insightful moments, feelings and intuitions were always made immediately following the interviews. As soon as possible, and in all cases within twenty four hours after the...
group progress meetings and the individual interviews, the recordings were listened to again, now with the ability to stop the recording and make further ‘hot’ notes whilst the memory of the meeting or interview was still relatively clear.

In making ‘hot’ notes, a clear distinction was made between analytic notes, accounts provided by participants, observer descriptions, and feelings of personal comfort/discomfort for whatever reason. The argument is that a fuller understanding of data to date would help to steer the future data collection sessions and help in the analysis of data. This method suits a personal preference of being ‘close’ to the data, and enables reflexive monitoring of the research process.

There were also many unplanned or ‘chance’ conversations, for example when crossing paths with people at the on-site offices or car park, and opportunistic telephone calls that turned into useful conversation/discussion. On these occasions field notes were made as soon as practicably possible after the event.

**Leaving the Field – ‘put a spot of oil on it’**

In a previous role as an apprentice truck mechanic, the words of wisdom from the master mechanic when fitting a new oil filter were: “*put a spot of oil on the seal to make it easier for the next bloke to get it off again. It might be you.*”

These words of advice may be transferred to a research context. At the EURAM Conference 2009 held at the University of Liverpool, Pettigrew warned those involved in research to avoid what he called ‘smash and grab’ research where the researcher accesses an organisational setting, grabs the necessary data and departs, effectively breaking any established links and without feeding back to the focus organisation/s. Whilst this may satisfy the short-term needs of the researcher, he/she or anybody else is unlikely to access that setting again. Combining these words of wisdom, communications links with the focus community have been lubricated with updates on how different stages of the research have gone. Feedback from research outcomes have been faithfully promised and are expected by the community. Rapport is good and it is anticipated that the research setting is open for future research possibilities.
Theory Development

Although account of theory development appears here, after data collection, it is stressed that data analysis started at the very beginning of the research during the first introductory meetings and gathering of documentation. It was here that an appreciation of the community mindsets and culture began.

The approach to the development of theory adopted here is a variant of grounded theory. Grounded theory was developed by Glaser and Strauss (1967) as a reaction against the extreme positivism that had permeated most social research. They disputed the view that the social and natural sciences dealt with the same type of subject matter. Specifically, they challenged prevalent assumptions of ‘grand theory’, the notion that the purpose of social research is to uncover pre-existing and universal explanations of social behaviour (Suddaby, 2006, p.633). Glaser and Strauss coined the term to refer to an approach which they had developed during the course of research into American health institutions to enable them to ‘discover theory from data’ rather than having to proceed by quantitatively testing hypotheses derived from the work of a few specialised theorists (Turner, 1983, p.333). Through grounded theory method, the theory should be allowed to emerge from within the situation being researched. The approach here is described as a variant of grounded theory in recognition that the method or process has developed different interpretations and ‘tensions’ as it has evolved. A recent critique by Jones and Noble (2007, p.84) suggests that grounded theory in management research is in danger of losing its integrity. The methodology has become so pliant that management researchers appear to have accepted it as a situation of “anything goes”. They argue for restoring more discipline into grounded theory studies. There is counter argument. For example, Easterby-Smith et al., (1991, p.112) claim “it can be argued that the systematic nature of the [grounded theory] process to provide rigor for academic ‘peer’ assessment does harm to itself and in a sense becomes a reductionist approach. Their argument is that research and analysis in qualitative data is about ‘feel’ and an implicit component of all research is the honesty of the person conducting the research.” In another critique of grounded theory, Thomas and James (2006, p.791) conclude (in part) “A preoccupation with method makes for mirages of some kind of reliable knowing, and this in the end makes us almost more concerned with the
method than the message”. Suddaby (2006, p.638) reminds us of the pragmatic core of grounded theory.

“It was founded as a practical approach to help researchers understand complex social processes. It was also designed as a method that might occupy a pragmatic middle ground between slippery epistemological boundaries. Because of this genealogy, grounded theory techniques are inherently ‘messy’ and require researchers to develop a tacit knowledge of or feel for when purist admonitions may not be appropriate to their research and may be ignored.”

With all this tension in the grounded theory method, why use it? Here, qualitative method and grounded theory suits the researcher’s social constructionist philosophical persuasion which challenges positivist ‘grand theory’ in favour of an assumption that there are multiple realities constructed by ourselves. Grounded theory method seems to be a suitable method of attempting to discover those multiple realities. Whatever the method, and how ever closely or otherwise the methods meets the guidance of its originators, the main concern should be that the method is fit for purpose. Ultimately, it will be the subjecting to evaluation criteria that will enable a judgment of the quality of the research. The approach adopted here is guided by an interpretation of grounded theory by Easterby-Smith et al., (1991) which is explained through seven stages. Each of these seven stages is explained next. Following these, and a review of evaluation criteria, the methodology is subjected to evaluation criteria.

1) Familiarization

As data were collected in the form of field notes and digital recordings, it was revisited within twenty four hours to confirm initial thoughts and to capture any new ideas that may have emerged during the interim period. This was a good time for ‘weighing up’ the relationships and rapport being developed within the focus community, reassessing the feelings and intuitions that had previously been noted, and thinking about the direction or content of the interviews that were being arranged. Later on, when recordings had been transcribed, they also were re-read providing opportunity for ideas to emerge as part of an iterative approach to build rigor into data analysis and theory development.
2) Reflection

With an increasing volume of ‘messy’ qualitative data, ordering and analyzing data was necessary but problematic. Two inter-related problems emerged. First, the acknowledgement of a priori knowledge from a thorough literature review of the constructs being researched. Nobody starts research with a blank sheet. The interest in the area one wishes to explore will be influenced by the researcher’s background or discipline which will provide a perspective from which to investigate a problem, issue, or situation. In practical terms, interviewees need some guidance on the nature of the research and the information being sought after. Without some structure or loose steering, there may be confusion regarding the aim of the research which could materialise as voluminous but meaningless data. The aim was to strike a balance between sufficient structure to enable respondents to deliver on their experiences without ‘loading’ their responses or telling them what to say.

Theory development began with acknowledging the constructs of social capital and resilience as a ‘starting point.’ In a way these may be regarded as assumptions or pillars of a priori knowledge that have been persuaded by the relevant literature. If the aim of the research was to further develop either of these constructs in isolation, then this approach would be against the basic principles of grounded theory development. However this is not the aim; the aim is to develop grounded theory of ways in which social capital can be exploited for building resilience as this is the ‘space’ in which a potential for making an original contribution to knowledge has been identified and where the research questions are posited. In accepting this, one accepts that at some point the coding will include or be related to the factors or dimensions that pertain to both social capital and resilience. But it is the themes or ‘enablers’ that emerge between these constructs in the development of new theory that represent original contribution to knowledge.

The second problem, related to the first - the approach to coding, required a decision regarding whether to code to construct or otherwise. In the spirit of grounded theory development the approach was to avoid this temptation and let the coding emerge naturally from the data whilst at the same time expecting at some point, codes or concepts would be related back to construct as this is the purpose of the research.
As anticipated, there came a point when many codes but not all, were relocated under dimensions pertaining to social capital and resilience. In a sense there has been a mish-mash of two approaches to coding. Given the nature of the overarching research question, it is argued that this is an example of when a purist admonition is inappropriate and can be ignored (Suddaby, 2006, p. 638). Another reason for the change of tactic came about from thinking ahead about how the findings would best be presented. Data positioned under the dimensions of one construct appears to be a practical way of showing how elements of that construct can be exploited for developing another construct - resilience. But again it is stressed that it is the themes that emerge between these constructs in the development of new theory that represent original contribution to knowledge.

3 & 4) Conceptualization and Cataloguing Concepts

Although conceptualization and cataloguing are suggested as two separate stages, this seemed to be more effective when carried out more or less at the same time. When initial coding of concepts was attempted as a separate stage, the process resulted in lots of ‘micro’ data that seemed to lose its meaning. It was felt that the stories given by the respondents made much more sense and embodied more meaning without being deconstructed than when they were deconstructed.

When transcriptions were re-read as the grounded theory process suggests, there seemed to be minimal if any misinterpretation of what had been said and captured. One explanation might be that there had been such an intense interface or ‘closeness’ with the data immediately following collection through field note taking, post interview/observation note taking, and in particular, a second listen to recordings within twenty four hours of data collection when additional ‘hot notes’ were made. However, constant comparison through re-reading or reconsidering the data is at the heart of grounded theory development and although intense interface with the data may reduce misinterpretation, it does not or should not substitute the process of constant comparison as this is the route to deeper meaning.

Although this part of the coding process may sound like a relatively smooth adjustment to the prescribed method, it initially caused great stress as if it was being done wrong or in a way that would not stand up to scrutiny. It was felt that another visit to the grounded theory literature was necessary to check on procedure. It was at
this point that the researcher became aware of much of the critique. After much contemplation, satisfaction was reached with the idea that research method does not necessarily have to rigidly follow prescription. The setting or the nature of the research might also influence the method. More important is the requirement to evidence quality of the research through evaluation criteria.

In terms of reflexivity, consideration was given to why this part of the method caused so much stress. Perhaps the apparent need to comply with prescription can be traced back to a previous career in a disciplined service. Perhaps for some individuals, in certain situations, for example when being assessed, there is a tendency to attempt to do things right, rather than do the right things. These thoughts were taken forward as a reminder to help avoid slipping into what may be a ‘comfort zone’ during future episodes of difficulty that may present whilst conducting the research.

Corbin and Strauss (2008, p.67) discuss a raft of analytic tools. Some of these tools or techniques were used with more or less consciousness during different stages of the research; a notion that seems to be supported by Easterby-Smith et al., (1991) who suggest research and analysis in qualitative data is about ‘feel’ rather than systematic process. For example, regarding ‘the use of questioning’, a minimalist use of specific questions during interviewing has already been discussed, but posing questions at the data itself such as ‘what do respondents mean when they use the term – pleasant working environment’? can facilitate a deeper level of inquiry and subsequent analysis. The strategy of ‘making comparisons’ was used to compare on-site progress meetings in two of the Highways Agency’s areas. This was recommended by a specialist contractor who suggested the level and nature of contractor engagement differed between the two areas. Making comparisons between observations was a useful analytic process leading to new questions that needed to be explored. Another analytic technique is ‘looking at language’. This was not a planned strategy as such, but when contractors refer to the Highways Agency as ‘the grown-ups’, it seemed to imply the contractor community felt that the HA treated them like children, or that they were untrustworthy, or needed constant supervision. Looking at language was also a useful tool for data analysis and generated further inquiry. Using the flip-flop technique was not a conscious strategy for data analysis, but at times happened naturally. For example, in the data there is much about resource sharing. What would happen if contractors were unwilling to share
resources? What motivates resource sharing? Using the flip-flop technique, this was one issue that exposed the nature of network ties that could be exploited for mutual benefit and the resilience of the community. Looking for the ‘negative case’ or the exception to what seems to be general can be a useful strategy to access alternative ‘world views’. Whilst many of the community members expressed positive experiences from being part of the contract framework, one second tier supply chain partner offered extremely negative accounts, despite being a firm that draws the majority of their work through the framework. It became apparent that he simply wanted to be more involved. One technique that is not described by Corbin and Strauss (2008), and does not seem to appear anywhere else is ‘looking for tensions’ in the data. One tension that became apparent early on and prevailed through the research was a tension between control and collaboration within the contractor community. This was a particularly useful tension to explore with links to the history of the construction sector, the suitability of individuals for working in a community contract framework, and other reasons influencing ability or willingness to engage in the community element of the contract framework. Linked to the tension between control and collaboration, was another strategy for data analysis – ‘drawing upon personal experience’. In a previous career in the Fire Service, and previous studies of change management and leadership in that organisation, the researcher was able to draw upon those experiences to obtain insight into what the participants were describing. For example, although not everybody agrees, most people seem to agree there is a place for both control and collaboration – the challenge is achieving the right balance. At different times and to varying degrees, each of these analytic tools has been used to analyse the data and contribute to theory development.

5) Recoding

Many of the sub concepts appeared in one or more of the higher level categories. Through a messy process, aided by computer software, codes were re-assessed, collapsed or expanded as appropriate for best location in building themes.

At the same time as wrestling with what was the best or most appropriate way to go about coding, higher level abstract meaning was beginning to take shape in terms of how social capital can be exploited for building resilience. There seemed to be trends in the data related to the longevity of contractor relationships, continuity of work; the
level of participation in community initiatives, community interdependence, and peer pressure within the social structure.

A revisit was made to the social capital and resilience literatures for a fuller understanding of some of these factors. Nahapiet and Ghoshal (1998, p.256) discuss four inter-related factors shaping the evolution of social relationships – time, interdependence, interaction, and closure. This was a tentatively reassuring time to have identified similar factors to these as potential mechanisms for linking social capital with resilience.

6) Linking

Although the approach allowed meaning to emerge from the data rather than simply coding to construct, at the same time memos were attached to many of the coded sections of data suggesting possible links between social capital and resilience. For example, in recognising the Early Contractor Involvement (ECI) initiative as a means of influencing contractor collaboration, it could also be recognised as a structural dimension of social capital, enabling the structure for network ties to be established and maintained. In terms of resilience, ECI seemed to provide the environment or enabling conditions for multi-disciplined actors to exercise bricolage, wisdom, respectful interaction, and the development of virtual role systems (Weick, 1993). But these sorts of links needed deeper understanding of what was happening. In line with Glaser and Strauss (1967), the approach involved standing back and asking broad questions such as ‘what is going on here?’ Through this reflection, the deeper common themes that seemed to explain how social capital was, or could be exploited for resilience in this particular context emerged.

7) Re-evaluation

When to stop data collection and analysis? In terms of data collection, access to the on-site research setting was restricted to a three month period. Potentially, this could have been a limitation as the data collected was in part, determined by time rather than adequacy. However, at the end of the three months it felt as if nothing new was being gathered. Interviews continued for an additional month where an end to data collection was self-imposed. Again, if insufficient data had been collected by this time this would have been a severe limitation of the research. Some weeks before
data collection ended, it was apparent that the interviews were suggesting little if anything new. Because grounded theory uses iteration and sets no discrete boundary between data collection and analysis, saturation is not always obvious. According to Glaser and Strauss, saturation is a practical outcome of a researcher’s assessment of the quality and rigour of an emerging theoretical model (Suddaby, 2006, p.639). In real terms, it felt unlikely that anything significantly new would emerge. A judgement was made that the data collected along with the progress with theory development was sufficient to respond to the research questions.

Evaluation

There is consensus that qualitative research cannot match the canons of positivism (Bryman, 1989, p.26; Hammersley and Atkinson, 1995, p.6). The research community now generally recognises that rationales and the supporting criteria for various inquiries will differ (Marshall and Rossman (2006, p.199). Nevertheless, concern remains over what criteria should be used for evaluating qualitative research.

“… everyone agrees evaluation is necessary but there is little consensus of what the evaluation should consist. Are we judging validity or would it be better to use terms like rigor… truthfulness… goodness… or integrity when referring to qualitative evaluation?” (Corbin and Strauss, 2008, p. 297).

For evaluating grounded theory research Charmaz (2006, p.182) suggests credibility, originality, resonance, and usefulness as criteria. These are endorsed by, and carry much of the detail of Corbin and Strauss’s (1990) procedures, canons, and evaluative criteria for grounded theory research.

Lincoln and Guba’s (1985) evaluation criteria are widely cited by researchers for establishing rigour in qualitative research. They identify four useful principles:

- Credibility – authentic representations of experience
- Transferability – fit with contexts outside the study situation
- Dependability – minimization of idiosyncrasies in interpretation; Variability tracked to identifiable sources
• Confirmability – extent to which biases, motivations, interests or perspectives of the inquirer influence interpretations

The criteria are analogous to the traditional quantitative standards of validity, generalizability, reliability, and objectivity. Yet similarities regarding the principles to which both sets of evaluative criteria appeal should not be interpreted as a licence to use quantitative criteria to evaluate qualitative work or vice versa (Baxter and Eyles, p.521).

Lincoln and Guba’s (1985) principles have been employed to help guide and evaluate this research. A decision to employ this criterion has been persuaded by their useful presentation of a list of strategies for enhancing rigour against each criterion, which also allows the reader to connect the criteria to the philosophical concerns about epistemology, ontology and methodology as well as to the research process itself. These are shown in Table 3.2.

Table 3.2 Evaluation criteria and definition, philosophical assumption, and strategies or practices to satisfy the criteria (Lincoln and Guba, 1985).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
<th>Assumptions</th>
<th>Strategies/practices to satisfy criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility</td>
<td>Authentic representations of experience</td>
<td>Multiple realities</td>
<td>Purposeful sampling, Disciplined subjectivity/bracketing, Prolonged engagement, Persistent observation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Causes not distinguishable from effects</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Empathetic researcher</td>
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<tr>
<td></td>
<td></td>
<td>Researcher as instrument</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emphasis of the research endeavour</td>
<td></td>
</tr>
<tr>
<td>Transferability</td>
<td>Fit within contexts outside the study situation</td>
<td>Time and context-bound experiences</td>
<td>Purposeful sampling, Thick description</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not responsibility of 'sending' researcher</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of information for 'receiving' researcher</td>
<td></td>
</tr>
<tr>
<td>Dependability</td>
<td>Minimization of idiosyncrasies in interpretation</td>
<td>Researcher as instrument</td>
<td>Low-inference descriptors, mechanically recorded data, Multiple researchers, Participant researchers, Peer examination, Triangulation, inquiry audit</td>
</tr>
<tr>
<td></td>
<td>Variability tracked to identifiable sources</td>
<td>Consistency in interpretation (same phenomena always matched with the same constructs)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple realities</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Idiosyncrasy of behaviour and context</td>
<td></td>
</tr>
<tr>
<td>Confirmability</td>
<td>Extent to which biases, motivations, interests or perspectives of the inquirer influence interpretations</td>
<td>Biases, motivations, interests or perspectives of the inquirer can influence interpretation</td>
<td>Audit trail products, Thick description of the audit process, Autobiography, Journal/Notebook</td>
</tr>
</tbody>
</table>
Informed by espoused philosophical assumptions, the various research practices employed in this research are linked to Lincoln and Guba’s (1985) evaluation criteria.

**Credibility**

Definition or description

- The degree to which a description of a human experience is such that those having the experience would recognise it immediately and those outside the experience can understand it (Lincoln and Guba, 1985).
- Indicates findings are trustworthy and believable in that they reflect participants’, researchers’, and readers’ experiences with a phenomenon but at the same time the explanation is only one of many ‘plausible’ interpretations possible from the data (Corbin and Strauss, 2008, p.302).

**Purposeful sampling**

Influenced by a philosophical assumption of multiple realities, the purposeful sampling strategy included three tactics. First, there was an element of ‘stratified sampling’ to access members of both the formal community (first tier contractors, contractually related to the client) and members of the non-formal or extended community (second tier contractors with no contractual relationship with the client). Stratified sampling is useful in constructing commonalities and differences in interpretations across groups or communities. Second, as the number of first tier contractors involved on the focus project was relatively small, it was, in the first instance a case of engaging with those who were willing to participate. This may be regarded as ‘convenience sampling’. Fortunately, at least one manager from each first tier contractor agreed to participate. A limitation of convenience sampling can be that the informants may have limited capacity to comment on issues relating to the research. Two of the seven first tier participants loosely fall into this category. However, this in itself was a useful insight into the ‘buy-in’ of those individuals to the community contract framework. A third tactic was to pursue snowballing. This method of sampling can be risky as there is no certainty of securing access to a
purposeful or theoretical sample. But the approach here was an informed approach following discussions and requests made to first tier managers to be introduced to some of their supply chain partners (second tier contractors).

Disciplined subjectivity

‘Disciplined subjectivity’ describes the practice of being mindful of one’s own ethnocentricity and bias (Erickson, 1973), a concept that seems to have similar meaning to reflexivity. Throughout this research there has been much emphasis on continuous reflexive evaluation. Examples of reflexive evaluation in the field have included awareness of the role of critic; the need for promptness when attending site meetings and interviews; feelings of discomfort when participant rapport and confidentiality may have been jeopardised. Examples of reflexive evaluation during data analysis and theory development included recognising one’s own ‘disciplined’ socio-historical background as a likely influence over a hesitation to depart from prescribed method, even though the method might not have been appropriate or fit for purpose.

Prolonged engagement and persistent observation

‘Prolonged engagement’ can be considered as providing scope and ‘persistent observation’ can be considered as providing depth to the research endeavour. The temporal engagement of three months with the focus community was agreed with a gatekeeper prior to accessing the research setting. This strategy carried an element of risk, as it could have taken longer, if at all, to have established acceptance by the community. However, after only two or three encounters there was a feeling of acceptance by the community and rapport began to develop. The engagement was sufficient to learn much about the culture of the community and to investigate possible misinformation/distortions from the participants or by the researcher. For example, early stories of free-riding by some community members were attributed by other members to a lack of interest or support for the community element of the contract framework. During the engagement, it became apparent that there were acceptable and legitimate reasons for variable levels of buy-in by contractors. In terms of providing depth, the type or level of observation is best described as interrupted participation (Easterby-Smith et al., 1991) rather than persistent observation. But the point Lincoln and Guba make here is that the observation
involves focusing on the things that count to enable the research questions to be answered. The purposeful sampling strategy was a key part of getting to the ‘things that count’.

Triangulation

It is argued here that this research ‘more or less’ accommodates constant triangulation. The continual comparison aspect of grounded theory development is the same as what Denzin (1978) terms ‘source triangulation’. For example, the comparison of two different respondent’s interpretations, along with ‘researcher as instrument’ creates triangulation. Method triangulation was also useful in comparing the credibility of the findings. The research employed multi-method data collection – the gathering of documentary evidence, complete observation at on-site meetings, and participant observation via interviewing. Another type of triangulation is investigator triangulation where having more than one researcher serves to triangulate the research space. This however, is a sole researcher endeavour.

Peer debriefing

Although the views of a respected colleague can be a useful method of checking or assessing the credibility of one’s work, for example, identifying potential areas of misinterpretation, there is also the danger of disagreement, or that one person may defer to the perceived power of influence of the other. Whilst there was no peer debriefing of actual data, many conversations with a couple of respected ex-colleagues were useful for example, for gathering their opinions on transferability of emerging ideas.

Negative case analysis

Throughout the research the researcher and methods employed were receptive to ‘the exception to the rule’. Grounded theory promotes the further exploration of both convergence and divergence in respondent interpretations of their world in search of deeper and multiple meanings. Although many of the contractors in the community expressed positive experience of working within the contract framework, one supply chain partner, an apparent ‘exception to the rule’ had nothing positive at all to say about the contract framework. When allowed to tell his story there appeared to be
insightful and legitimate reasons for his view which contributed to the emergence of constructs and formed part of the developing theory.

Member checking

This strategy involves checking the adequacy of constructs with the respondents from whom the data were collected. Implicit in this strategy is the idea that interpretations are more credible if they are meaningful for both academia and the focus group itself. Although there may be a risk of interpretive conflict between the researcher and respondent, Borland (1991) suggests without member checking there is a danger of merely fitting data into preconceived theories/frameworks with which we are comfortable. During the research, member checking occurred in at least three ways. First, as part of interview technique, to ensure the adequacy of the researcher’s interpretation of a respondent’s words, a confirmatory question might be asked. Second, after interview recordings had been transcribed they were returned to respondents to check the content was as the respondent intended. Third, chapters of findings were returned to respondents with their own quotes highlighted. In this way, not only does the author verify the highest level of interpretation, he shows the respondent how their comments fit into the analysis (Baxter and Eyles, 1997, p.515).

Transferability

Analogous in principle to generalisability or external validity, ‘transferability’ refers to the degree to which the research findings will apply within contexts outside the study. In qualitative research, although there may be an assumption that experiences and meanings are bound to the time, people, and setting of the particular study, it is possible that those meanings may be common in another setting. However, as Marshall and Rossman (2006, p.201) note, the burden of demonstrating that a set of findings applies to other contexts rests more with the researcher who would make that transfer than the original researcher. Lincoln and Guba (1985) identify these roles as the research ‘sender’ and ‘receiver’.

Within this research, the fine detail is context specific, but it is suggested that the broader emergent themes are worthy of further exploration in other organisational settings. For example, from a theoretical perspective the findings relate to social
organisation which more or less applies to all organisations. From a practical perspective, national and international resilience is high on the UK political agenda. Elements of the research findings here, in a multi-disciplined community of construction contractors, may be ‘useful’ (Charmaz, 2006, p.183) to a multi-disciplined community of emergency response agencies.

Purposeful sampling

As well as being a strategy for establishing research credibility, rich description and subsequent interpretation gathered through purposeful sampling can be used as a means of helping a ‘receiver’ decide whether the findings of a research endeavour are useful to apply in other or similar situations.

Dependability

Dependability accounts for changing conditions in the phenomenon chosen for study and changes in design responding to an increasingly refined understanding of the setting. This is different to positivist notions of reliability that assume an unchanging universe where inquiry could, quite logically be replicated. Within the qualitative/interpretive paradigm, there is an assumption that the social world is constantly being constructed and that the concept of replication is itself problematic (Marshall and Rossman, 2006, p.203). Baxter and Eyles, (1997, p. 516) assert dependability includes the consistency with which the same constructs may be matched with the same phenomena over space and time but is largely concerned with documenting the research context. Dependability thus refers to whether one can track the procedures and processes used to collect and interpret the data. Although the criteria of credibility and dependability are different, the strategies employed for establishing credibility are similar to those for establishing dependability. This chapter has attempted with transparency to show how the various stages of the research have been undertaken. Changes in research design have been noted during for example, the approach to coding. Another example in terms of the changing conditions in the phenomenon chosen for study is unanticipated access to a second construction site to be able to make comparisons of on-site meetings. In ethnographic studies it is generally accepted that the ‘road ahead’ carries with it some uncertainty.
in terms of research orientation. An attempt has been made here to provide an accurate as possible log of the entire journey whilst at the same time providing continuous reflexive evaluation.

**Confirmability**

Confirmability, similar to the traditional notion of objectivity in the positivist paradigm, focuses attention on both the investigator and the interpretations. Lincoln and Guba (1985) stress the need to ask whether the findings of the study could be confirmed by another. In other words, do the logical inferences and interpretations of the researcher make sense to someone else? Integrated within a description of the various research activities has been an attempt to provide continual reflexive evaluation and transparency to assist the confirmation of interpretations by someone else.

Summary reflection

It seems apparent that the Lincoln and Guba’s (1985) evaluation criteria are highly inter-related. Many of the strategies and practices suggested for establishing credibility extend to evaluating transferability, dependability, and confirmability. These criteria however, do not speak in any depth of reflexive evaluation. With reflexivity at the fore of social research, it would appear that almost twenty five years on, this may be a limitation of Lincoln and Guba’s criteria. Having used the criteria here, there is now a fuller appreciation of scholar’s comments and views regarding the difficulty in deciding of what evaluation criteria should consist.

**Chapter Summary**

This chapter started with a brief outline of the debate concerning the most appropriate philosophical position for social science research. Underpinned by social constructionist philosophy, an ethnographic study best describes this research with much emphasis placed on continuous reflexive evaluation, rather than attempting to separate the researcher from the researched. The content of an email to an initial gatekeeper shows the intentions of working with the community rather than in
isolation. After recapping on the research problem, the methods and justification were presented in terms of the research setting, access, and field relations including promptness, avoiding the role of critic, and the potential stresses and strains of fieldwork. The methods for data collection included observation, interviews and documentary evidence. An outline to the data collection ended with the importance of maintaining links for further research opportunities. The development of theory described and justified a variation of grounded theory that acknowledged the importance of ‘feel’ as much as the restoration of a method that is reputedly losing its integrity. The development of theory was guided by an interpretation of grounded theory method by Easterby-Smith et al., (1991). Lastly the application of Lincoln and Guba’s (1985) evaluation criteria helped to guide and evaluate the research.

The next chapter delivers two preliminary case studies followed by the main case study.
Chapter Four

Case Studies

This chapter comprises two preliminary and the main case studies. The analytical framework constructed from the resilience review and Nahapiet and Ghoshal’s (1998) social capital framework are applied in exploring how organisations can exploit their social capital for building resilience. The first preliminary case is a business community’s experience of coping with an episode of severe flooding at an industrial park in Gloucestershire in 2007. The second is the reconstruction of a crash site following a train derailment in Cumbria also in 2007. These are followed by the main case study which explores social capital and resilience within a community of construction contractors. Figure 4.1 depicts chapter four’s ‘position’ within the thesis and contribution to knowledge.
Objective 1

Identify ways in which organisations exploit their social capital for resilience

Gap in knowledge between constructs

Opportunity to transfer knowledge from another field

Meeting objectives

Chapter Four - case studies identify ways in which organisations exploit social capital for building resilience

Research contribution - adding new knowledge, transferring existing knowledge, and tackling problems that interest practitioners and policy makers

Figure 4.1 Chapter four’s ‘position’ within the thesis and contribution to knowledge
Preliminary Case Study – Industrial Park

Box 4.1 Case Study – Industrial Park

This case study involved a Regional Development Agency (RDA) working with a business group of approximately fifty small businesses on an industrial park. The RDA provided general business advice and assistance such as training opportunities to local businesses and helped to establish a network where businesses could engage in collective purchasing to reduce material costs. In 2007, when many business premises on the industrial park suffered an episode of severe flooding, the social networks developed for growth and development became the source of several accounts of collective action and the maintenance of positive adjustment under challenging conditions – resilience (Weick et al., 1999).

In 2007, following prolonged rainfall much of the UK suffered the effects of flooding. Shortly after the floods, an opportunity emerged to learn how a number of small businesses on a Gloucestershire business park coped during the floods. A business group had recently been established as part of a regional development initiative. The expanding social capital and resource network enabled firms to draw on each others’ resources during the floods. For example, one business group member contacted another who was a competitor asking for the use of spare office space. The space was offered and accepted. The two members had not known each other prior to the business group being established. This experience has had at least two effects. First, it has enhanced social capital as the member providing the resource feels a favour or obligation will be reciprocated should the need arise. Second, the experience has changed the attitude of the member providing the office space. Prior to the flood he avoided competitors which he perceived as a threat. Now, with an ‘attitude of wisdom’ (Weick, 1993) the member actively seeks competitors through networking recognising the potential for mutual benefit. It appears that being exposed to threat or hazard and the experience of dealing with it has made the business group or at least some individuals stronger and more resilient as the social capital is deeper, the resource network is broader and potential action inventory more varied (Lengnick-Hall and Beck, 2003, 2005). In addition, through broadening their
network, members of the business group have sought to reduce insurance policy premiums through collective purchasing arrangements. Primarily a cost saving exercise, the ‘knock on’ effect is that firms are encouraged and willing to play a more active role in site security because this helps keep premiums down. An outcome is that break-ins have reduced most likely because of the collective security awareness that now exists.

Other examples of social capital on the industrial park include a reciprocal arrangement by adjacent firms in providing a base for implementing basic business continuity measures such as use of storage space, telephones and computers. Although the business group had been established for less than a year, the new network links and potential resource exchanges that have formed are shaping behavioural norms within the group which in turn carry expectations and obligations for reciprocity. The structural and relational dimensions of social capital are reinforced through stories of mutual benefit. People are more willing to talk to each other, to learn, and pick up useful local tacit knowledge. Discussing a ‘pool’ of electrical contractors, one business group member described how the contractors pull together to ensure continuity of work. The arrangements are informal without any contracts:

“It works because they see each other on a regular basis; they know each other and trust each other - up to a point. They bid for the same work and compete with each other, but it doesn’t stop them from actually working together” (business group member)

One lesson that may be learned from this study concerns what Coleman (1990) terms ‘appropriable organisation’ which he defines as organisation established for one purpose that may be appropriable for another purpose. Rather than, or in addition to attempting to establish new networks or means of building resilience, organisations across all sectors may consider identifying networks or ‘organisation’ already in place which may provide a source of social capital that may be appropriable for building resilience.
Preliminary Case Study - Network Rail

Box 4.2 Case Study – Virgin Derailment

In February 2007, a Virgin train derailed at Lambrigg in Cumbria (UK) causing one fatality and injuries to many others. The crash occurred in a remote location; contractors had to contend with building a temporary road across farm land to give access to trucks, heavy plant, and other response and recovery resources. The train derailed down a large embankment that required reconstructing along with overhead line equipment, drains and fencing. There were also environmental concerns and constraints as the crash site was an area of special scientific interest.

During the reconstruction, the site accommodated up to four hundred contractors at any one time. Contractors worked round the clock for 420 hours, passing over 400,000 safe man hours. According to a lead contractor, a planned approach to a project of this size and complexity could have taken up to two years. However, the reconstruction was achieved in two weeks. The lead contractor also claimed to have carried this out without affecting existing programmed work on the rail network. The swift and resourceful recovery and reconstruction of the crash site may be seen as the maintenance of positive adjustment under challenging conditions – resilience (Weick et al., 1999).

The relationships within the Network Rail contractor network appear to be a significant contributor to the swift and safe reconstruction of the crash site and are an indication of social capital network ties and configuration. Contractors are in competition with each other, to win contracts from Network Rail. At the same time there is a network community operating across the competition that embodies a functional habit (Lengnick-Hall and Beck, 2003) whereby key individuals within the contractor community maintain an awareness of resource availability including information, expertise, human and physical resources. Knowledge and resources may be accessed through informal network ties for the mutual benefit of the contractor community. The network configuration may be illustrated as vertical and horizontal integration (Figure 4.2).
The relationship between Network Rail and their contractors is vertical, contractual, more formal, representing a ‘strong tie’, or a control relationship. Strong ties can be effective in the transfer of known information, such as necessities for working within the highly regulated rail industry. The horizontal integration represents informal community (structures that are often not officially recognised by the organisations they permeate), relationships of ‘weaker ties’ or loose coupling, without necessarily the need or presence of external control. Loose coupling implies a loosening of control which can be more effective when there is a search for information.

Participation at Lambrigg was not pre-planned. With the lead contractor engaging up to forty subcontractors at any one time there would have been a high level of searching for information through less formal or horizontal network ties as well as the known information being passed via formal channels. It appears that network ties and configuration - structural dimensions of social capital, contributed to broad and rapid information processing (Sutcliffe and Vogus, 2003) and in turn the resilience shown during the reconstruction.

Resilience implies a capacity to adapt. Staber and Sydow (2002) propose three dimensions; multiplexity, redundancy, and loose-coupling can influence
organisational adaptive capacity. There is evidence of redundancy in the Lambrigg reconstruction. Redundancy was evident in broad job descriptions. For example, design engineers normally tasked with routine desk jobs were mobilised in emergency response roles reflecting broad job descriptions. The large number of contractors deployed at Lambrigg did not result in interruptions to other programmed network maintenance work. The contractor network accommodated sufficient redundancy to reflect an adaptive capacity.

At the surface, the case study suggests the relationships between Network Rail and its contractors, and the relationships between contractors exist with some independence but appear to complement each other. Trust, a relational component of social capital, appears to have played a role in the integration of vertical and horizontal network relationships. For example, describing the relationships within the contractor network, a lead contractor claimed “We are all mates… we trust each other… we have been issued awards for jobs…” Again, this suggests a link between social capital and network resilience.

Prior to the derailment Network Rail had been investing in ‘supplier development’. Supplier development has been defined as any effort by an industrial buying firm to improve the performance or capabilities of its suppliers (Krause et al., 1998). To some extent this resembles Toyota’s strategy for a knowledge sharing network. In the 1940’s, Toyota established a supplier association (kyohokia) to promote ‘mutual friendship’ and the exchange of ‘technical information’ between Toyota and its suppliers (Dyer and Nobeoka, 2000). Historically much of Network Rail’s work has been subcontracted out via a small number of lead contractors. This traditional method of procuring work has proven costly, not only in terms of the layer upon layer of costs incurred for subcontracting, as large contractors do not necessarily carry all their own labour, but also unsatisfactory standards in performance - safety and efficiency. As a result, Network Rail engaged in supplier development to drive down sub-contracting costs, improve safety and enhance performance.

It is feasible that the supplier development investment contributed to Network Rail’s ‘performance’ and ‘adaptive’ systems which Robb (2000) claims organisations must manage simultaneously to build resilience. In the performance system, contractors have to bid for work. In an open bidding arrangement, firms can put a lot of effort
into bids without necessarily winning a contract and without getting any feedback. If a contractor is repeatedly being out bid, Network Rail may offer guidance in areas where they need to improve their costing to become competitive. By maintaining good contractor network relationships, Network Rail influences an informed and consistent contractor bid range which helps it maintain a resourceful pool of contractors, which in turn provides some slack or redundancy (adaptive capacity) in the network should there be a high demand on contractors, for example, following a derailment. By maintaining good network relationships Network Rail has facilitated some network ownership of key performance indicators (KPI) which the contractors work to. For example, at a contractor workshop, to ensure Network Rail has got meaningful data in terms of performance, it requested the contractors (in groups) to consider certain KPI’s. The contractors came up with ‘yardsticks’ for the KPI’s. By giving an element of ownership of the procurement process to the contractor community, Network Rail appears to be creating the conditions that shape the cognitions i.e. shared codes, relational norms and foundations for trust (cognitive and relational social capital). Inkpen and Tsang (2005) argue that when members of a network share a common understanding and approach to achievement of network tasks, goals are more likely to become shared. Conversely, when goals and values are incongruent, interactions between parties can be expected to lead to misinterpretation of events and conflict. Contractors still have to bid for work and whilst competition between contractors can limit the extent to which they are willing to cooperate or share information, in the main, once a contract has been won, which most often means firms working collectively, behaviour changes and becomes more collaborative, especially in a crisis or emergency. One explanation for this is the influence of a common identity. Kogut and Zander (1996, p.502-503) contend a shared identity does not only lower the costs of communication, but establishes explicit and tacit rules of coordination. But Network work Rail stress contractor relationships are anything but ‘cosy’. “Any contractor not playing by the rules will be removed from the contractor list.” (Network Rail Manager)

Another event exhibits trust and obligations in Network Rail’s contractor network. A number of contractors were experiencing difficulty in bringing a time constrained project to completion – the job was in danger of ‘going wrong’. Network Rail requested assistance and expertise from contractors who had been part of the supplier
development programme. The contractors attended within an hour to help manage the critical situation.

“There was no need for an order number as such, as there is sufficient trust between Network Rail and the contractors to know that that sort of thing will be back managed” (Network Rail Manager)

Network Rail was able to obtain raw materials ‘out of hours’ on a Sunday night and bring the job to a successful conclusion. This may be seen as reciprocity or an ‘obligation’ to Network Rail for their investment in supplier development; in bringing contractors up to speed on issues that enable them to operate in the regulated environment.

These observations might seem unrelated to the Lambrigg reconstruction performance. Although Network Rail’s investment in network supplier development was primarily driven by cost reduction and improved routine contractor performance, it appears that in addition to the vertical and horizontal network integration discussed, the resilience shown by Network Rail and the wider contractor network at Lambrigg may in part, have been a manifestation of the social capital developing as an emergent property of the ‘supplier development’ investment programme. This would be what Coleman (1988) terms ‘appropriable organisation’. Coleman sees the creation of social capital as largely unintentional processes, emerging mainly from activities intended for other purposes. Another type of social structure that Coleman sees as especially important in facilitating various forms of social capital is one that creates closure in the social network, so that all actors are connected in a way that obligations as well as sanctions can be imposed upon its members. It may be that the swift and collective action of the contractor network at Lambrigg was considered obligatory in return for Network Rail’s ‘supplier development’ investment. A degree of KPI ownership afforded by Network Rail to the wider contractor network or community may have contributed to a shared identity, establishing common explicit and tacit network rules. Further, failure to abide by network rules may trigger the imposition of sanctions.

Each of the two preliminary case studies provides some evidence of various elements of social capital being exploited for the maintenance of positive adjustment under challenging conditions – resilience (Weick et al., 1999). The industrial park case
suggests the development of social business networks can foster favours that may be reciprocated in times of need; collective action that can raise security awareness; and the potential exploitation of appropriable organisation for resilience building. The Network Rail case suggests Network Rail and its wider contractor network were able to exploit their social capital for the resilience demonstrated during the swift and safe reconstruction project. The case shows how formal and less formal social business relationships can be complimentary. There appears to be much trust in the network. Trust is embodied in behavioural norms, obligations and expectations between actors who abide by ‘the rules’. Dishonesty or opportunism can result in the imposition of sanctions or being removed from the contractor network. The case suggests how engaging contractors in network activities such as the KPI development process helps to create shared cognitions and identity, which in turn establishes explicit and tacit rules of coordination. In line with Coleman (1988), the case has also shown that social capital emerged as a by-product of another process. The ‘supplier development’ programme undertaken by Network Rail appears to have contributed to the development of network social capital manifesting an obligation to respond and engage in the collective effort needed during the reconstruction.

Although the two preliminary case studies show some evidence of various elements of social capital being exploited for building resilience, neither provides the appropriate depth or breadth for a main case study. The preliminary findings combined with already having identified underdeveloped knowledge in the literature at the social capital/organisational resilience interface confirmed the potential for making an original contribution to knowledge in a similar community context. The next section presents the main case study which explores social capital and resilience within a community of construction contractors.
Main Case Study - The Construction Management Framework

The main case study is different from the preliminary studies in that it is less about how social capital can be exploited for responding or adapting to a specific event such as an episode of severe flooding or a train crash, and more about how social capital can be exploited in the routine work practices and processes undertaken on a day-to-day basis for building resilience. Recall from the resilience review, Sutcliffe and Vogus (2003) assert resilience emerges from relatively ordinary adaptive processes that promote competence, restore efficacy, and encourage growth, as well as the structures and practices that bring about these processes.

Findings from the preliminary case studies identify social capital as a potential source for resilience. Both case studies exhibit aspects of ‘community’ within an organisational setting suggesting a business community or network would be a suitable setting for a full and rigorous main case study. An opportunity emerged to develop a richer analysis by researching a method the Highways Agency had developed for procuring work through their contractor network, which had the notion of ‘community’ at its core. This method exhibited various aspects of collective and reciprocal action such as the ability and willingness to share resources - resourcefulness that can be linked with resilience. A community of construction contractors working in partnership for the Highways Agency (HA) is the focus community of this case study.

When the HA was established in 1994 the procurement of highway maintenance was tendered on the basis of lowest price. The traditional contracting methods employed, however, resulted in poor performance and outturn project costs were typically 40% above the original tender (Ansell et al., 2009). In 1999, seeking to improve delivery of planned maintenance and improvement schemes, the HA introduced pilot schemes to trial a new approach to the procurement of works - the Construction Management Framework (CMF). The CMF concept is currently employed in two of eleven HA Areas.

The case study suggests how the CMF has enabled contractors to work in ways that are much different to the dog-eat-dog environment (respondent’s words) associated with traditional construction contracts. Where contractors once protected against sharing of information and other resources to maintain a perceived competitive edge,
they now seek improved performance in part, through the sharing of information and resources. With these exchanges come expectations of reciprocity and mutual benefit – resources that can be exploited for resilience.

**Traditional and Construction Management Frameworks**

In a traditional contract structure the client engages a principle contractor to undertake project management and to sub-contract out the various elements of work. Contracts are won on the basis of lowest cost, although outturn costs are much higher, resulting in conflict and low trust.

The CMF differs from traditional tendering in several ways. Project Designers, a Managing Agent Contractor (MAC), and first tier contractors (known as specialist contractors) have a contractual relationship directly with the HA. At the start of the fixed term contract framework there is a tendering process where specialist contractors must evidence competence, capability, and compliance with specific regulations. They tender for, and agree work prices with the HA for the duration of the framework rather than tendering for each project. As the framework has matured a derived pricing system has developed. A MAC coordinates the project and in this respect they resemble a principle contractor in a traditional structure, but in the CMF, the MAC along with the Project Designer is of equal status with the specialist contractors. The MAC and the specialist contractors share the same incentives to deliver a scheme on time and within budget. If they achieve this or make any savings the whole community share the rewards. If they fail, the community share the costs. The CMF structure creates interdependence between parties.

There is much emphasis on quality and continuous improvement through the ‘community’ approach to project delivery. The values that underpin the CMF were developed jointly by the HA and the contractors and reflect the community’s identity. As the contractual or ‘formal’ community are engaged for the duration of the framework they can secure a high degree of work continuity, a major benefit in a highly competitive sector.

Each community member gives a percentage of order value from the framework to fund a Community Management Team (CMT). These contributions fund three
people who monitor performance, identify areas for improvement, and promote initiatives to share better practices. Although unwritten, forming no part of any contractual agreement, members of the formal community are expected to participate in certain initiatives developed by the community to enhance performance. Participation seems to be influenced by peer pressure, which in turn is motivated by the incentive system.

Benefits and Advantages - Example Stories

Early Contractor Involvement

One of the key strategies employed within the CMF is Early Contractor Involvement (ECI) which brings together multidisciplinary contractors during the design phase of a project. Structurally, it establishes and maintains network ties between the various actors. Cognitively, it can be a means of nurturing and reinforcing shared codes and standards of work, and relationally it can provide a means of building trust. In terms of resilience, this kind of interaction can be a source of improvisation when problems emerge. For example, one respondent described how the group was able to develop a solution to a problem by adapting an idea from a previous project. The trust and relationships that are built early in a project encourages actors to engage and work collectively on routine works and emergent problems. ECI also enables contractors to learn of the problems and issues facing other disciplines. This process can be likened to the development of ‘virtual role’ systems (Weick, 1993) where one can anticipate the actions of another; a useful resource when faced with an interruption.

Benefit by Association

There is an understanding that if a contractor secures only minimal works through the framework they would not be expected to participate in community initiatives to the same extent as other contractors; one had no work via the framework for eighteen months of membership but voluntarily participated in the initiatives enabling him to learn from the better practices being developed which he could then exploit elsewhere.
Information Sharing

When a contractor rejected designer’s plans for a large construction scheme, he engaged with the designer to develop an alternative buildable solution. Learning of a similar problem on another scheme within the CMF, one being undertaken by competitors, he shared the new method with them, saving them from going through a similar time consuming process. When asked if this sort of behaviour would have happened in a traditional contract framework, the reply was “absolutely no chance” (r10) continuing, that he would expect the same sort of behaviour in return.

Facilitate Collective Innovation

Contractors face ‘problems’ every day which they routinely overcome. Within the community framework members are requested to log problems and solutions. These are evaluated and, if accepted, they are taken forward onto future schemes. Innovation was often talked about in the on-site tea room and carries real kudos.

These examples of organisational behaviour illuminate the ways in which social capital can be exploited for building resilience. The research observed firms able to exercise both competition and collaboration simultaneously. A supportive organisational mindset created the latitude to explore and exploit new ideas. Drawing on the relevant literature, the following sections explore how three dimensions (structure, cognitive processes, and relationships) of social capital (Figure 4.3) may contribute towards building resilience. Although the dimensions are separated for analysis, the reader is reminded that “many of the features are in fact, highly interrelated” (Nahapiet and Ghoshal, 1998, p. 243).

![Figure 4.3 Dimensions of Social Capital](image)
Social Capital - Structural Dimension

There are several specialisms within the CMF (carriageway surfacing, cathodic protection, concrete repairs, general civils, painting, safety fencing street lighting, and traffic management) and ECI brings these together. For example, one specialist contractor identified that the resilience of the CMF is grounded in the ECI, where actors have been a part of the planning process and had an opportunity to suggest alternatives and improve the project. The process of gathering alternatives creates a repertoire of responses that can be exploited in a given situation. The arrangements between the HA and the specialists are such that the community is interdependent. This makes the ECI a useful medium for specialists to explore areas where sharing resources such as plant, equipment and manpower might lead to improving project delivery.

“...ECI is a good process... it’s about getting together and planning a job with respect for everybody’s needs within that job” (r7)

“...a benefit of the ECI process is that you get to know how people work and how they think” (r10)

Off-line Groups provide another structure enabling resource transmission and the development and sharing of better practices. There are a number of offline groups (so called because their work is done away from the delivery of any scheme). Three main groups – process, culture, and measurement are supported by sub-groups – safety communication, innovation, supply chain integration, and the environment. Offline group membership is voluntary and not funded. There is no specific skill sets required for membership of an off-line Group, although passion was seen as a valuable quality.

“When we first started we wanted every member to have at least one or two people sat on groups... It needs to be people who have a passion for the area that they are getting involved in. There’s no point putting someone on the culture group who thinks in process terms. I think it becomes very evident those people who have a culture bias and those who have a process bias and I think the industry and our community needs all those people but, if you try and put a process person on the culture group, it doesn’t work” (r3)
Another structure encouraged in the community is ‘buddying’ where a specialist contractor can buddy-up with like contractors to share ideas and better practices. Often the ‘buddies’ are competitors, but CMF membership encourages contractors to share information and resources because they share goals underpinned by the community’s values.

“There is quite a bit of that. I used to sit down with the other civils guy and we used to go through things and he used to tell us where he was having difficulties and likewise” (r6)

Other simple mechanisms such as the co-location of contractors in shared site cabins pulls together diverse disciplines enabling them to interact and communicate more easily.

“Everybody’s in the same kitchen, same meeting room, in and out of each other’s offices. In effect, they’re all in the same office...If it were the old days, everybody would have a separate portacabin” (r2)

As well as creating channels for resource transmission, an aim of these community structures is to encourage interaction to promote an ‘equal voice’ within the community. Some of the CMF members would normally be considered second or third tier contractors on a traditional contract. For example, traffic management and safety fencing are normally second tier contractors, and at this level they would not normally be part of an ECI process or invited to sit on off-line groups; they would be given instructions without an opportunity to interact with other specialists and input at the design and planning stages of a project.

A powerful element of equal voice/status within the community is the harnessing of peer pressure, facilitated through performance review and feedback mechanisms which include contractor expectation questionnaires, and 360 degree contractor performance review sessions. The structures serve not only to maintain and improve performance, but more fundamentally reinforce the community’s values.

Specialist contractors have a direct contractual relationship or ‘strong tie’ with the HA, guaranteeing some work continuity over the life of the framework. Additional benefits include access to resource sharing with other community members who are also contractually tied to the HA. This strong tie represents a control relationship -
members are contractually bound to do certain things. However, although attendance at ECI, Off-line Groups and other activities can be beneficial to members, there is no contractual requirement to engage in any of these. There is an expectation that members will contribute to the community element of the framework.

Moving into extended networks, there is no formal contract between the specialist contractors and their suppliers; work tends to be undertaken on a job-by-job basis. Ties become weaker away from the centre, but this does not suggest that the weaker ties at the supplier level are any less important than the more formal stronger ties, towards the centre:

“In respect of getting the work done for the HA, they [suppliers] are probably more important than us [civil specialist] because they do the work...we wouldn’t have a clue how to go and put an expansion joint in that bridge. We haven’t got the resources to do it” (r1)

The HA is dependent on the specialist contractor’s own sub networks to provide the necessary resources to get things done.

The formal community are encouraged to promote and reinforce the CMF culture in their own supplier network.

“The way we see it is it’s not us and our supply chain, we’re all in it together and if they fail, that’s us that have failed...But some of our people, I have to say, they point the finger too much at our supply chain...You’ve allowed them to do that so it’s your responsibility as well as theirs. So it’s no use sitting back and telling the HA that it’s Fred Bloggs who’s failed, it’s you that’s failed” (r6)

Some specialists may engage only a small number of suppliers which can make it easier for them to promote the CMF culture within their own sub-network.

“We ask for the same people so when we have a road brush, we ask for the same road brush driver. The planer company we use only has 3 planers and about 12 operatives – we know them all. They’ve all been inducted into the CMF. They all know what we’re aiming for.” (r10)
Others suggest there is a limit on how far the CMF ethos extends in the wider network:

“We have to manage the interfaces of our sub contractors and there are a few key ones that are absolutely crucial to it who are involved and fully understand how we price and they price, how we get paid and how they get paid. They’re very clear on that so you could argue that the CMF does go one tier below us. Beyond that, no” (r11)

From the supply chain partner’s perspective, community commitment can be influenced by the amount of work received through the framework. If a supplier draws high value from the CMF they are more likely to commit to the community element of the framework. Conversely, if they get limited work continuity through the framework, they are less likely to commit.

Further tangled within the complexity of specialist/supplier relationships is the extent to which the specialist contractor is willing to engage or shield their suppliers from the community element of the framework. For example, although one supply chain partner draws 90% of their annual turnover through their engaging specialist contractor, he claimed to be excluded from community activities and any associated benefits.

“I don’t go to the site meetings. I’m not invited. No. I’ve never been to a progress meeting…” (r8)

One possible reason for this is that although the CMF has been running for about nine years, some of the members have retained the control mindset of traditional contracts. If this is the case then some members will likely be trying to exercise the control to which they are historically accustomed.

“…the traditional one, I prefer it when I’m in control of everything” (r1)

“It was the hardest for them boys to have to relinquish the fact that they weren’t in control…” (r10)

On the other hand, there are specialist contractors who actively engage their suppliers.
“Although our suppliers do not attend ECI meetings, the relationship with those suppliers is well informed. We hold pre-progress meetings with them and any issues or ideas that they might have would be voiced by me at ECI or progress meetings” (r15)

In summary, the CMF has a number of structural arrangements to facilitate resource and information sharing. As well as strong contractual ties there are a range of weaker ties which appear to enable the adaptability that is core to many definitions of resilience. As the quotations indicate the CMF is not perfect and not all members conform to the ideal. Developing and maintaining both social capital and resilience is an ongoing challenge.

Social Capital – Cognitive Processes

“I said if we could form a community of suppliers, contractors with a common set of values and objectives, then you could do some serious business. ...The concept was crystallised” (r9)

At the outset of the CMF, a workshop facilitated by the Community Management Team set about identifying community values with the aim of changing from the adversarial nature of the wider construction industry.

“...we picked 20 contractors... None had got a clue what CM was. And the very first workshop we scribbled up this thing called 'joining the community'. ...they all came and all we talked about was establishing our values. For a whole day we did nothing but establish boundaries... it had to be different, it had to be something with its own language... they had to own this stuff” (r9)

At least three building blocks may be seen, process, culture, and measurement, upon which the CMF concept has been built. These provide a template which helps align community behaviours:

“We have our building blocks. Process, which is what we do, we have culture which is the way we do it, and measurement which is how we prove it. And that's the basis of everything really... It's about aligning everybody” (r3)
The CMF has strived to create something different to traditional, adversarial contracts. Most have welcomed the change, others remain sceptical and have had difficulty in changing embedded behaviours. Some organisations have addressed this by selecting appropriate people/teams to work within the CMF.

“from our point of view I think it’s because we’ve got the right people involved in it... we’ve got some fantastic people that work for our company but you couldn’t have them on this. They’re too abrupt or abrasive. Good at what they do but they’re not for partnering. And similarly we’ve some people on CM that couldn’t cut the mustard outside of it because they rely on it being a close knit relationship and relying on others to help them and assist them” (r6)

“I’m here specifically to look after the CMF jobs... I came from *** who’ve always been renowned as being very contractual. And it took me a good 6 months to (1) buy into it, to say this does work rather than say it’s all flowery, trust etc and (2) get my head around not having to go with a piece of paper to the site manager and say we want to do this, we want to do that. It’s all about mindsets...They are completely different” (r10)

Although the community values including openness and honesty are promoted extensively, there remains reluctance from some members to use community resources. This suggests for some, shared codes are not as shared as they might be.

“For people who are struggling there are facilities there to say – we’ve got some machines and men, we can help. And that’s how it works... but the trouble is people are reluctant to put their hand up and say I’m struggling. People won’t do that, which they are meant to. They’re meant to be open and honest all the time” (r6)

Some of the language used by respondents suggests a strong alignment within the community. For example, one supplier claimed ‘it feels like a family here’, another ‘there’s no us and them’. This may represent some success by the Community Management Team who made a conscious effort to use language that unites the community, reinforces equal voice and standing, and provides a reminder of the benefits of the CMF over traditional contracts.
“We have created to a certain extent our own little language within the community which confuses people elsewhere. We call all our contractors specialists contractors... As well as our main members, our specialists, they all have their supply chain. We have a yellow pages directory of our supply chain members who we use but we call them supply chain partners, we don’t call them sub contractors. They work under a sub contract but the notion of subbies...you just don’t hear those words here... We’re always trying to level the playing field” (r3)

To reflect the difference between traditional contracts and the CMF, posters with symbolic meaning are positioned around construction sites that compare the struggle and disarray of a rugby scrum with the synchronised effort of an Olympic winning rowing team. Another poster compares two boxers with two relay runners handing over the baton. The boxers represent the ‘battle like’ claims process that contractors endure at the end of a traditional contract to recover extra costs incurred. The relay handover represents interdependence in the CMF and the need to work together:

“I don’t know if you’ve seen the posters around about the before and after. The before was a rugby scrum and the after it was Steve Redgrave. ...in the scrum everybody’s fighting for the ball. They’re all going different ways. With the rowing, you’ve all got to row together... They’ve got to believe that this is the right way. And if everybody does, that’s when everyone’s a winner” (r7)

Another feature of the CMF is an annual award presented to the project which has demonstrated outstanding performance, in particular with regard to continuous improvement.

“...[The] Phil Stanton Award each year goes to the team that’s performed out on site during the year and there’s a prize for that. That does quite a lot in terms of team building and in terms of competition and really getting the people out on site caring about it. That’s half the battle really. It’s getting the community spirit and that spirit of cooperation and working together down to the people who actually work on site that makes it very different” (r3)
“the award is a big in the framework, it’s got recognition... because everybody has worked to the framework standards. They’ve done what they said they were going to do... they’ve done everything that’s asked of them and more without going off on a limb doing their own thing, it’s been done for the community values” (r7)

The most frequent stories to be told by the respondents related to comparisons of hostility associated with traditional contracts and a better or ‘pleasant working environment’ associated with the CMF. This issue seems to be a key determinant of many other relational and behavioural issues such as a willingness to engage in resource sharing and collective action in general. Shared narratives relating to working environments can be a strong influence on community cognitions.

“It’s a better place to work...there’s less confrontation so less chances to mess up. And at the end of the day it’s all about money. Innovation is a lot about money. Where can we save money on this contract? If we can’t do it on this job, how do we make the next job better?” (r1)

“... 10 years ago it was an enormous void between the two. There was trading outside the CMF which was dog eat dog... it really was a mind your back situation. The CMF was completely the opposite. ...work together to deliver the job and price was almost secondary, you were expected to provide a good price for the job because you knew that it was a nice atmosphere to work in and you weren’t going to have to defend yourself against aggressive contracting... And there was more a kind of deliver the job atmosphere” (r4)

“...one of the best rewards for me is speaking to the guys out there, the guys who are chucking the cones and are really doing the work and they say they’d rather be here than anywhere else. You’re talking about guys who’ve had 40 years experience in the construction industry... I believe increases productivity, increases the willingness for people to go that extra mile” (r3)

As with the structural arrangements, shared codes and a common language appear central to fostering a community spirit. Again, the evidence is mixed emphasising that communities require continuing effort to sustain.
Social Capital – Relational Dimension

The relational dimension of social capital comprises trust, network norms, expectations and obligations, and identification. Trust is the primary value adopted by the CM community. This may be seen in examples of resource sharing at the community level and reciprocity at the individual level, where a favour carries with it an expectation/obligation. Both norms and expectations can be a valuable resource in terms of maintaining positive adjustment under challenging conditions – resilience.

“... they came with 4 or 5 articulated vehicles with a big barrier on and a rubber duck (a large 360 degree excavator machine) and they broke down. Another specialist on the framework had a machine. Basically one phone call, a machine’s broke down, you’re machine’s parked up here... yeh, no problem, use the machine...whereas old school... nobody would be prepared to lend anything” (r7)

Three community members, competitors outside the framework shared resources which resulted in positive adjustment to a challenging condition:

“We were working for r10 on one side of the M6 and r18 was working on a separate scheme...about two miles to the south. The plant, a machine, hired to r10 broke down. We went onto the r18 scheme and transported plant on loan from r18 (competitors) to r10 to enable them to complete the nights work. It involved three parties agreeing to enable the work to be completed” (r14)

Others have noted the ‘strangeness’ where ordinarily competitors shield information and resources but in the CMF they share resources:

“That’s something that’s slightly strange and you have to get used to it...We do quite regularly, sit openly sharing information with people that we would normally consider to be a competitor... Outside we would think ok we’re going to try and produce something that they can’t do, we’re going to try and undercut them on price. With CMF you have to forget all that and you have to appreciate that the work’s going to be shared between you” (r4)
In addition to the trust that the framework contract itself seems to foster, there are individual trusting relationships between specialist contractors and their suppliers or sub-networks. Again, the comparison with old traditional contracts is apparent.

“We have a good relationship with r10. We don’t just do the CMF we also do the Area 10 MAC with r10 (turn maintenance contract). The benefits and relationships that we’ve picked up in the CMF with the resurfacing schemes, we’ve carried into Area 10. We share water bowsers and road sweepers so we’re not doubling up on things…we agree between us who’s going to do it…If you were working the old style, and someone had got a bowser standing there they’d say no you can’t use that, that’s ours” (r13)

The relationships and associated resourcefulness that has developed through working on CMF schemes has been appropriable for works in other areas; an example of ‘appropriable organisation’ and an element of the structural dimension of social capital which can contribute to sustainable advantage – resilience (Robb, 2000). The arrangement exhibits both redundancy and flexibility, both of which Sheffi (2005) identified as ways of achieving organisational resilience. There is sufficient flexibility in the relationship to decide whose machine will be used, and there is redundancy in that there is a spare machine available should one develop a problem. The arrangement means the operatives from both firms work together which helps to maintain good relationships and respect for the plant and equipment of others.

Sharing Expertise

“One of the big CMF jobs we did was on the M** and it was designing a carriageway that was flooding and we had to change it. And the designers designed it and it was an external designer, and we said we can’t actually build it to your design with the equipment we’ve got. There’s no equipment that can build it. They were asking for the road to change levels. So we went in and spent the first 2 months helping them redesign it. But we took all the information out of that and we produced a file and r18 [competitors] had to do the same sort of job so we passed the file over and said we did it like this” (r10)
A combination of established relationships, knowledge and expertise, and the enabling that the CMF and the ECI process provide has enabled an adaptation which has overcome a problem. The CMF enables people to challenge traditional ways, to improvise and innovate. Further, the relationship between specialist and supply chain partner is stronger resulting in enhanced social capital. Resource exchanges can impose an expectation for reciprocation which within a community may become a norm. In terms of resourcefulness, expectations and norms can be a valuable resource in maintaining positive adjustment under challenging conditions – resilience. For example, one specialist observed an ill-performing supply chain partner. Although the specialist claimed he would not use that supplier again, eventually he re-engaged with recommendations as to how that supplier could improve to win work again.

“...they were pretty poor health and safety wise and performance wise. I don’t think we used them for about two years after that. But we sat down with them and said, look, if you want to get back with us, you’ve got to do this. They put that in place and I used them two years later. I was singing their praises, thought they were absolutely fantastic. A lot of that was down to sitting down with them and showing them where they were going wrong. So there is a lot of that goes on as well, because we want to use them again. So it’s about developing everybody as well” (r1)

In this particular case, the specialist’s willingness to engage in supplier development carried an informal obligation for reciprocity, as the supplier has subsequently helped the specialist through times of need.

“I’d ring **** up and say I need somebody here this afternoon. They’d be there. And they got us out of sticky situations two or three times” (r1)

There is always a possibility that some contractors will not reciprocate or will behave opportunistically. At least two forces however, prevent opportunism within the CMF. The first is the risk of being removed from the framework or subsequent frameworks which incurs potentially large losses in terms of lost turnover. The second is peer pressure from other community members who have bought into the CMF concept.
“I think that everybody knows that they need to behave themselves really. There’s too much at risk. If you know that you’re going to be getting £1M worth of work each year for the next 4 years” (r2)

From the outset of the CMF, the community team, stressed the need to adhere to community values and expectations, as well as promoting the culture in members own sub-networks.

“Being part of this club, I used to say we’ve got to become elite, not exclusive because we’ve got to engage the next supply chain. I’d say to these guys, what are you doing about engaging your supply chain? Don’t just think you’re the privileged few... Every one of these guys should have his own sub community of half a dozen suppliers. ...and you had to do exercises everyday to stay in here because this was not an easy cuddly toy living to these values and abiding by the rules. Now if I come and find that you’re not doing that, you get a yellow card mate. And I wanted the HA to literally come up with a yellow card, red card, come up with something that was fun, don’t come up with contractual stuff because people can argue about the contractual. Come up with a peer group and let’s have a peer group that measures” (r9)

There are however, respondents with stories of specialist contractors who do not commit to the community element of the framework to the same extent as others:

“...there’s some people who don’t play the game... certain contractors who you just know are taking it as an easy ride. I don’t think it’s as bad now but in the early days, the first two or three years, there was certain people who thought and they wouldn’t come to the meetings. All they wanted was the work. ...And it’s that break down which potentially could have brought the community down” (r10)

Peer pressure has been effective in eradicating free riders, but the community have learnt that there needs to be a structure/process that provides an enabling environment for peers to engage.

“You start pushing people along. There was an inference that you didn’t directly say to anyone you’re taking the piss because it wasn’t our position as a specialist to criticise other specialist’s ability or work” (r10)
One effective structure/process for providing an enabling environment for peers to impose pressure is the interim and final project company performance reviews, which are facilitated 360 degree feedback sessions.

“...that was the forum to actually say, I don’t think you’re performing. It was open and honest. And that was the forum where as a specialist, we did have the facility to criticise other people or praise them... I think it is that pressure, it was hang on if I don’t perform I’m going to get it, because it was called the hot seat and you sat at the front of the room and everyone was sat around you. You had two minutes where everyone tells you what they think you’ve done well but you can’t say a word, two minutes when everyone tells you what you’ve not done very well and you can’t say a word and then you’ve got two minutes to respond at the end. So you just have to say well actually, yeh, we didn’t do this but we did it because of this or we were held up by this or we did this well but we could have done better. It wasn’t a nice thing to sit in” (r10)

The contractual nature of the CMF, the community values coupled with structures for imposing peer pressure appear to have an influence on eradicating undesirable behaviour and opportunism.

“I think if people started performing like that within this framework, you would stand out like a sore thumb. You can’t be a maverick within this. Yes, you can think outside the box and be cool with innovations and things like that but the innovations that you come up with are to the benefit of the framework and the people working within it. So you try and be a bit of a maverick, you stick out like a sore thumb. No one will have anything to do with you because you’re of no use to anybody... I would tell them. I would have to tell them because it reflects on my performance within this job” (r5)

Identification has been described as a process whereby individuals see themselves as one with a group of people or organisations “in which the individual takes the values or standards of other individuals or groups as a comparative frame of reference” (Nahapiet and Ghoshal, 1998). When the CMF was being constructed, the community navigator understood the need to create a community identity.
“When you join a golf club, you know the rules. You get a rule book, a set of standards. There’s a set of rules and people say I belong to a golf club. And they’re proud of that golf club because it’s a good golf club. They know what the values are, they know what the golf club’s all about and they know they have to behave in a certain way and they belong to a club. And what the community did, it gave this thing called partnering an identity, it said we belong to something. So when you go and talk to some of these contractors in the CMF, we’re part of the CM community…” (r3)

Identification and association with the CMF can be exploited by members as a source of benefit or advantage. Corroborating the comments of the community manager, one supplier claimed he had been involved in the CMF from the start (9 years) but for the first two years did not get any work through the framework. His investment of time bore benefits by association rather than financial value. Mixing with a variety of successful companies and specialists he described his return on investment in terms of learning. Through membership of the offline groups he gained knowledge of shared best practices, safety, and quality, and learned of the KPI’s used to measure community performance. Prior to the establishment of the CMF there was no knowledge of the KPI’s employed by the HA.

“Being associated with the CMF became advantageous as knowledge of the concept spread through the highways industry… There was a certain amount of kudos with the association” (r15)

Another specialist exploited identification with the CMF in their marketing strategy.

“…we use it for one of our marketing points because a lot of people are looking for history or evidence of your past performance so we always say we are working for the HA on CMF. …It has enabled us to open doors and get on pre-qual lists and tender lists. So we always use it as a selling point really. That’s good for us” (r6)

Identification acts as a resource influencing the anticipation of value to be achieved through exchange and combination and the motivation to do so (Nahapiet and Ghoshal, 1998). CMF members have been able to anticipate adding value by engaging with each other for works outside the framework.
“I think as relationships develop, then those relationships automatically lead to working relationships elsewhere and sometimes in completely different circumstances” (r3)

Collectively, the three dimensions of social capital (structural, cognitive, and relational) have influenced organisational behaviours, benefits and advantages that can be exploited for organisational resilience.

**Resilience**

From a review of relevant literature several aspects were identified as useful in analysing the data collected in the CMF case. First, a broad working definition of resilience – the maintenance of positive adjustment under challenging conditions (Weick, 1998); second, the trade-off between exploitation and exploration implicit in building resilience (March, 1991); and third, the potentially useful application of Weick’s (1993) four potential sources of team or small group resilience – improvisation and bricolage, attitude of wisdom, respectful interaction, and virtual roles systems (Figure 4.4).

![Figure 4.4 Analytical framework for resilience](image)

**Positive Adjustment under Challenging Conditions**

Positive adjustment - Resourcefulness

On one scheme, a foreman described how a contractor was struggling with their work schedule because of unanticipated repair problems. He offered his company’s help and resourced part of the work to maintain the project schedule. There was no payment for the help; it was offered because it would increase the probability of the
scheme as a whole being completed on time. If the scheme is not delivered on time, everybody incurs financial penalties. The influence of contractor interdependence extends to day-to-day activities – safety and performance. The respondent also claimed when he sees another contractor performing poorly, he will say something because ultimately it is in his and everybody else’s interest.

“The wrong thing to do is say nothing because it may have a negative effect on the scheme which will hurt everybody” (r16)

Positive adjustment - Community support

In 1996 one of the CMF specialist contractors was experiencing financial difficulty and went into receivership. However, they received a lot of help from the community:

“We got quite a lot of help off people. ... Suppliers were saying we’ve got to come and recover our equipment and other people in the framework said oh no leave it there, we’ll pay for it. ...Because if we were on a job and we weren’t able to perform, the whole job would have stopped which affects everybody... So I think people thought the best thing to do here is step in, help where we can...” (r6)

When the contractor reformed as a different company, the conditions they pushed for in terms of settling supply chain debts has helped them to retain confidence. The respondent was asked if the help they received carried an obligation to return the help if their supply partners were to experience difficulties of any kind.

“Oh absolutely yes. You’d like to think that some of it was down to personalities; they thought we were ok people. We’ve known them since before the CMF started. We knew people before who came together as partners. It’s a kind of small industry really. So that was a positive for us” (r6)

As well as exhibiting community support, another point of interest with this story is almost all of the respondents referred to it at some point during interviews. One may deduce as a shared narrative the event has significant cognitive influence within the community.
Positive adjustment - Emergency calls

“A lorry hit a footbridge and pushed the pier over and they closed the M* so they got us out... It was 5 o’clock on a Friday night... We don’t have any formal arrangements with the staff, we don’t pay, nor do we have any formal arrangements with the MAC contractors, only that we are available to respond within a certain amount of hours... we got the call at 5 o’clock. It was at **** so it’s only about half an hour away... We had an engineer there by about 20 past... and we had the bridge propped by 11 o’clock that night... [T]here’s no contract between us, there’s no formal arrangement between us. There is an understanding that we need to get the motorway open again. There is a relationship between us and *** that allows us to do that and then the contract, the money, the lot, is sorted out afterwards, once the motorway is open... ” (r4)

With similarity to the preliminary Network Rail case study, the CMF emergency response capability is dependent on both contractual strong ties between the HA (and their representative MAC) and the specialist contractor, and the weaker or informal ties in the extended contractor network between the specialist contractors and their supply chain partners. A managerial implication when seeking to build supply network resilience is to focus on the development and maintenance of both strong and weak ties.

The Resilience ‘Trade-off’

Organisations with adaptive capacity, a construct closely related to resilience, focus on both exploitation of old certainties and exploration of new possibilities (March, 1991). Sheffi (2005) argues supply network resilience can be achieved either through creating redundancy or increasing flexibility, but usually demands a balance between the two. Robb (2000) depicts a resilient organisation as a hybrid entity able to sustain competitive advantage through the integration of two domains of activity; a ‘performance system’ capable of delivering excellent performance against current goals, and an ‘adaptive system’ enabling the organisation to effectively innovate and
adapt to rapid, turbulent changes in markets and technologies. CMF community initiatives may contribute to striking the resilience trade-off.

“... the big thing for me is this front end [ECI]. I’ve been innovation champion on a few schemes and people have complained we’ve only had 5 innovations for this scheme, that’s crap... What did we have before we started? If I get to a scheme where we have no innovations but we’ve had 100 beforehand, brilliant. If we get to that point where we’ve had none and then we have 100 through, we’ve not done our job beforehand because we’ve not designed that scheme to the best of our ability before we started. We’re having to come up with changes during the scheme because we’ve not addressed them beforehand” (r10)

“... and on several jobs doing ECI with the same people. The benefit of it is, it’s been mentioned to me, about 3 jobs ago we had the same problem and this is how we solved it. Are you ok with doing that again? Yeh. And they’d remembered and learnt from that” (r6)

Competitors have learned to manage a trade-off between competition and collaboration in the CMF. Having worked alongside each other and helped each other through plant break-downs, two resurfacing competitors made a decision to engage in the same sort of collaboration on another scheme some time afterwards.

“We did exactly the same, one carriageway each. And one night they had their asphalt plant break down so we supplied them material...So at that point we’re competitors but we’re working on the same contract and we’re helping each other out. And there was no anxiety of we’re competing, because we’re not, we’re working together to complete a contract” (r10)

r10 asserted that such arrangements would not have come about without the CMF, indicating that either competitor would have taken pleasure at the other’s failure, an indicator of significant cultural change.
Potential Sources of Resilience

Some of the most influential research on organisational resilience can be attributed to Karl Weick, who identified potential sources of team resilience. First are Improvisation and Bricolage which refer to the ‘The capacity to improvise and to apply creativity in problem-solving’. Weick’s (1993) best known example is of a forest fire fighter, threatened by a fast moving fire, using an escape fire to burn a hole in the vegetation so that he could lie in the embers when the main fire overtook him. He survived, but many of his colleagues who continued to flee perished. There are at least three trends within the data that can be linked to improvisation and bricolage. The first is the community’s ability and willingness to engage in resource sharing. The examples above show how the community deal with unanticipated problems such as a machine breaking and improvising with competitor equipment. The second trend involves structures such as the ECI process and Off-line Groups as an enabling environment for multidisciplinary interaction, creativity, and problem solving. The third trend or feature of the CMF that encourages creativity is the innovations recording process which ensures that learning is captured and passed on.

“We preach a lot about closing the cycle. If somebody comes up with a good idea, if we can do it, great, if we can’t, then making sure that we feed back to say why” (r3)

Second are Weick’s Attitudes of Wisdom, ‘The capacity to question what is known, to appreciate the limits of knowledge, and to seek new information’. A good example of an attitude of wisdom is in the community membership’s ability to challenge traditional forms of contracting and engage in a concept that is fundamentally different. From the conception of the CMF, the membership’s buy-in and participation in establishing community values which have shaped new or different behaviours and relationships represents an acceptance of the limitations of traditional contracting methods. Third is the notion of Respectful Interaction which ‘consists of respecting the reports of others and being willing to act on them; reporting honestly to others; and respecting one’s own perceptions and trying to integrate them with others’. Respectful interaction is evident in the conduct and feel at ‘setting the scene’ meetings, project progress meetings, interim and final project performance reviews. This is not to suggest that these settings are cosy. To the contrary, some of the
meetings attended at times became heated, but all of the focus project meetings attended resulted in agreement upon which contractors respected and were willing to act. The highways maintenance industry can be very dangerous; actors at all levels are encouraged to respect the concerns of others.

“There’s mutual respect between the contractors... In this industry, if you’re not very good at your job, you tend to get found out...It makes the job easier if everybody gets on and everybody is aware of that. You don’t want conflict. What the framework does is it gives you the opportunity to sit down and sort things out... And that goes for the lads on site. If Mike the cleaner is **** off with something I’ve done, he can come and tell me.... It does allow that open honest communication. There’s praise there as well, the culture side promotes that. They’ve done a questionnaire that everyone’s... You put down your thoughts. ... Everybody on site, all the lads, they’ve filled in... What that does, it gives the lads the opportunity to voice... you’ve got to have open and honest communication because these sites can be pretty dangerous at times”
(r1)

The fourth is Weick’s notion of Virtual roles where ‘Each person mentally takes all roles, so that even in situations of peril and disruption everyone is able to maintain a shared vision of risks, goals, and possible actions. This allows people to both fill in for an absent member (one who is either physically or cognitively absent) and to refer to that conception in order to continually align their actions with the shared goals of the group’. The multidisciplinary ECI process provides an enabling environment not only for relationship building but has also helped contractors to develop an awareness of the issues and problems faced by other contractors of a different specialism.

“You start thinking what he is thinking and the answers become self explanatory” (r16)

“... you’re sat in with 10 other people who you know really well.... And you get to know how people work and how they think” (r10)
These comments represent the development of the potential for virtual role systems which may be a potential source of community resilience when dealing with both routine and unexpected events.

In summary, there is evidence of the CMF contributing to the development of a more resilient contractor community. The result appears to be more effective at identifying threats, focuses upon value creating activities, builds a more effective response capability and, appears better able to absorb interruptions; that is it demonstrates elements of resilience. The case study has sought to depict three dimensions of social capital (structure, cognitive processes, and relationships) that appear to contribute to greater resilience. The case study has drawn current knowledge of resilience including a working definition – maintenance of positive adjustment under challenging conditions (Weick et al., 1998), managing trade-offs (March, 1991; Sheffi, 2005; Robb, 2000), and potential sources for building team resilience (Weick, 1993).

Emergent Themes

Four interrelated themes or ‘enabling conditions’ emerged that enabled the CMF community to build and exploit their social capital for resilience. These are identified as Time and Continuity, for example how long standing relationships can embody trust which in turn, can influence cooperation and reliability (Mishira, 1996); Participation and Interaction, for example, ECI as a structure can facilitate knowledge and information exchange as well as the potential for developing good working relationships; Interdependence, for example, interdependence implies cooperation and coordination – shaped by the community’s shared codes and values; and Closure and Brokerage, for example, whilst a degree of closure appears to influence an ‘identification’ that separates the CMF from traditional contracts, the CMF is open to exploring new possibilities beyond the community boundaries. Each of these themes is afforded a separate chapter for an additional and deeper phase of analysis.

Before delivering these chapters, Chapter Five - a ‘bridging’ chapter revisits a ‘complexity-based thinking’ perspective for an appreciation of principles that may
inform “the identification, development, and implementation of an enabling infrastructure which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

This chapter (two preliminary case studies and the main CMF case study) responds in part, to research objective one by identifying ways in which organisations exploit their social capital for resilience, and in part objective two by identifying four emergent themes or ‘enabling conditions’ that appear to contribute to enabling the CMF community to exploit their social capital for resilience.
Chapter Five

Revisiting Complexity-Based Thinking

Chapter Two included a review of relevant Adaptive Capacity literature for a fuller appreciation of the adaptability element of resilience. The review identified limited discourse as to how organisations might go about developing adaptive capacity. Acknowledging adaptive capacity is characterised by considerable ambiguity and complexity the focus turned to a complex adaptive or evolving systems perspective for further insight into resilience building. This ‘bridging’ chapter returns to that line of thinking.

Complex adaptive systems (CAS) are one part of an emerging knowledge in complexity science. Mitleton-Kelly (2003) identifies ten generic principles of complex evolving systems. Bearing in mind complexity is informed by both hard and social sciences, these are not the only principles, but ones which may relate to social systems and organisations. Listed below, the principles are highly interrelated. Rather than provide additional description here, this will be provided when the principles are applied in the following analytical chapters.

- Self-organisation
- Emergence
- Connectivity
- Interdependence
- Feedback
- Far-from-equilibrium
- Space of possibilities
- Co-evolution
- Historicity & time
- Path-dependence

Recall, “complexity is not a methodology or a set of tools (although it can provide both). The theories of complexity provide a conceptual framework, a way of thinking, and a way of seeing the world” (Mitleton-Kelly, 2003, p.26).
If one considers organisations as co-inhabitants living within a social ecosystem, then the notion of co-evolutionary processes are plausible. Figure 5.1 depicts a social co-evolving ecosystem.

![Co-evolution within an ecosystem](image)

**Figure 5.1** Co-evolution within an ecosystem (Mitleton-Kelly, 2003).

The various entities within the ecosystem have permeable boundaries suggesting that when one entity adapts or changes this will have an effect on other entities. The inner entities could be a group of firms that form a business community or supply network; the next layer, the environment, could be the consumer market or the client served by the supply network. These can be envisioned as nested in a larger environment of sector specific drivers or legislation. “In a social co-evolving ecosystem, each organisation is a fully participating agent which both influences and is influenced by the social ecosystem made up of all the related businesses, consumers and suppliers, as well as economic, cultural, and legal institutions” (Mitleton-Kelly, 2003, p.30).

Co-evolution within an ecosystem need not be confined to individual entities. Each of the three constructs that this research explores – resilience, adaptive capacity, and social capital, are social constructs, constructed and enacted by humans, and may also be depicted as co-evolving in a broader business community, network, or environment as depicted in Figure 5.2. The terminology attributed to each construct is taken from the respective literatures. Many of the terms are similar and transcend two or all three constructs. Others terms suggest potential links between constructs. A few examples are lined-in suggesting the potential for co-evolution.
Complexity-based thinking suggests organisations can adapt or co-evolve as part of a social ecosystem providing there is an enabling infrastructure “which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p46). It is suggested here that four emergent themes or ‘enablers’ from the CMF case study in Chapter Four: Time and Continuity; Participation and Interaction; Interdependence; and Closure and Brokerage, in part, contribute to an enabling infrastructure in which the contractor community exploit their social capital for adaptive capacity and resilience. The four enablers are depicted in Figure 5.3.
Figure 5.3 Four ‘enablers’: Time and Continuity; Participation and Interaction; Interdependence; and Closure and Brokerage depicted as part of an enabling infrastructure in which the CMF contractor community exploit their social capital for adaptive capacity and resilience.

The reader is reminded that the four emergent themes or ‘enablers’ explored in following separate chapters are interrelated. Although there has been an effort to minimise repetition from the CMF case study in chapter four and overlap within the following four analytical chapters, some of the issues have been analysed and discussed from a different perspective and data/quotes may appear in more than one chapter or context.

Figure 5.4 depicts chapters’ six to nine ‘position’ within the thesis and contribution to knowledge.
Research contribution - adding new knowledge, transferring existing knowledge, and tackling problems that interest practitioners and policy makers

Objective 2

Explore how four emergent 'enabling conditions' help organisations exploit social capital for building resilience

Figure 5.4 Chapters’ six to nine ‘position’ within the thesis and contribution to knowledge
“Like other forms of capital, social capital constitutes a form of accumulated history - reflecting investments in social relations and social organisation through time… Time is important for the development of social capital, since all forms of social capital depend on stability and continuity of the social structure. Commitment to continuity facilitates other processes known to be influential in the development of social capital: interdependence, interaction, and closure” (Nahapiet and Ghoshal, p.257). As social capital can foster resilience (Sutcliffe and Vogus, 2003, p.105; Lengnick-Hall and Beck, 2003, p.23; 2005, p.752), time may be an important factor in developing and exploiting social capital for building organisational resilience.

This chapter is concerned with time, continuity, and network feedback mechanisms. The chapter comprises four sections. The first section explores CMF **History and Investment in Social Relationships**. For example, the construction sector’s adversarial history appears to have influenced the community’s desire to invest in collaborative relationships providing access to resources that can be exploited for resilience. A second section explores factors that influence **Contractor Commitment to CMF Stability and Continuity**. Here, work continuity and value along with buy-in to the CMF culture appear to be areas of significance. For example, contractors with continuous and high value work load can be more willing and able to engage in respectful interaction – a potential source of resilience (Weick, 1993). **Threats to Community Stability, Continuity, and Resilience** are identified in free-riding and CMF culture erosion. Although free-riding was evident during the community’s infancy, it has reduced as the community has matured and the CMF culture has become embedded. Limited community interaction resulting from limited...
work continuity was identified as a potential for CMF culture erosion. Each section emerged from the data and is supported by relevant literature. Figure 6.1 presents a chapter map linking data to social capital and resilience constructs. To gain insight into the adaptive aspect of resilience, the chapter integrates and culminates in a fourth section, **Adaptive Capacity: A ‘complexity-based thinking’ (CBT) perspective** (Gilpin and Murphy, 2008).

![Figure 6.1 Chapter map linking data to social capital and resilience constructs.]

**History and Investment in Social Relationships**

Having come from an environment where working relationships have frequently been described as adversarial, many of the respondents were initially sceptical of the CMF. As the CMF matures, members and newcomers have become less sceptical. The Community Manager claimed this is because the framework now has a history that people can identify with and this makes it easier to assume mutual trust.

“... if we get a team on site now that have never worked together before, which can happen, the framework’s got a history, the community’s got a history...I think it’s easy now to say let’s start here and trust each other and people have enough trust in the framework to do that” (r3)
This agrees with Coleman’s (1990) view that trust and social capital can take time to develop and implies that relationships that foster organisational resilience (Sutcliffe and Vogus, 2003) may also take time to build.

Respondent’s accounts of conflict in traditional contracting would appear to constrain rather than enable actual or potential social capital.

“…in the traditional style contract, you used to get a lot of falling out. A lot of jobs used to go to claims at the end of the job which didn’t benefit anybody….a cut throat environment” (r1)

According to r3, the CMF has removed the conflict and created a collaborative environment based in part, on longer term relationships. As the community has matured, good working relationships have become embedded. The concept of embedding fundamentally means the binding of social relations in contexts of time and space (Giddens, 1990).

From a CBT perspective,

“When a social entity is faced with a constraint, it finds new ways of operating, because ‘away-from-equilibrium’ systems are forced to experiment and explore their space of possibilities, and this exploration helps them discover and create new patterns of relationships and different structures” (Mitleton-Kelly, 2003, p.34).

When the CMF was being proposed as an alternative means of procurement, the highways industry had endured several years of constraint - hostility and aggression as a by-product of traditional contracting methods. At this time, the industry may be seen as being ‘away-from-equilibrium’.

Nobel Prize winning chemist Prigogine developed a concept of dissipative structures that explained why certain systems do not dissolve into entropy but, rather, renew and self-organise into complex systems with their own logic (Abel, 1998). The tendency of dissipative structures to split into alternative solutions is called bifurcation. A difference between physical systems and human social systems is that humans can make decisions upon which actions may be taken. For example, the architects of the CMF created the conditions for a bifurcation and an opportunity for
an element of the construction industry to take an alternative path and self-organise into a new coherence. This bifurcation is fittingly described by the Community Navigator at an initial workshop when ‘selling’ the CMF concept to the proposed community of contractors:

“... I drew on the board a fork in the road...I said to them it’s like a bus...
And there just happened to be loads of buses heading down this road and one of them was this bunch of guys who we’d just pulled in to a CMF lay by...
And we were going to talk about things in the industry. They’d been travelling down this road for the last 10 years, some of them, 20 years... And what were the things they experienced on the road they thought were good but what things had they experienced in their business life that were crap on the various buses they’d travelled on. And then all the shit came out – claims, lack of trust...So we took time out... what’s the consequence of continuing down there? ... So I then said there’s a fork in the road here... and if we could change things, what would you want to see? And they just came up with what they wanted. They wanted relationships, they wanted a quality job, they wanted to be paid on time and they wanted all this stuff and they created a vision. They wanted something to be proud of. So we created the community vision” (r3)

The new CMF community selected a different path, explored their ‘space of possibilities’ and self-organised to create a new coherence underpinned by new values and a vision.

“... it may not be possible to explore all the possibilities. It may be useful to consider exploring the ‘adjacent possible’ (Kauffmann 2000). That is, exploring one step away, using ‘building blocks’ already available, but put together in a novel way. Although the rate at which novelty can be introduced is restricted, the ‘adjacent possible’ is infinitely expandable.” (Mitleton-Kelly, 2003, p.36)

The history of a complex system is an essential feature of emergent patterns. Because the evolution of the system is the result of iterative interaction between its agents, past history helps to produce present behaviour (Gilpin and Murphy, 2008, p.30). As the CMF has matured, many interactions and exchanges have taken place;
relationships and trust have evolved and become part of the community’s behaviour and identity.

**Relationships**

c10 has been a formal member of the CMF since it was established and undertakes all routine surfacing work in HA Area 10. Under a separate arrangement, c10 hold a ‘turn maintenance’ contract which involves routine works such as litter picking, road sweeping, and sign cleaning. They also provide twenty-four hour emergency response when a road surface needs repairing after an accident, fire, chemical spillage, or frost. There is an ‘agreement’ with the MAC for the emergency response but there is no contract.

Whenever possible, c10 use local supply chain partners c14 and c13 with whom they have long standing (25 year) relationships. Primarily a transport company, c14 are also equipped to plane roads ready for resurfacing. In addition to transportation, c10 employ c14 for smaller road planing jobs as part of the turn maintenance emergency response agreement. Again, there is no contract; the agreement is verbal based on trust.

“He’s coming out and doing the work on the trust that we all agree rates after... Its about relationships, it’s about how you get on with people” (r10)

Over the twenty five year relationship much trust has developed.

“As they have expanded, we have expanded, transporting their plant for them. The two companies have grown together” (r14)

c10 also have a long standing relationship with c13 who are the ‘preferred’ road planers on larger CMF projects. Similar to the previous relationship, c10 engages c13 for CMF work, turn maintenance and emergency response.

“The relationship has an immediate impact in terms of added value as the turn maintenance work is similar to the CMF, in that work not completed on time incurs financial and contractual consequences” (r13)
Respondents’ r10, r13, and r14 agree they benefit from their long term relationships and the benefit of CMF better practices on turn maintenance works.

In terms of social capital, the relationships and resources that have developed through working on CMF schemes have been appropriable for turn maintenance. The competitive advantage that Robb (2000) associates with resilience can be recognised in adapting resources used for one purpose for another purpose, a notion not dissimilar from what Weick (1993) terms improvisation and bricolage – a potential source of resilience. This example exhibits one pathway by which social capital may be exploited for building resilience.

Working alongside the same supply chain partners provides opportunities to develop horizontal relationships at that level of the network. Although c13 and c14 are competitors, they also work together on other schemes outside the CMF. The arrangement provides for mutual benefit as each party has a competitive but trustworthy ally; they frequently resource each other’s needs when busy or during equipment break-downs. The relationship endows mutual resourcefulness that enhances both contractors’ resilience.

In addition to resource sharing between supply chain competitors, specialist contractor c10 and supplier c13 often share hired plant for mutual financial and logistical benefit. Arranging a shared hire involves an understanding of others’ roles and activities or ‘virtual role systems’ (Weick, 1993) to be able to exploit potential savings. The sharing of hired plant is another example of the resourcefulness that long-term trusting relationships can provide.

Both c10 and c13 own specialist plant. They collaborate regarding whose machines will be used.

“It’s like a rule now, him and us. We’ll always do the bowser and he does the sweeper, and at the end of the night we send a wagon to collect the sweepings and r10 loads them up with his tractor. So it’s things like that rather than having to take another tractor… it don’t seem a lot but it does work” (r13)

The arrangement exhibits both flexibility and redundancy. There is sufficient flexibility in the relationship to decide whose machine will be used, and there is redundancy in spare machine availability. One outcome is that workers from both
contractors work together which helps to maintain good relationships and respect for each other's equipment. r13 claimed on a traditional scheme:

“…another contractor would have a bowser sat there and they’d say no you can’t have that that’s ours. And you know there’d be more than enough water in it to do everybody” (r13)

The example suggests long term engaging relationships can influence a willingness to share resources for mutual benefit. Here the mutual benefit is evident in terms of flexibility and redundancy - two ways that organisations can build resilience (Robb, 2000).

From a CBT perspective, the history of interaction under formal CMF contract has shaped new behaviour outside the framework. The act of resource sharing becomes part of a new history that shapes future behaviour by broadening each entity’s repertoire of responses or ‘learned resourcefulness’ (Lengnick-Hall and Beck, 2003).

Continuity between contractors maintains network connectivity and enables entities to co-evolve. Another feature of complexity is the possibility of entities to change their rules of interaction; to act on limited local knowledge, without knowing what the rest of the system as a whole is doing; and to be self repairing and self-maintaining (Mitleton-Kelly, 2003, p.27). For example, the relationship between c10 and c13 where one routinely provides a bowser and the other provides sweeper exhibits the emergence of local rules or schema within a sub-system (nested hierarchy). The local schema co-evolved without the requirement or desire for any external control, through self-organisation.

**New Community Membership**

At least two respondents had no prior experience of working within the CMF. r11 appeared sceptical of some of the community initiatives. There was a clear preference for being responsible for one’s own destiny rather than the interdependence of the CMF.

“…we’d rather be masters of our own destiny because it’s better to be responsible for your own success or failure” (r11)
Site foreman r5 working for the same company also had no previous CMF experience. His choice of words ‘community fluffiness’, suggests he may also be a sceptic. r5 was unable to discuss or expand on the influence of community initiatives.

“Culture champion – I’m not really sure where that fits in... I think the only thing is sometimes with this framework they could possibly deal a little bit too much with the stuff round the outside, the periphery, you know, culture champions, this that and the other...How does that benefit me through my working day?” (r5)

Respondents with greater CMF experience frequently referred to community initiatives as an influence on community behaviour and collective action. From a social capital perspective, r11 and r5’s limited experience of the CMF support the seminal theorists that it can take time for social capital to develop. Correspondingly, it can take time for relationships to develop that support the sort of resourcefulness that can be exploited for building resilience.

Although respondents discussed the benefits of the CMF, there remains an element of scepticism. One factor appears to be limited experience of working within the CMF. Newcomers to the framework appeared uncomfortable with the idea of equal voice, preferring their ‘control’ in a traditional set up. This view is at loggerheads with CMF culture which pursues a collaborative approach. The aim is for interdisciplinary specialists to work in collaboration for the benefit of the community as a whole.

**Contractor Commitment to CMF Stability and Continuity**

**Managed Community**

The Construction Management Team (CMT) comprising a Navigator, Manager, and Administrator is self-funded by the formal community. Each community member voluntarily gives a percentage of task order value from work secured via the framework. The finance also goes towards funding the ‘Phil Stanton Award’ for the best performing project team. The annual award has symbolic influence in terms of team building and competition, and promoting the CMF ethos within the community.
“Achieving site-level buy-in is half the battle... it is getting the spirit of cooperation down to the people that actually work on site that makes the CMF very different” (r3)

The Community Manager’s view, corroborated by all but a couple of sceptics, is that contractors would rather work on the CMF than other frameworks because the CMF fosters a better working environment.

“You’re talking about guys who’ve had 40 years experience in the construction industry and they’re finding that they’re treated better here and I think that’s a much better working environment for everybody which I believe increases productivity, increases the willingness for people to go that extra mile and to give you a little bit more” (r3).

Implicit in the Community Manager’s comment is that worker commitment is motivated by a better working environment. This view is corroborated in Chapter Nine - Closure and Brokerage.

Along with more formal functions pertaining to process, culture, and measurement, the CMT routinely attend sites to learn of any concerns the community may have. According to r3, over time the CMT has gained the trust and respect of the wider community. Potentially, this is an awkward space for the team and the contractors. Although the team are funded by the community, they also report directly to the HA on performance. This is an important aspect of how trust and respectful interaction embedded in good working relationships can contribute to the resilience of the contractor community. Weick and Sutcliffe (2001) define resilience as “intelligent reaction and improvisation. To be mindful about errors that have already occurred and to correct them before they worsen and cause more serious harm”. The CMT is instrumental in maintaining commitment to the stability, continuity, and resilience of the community.

Communicating and embedding the CMF culture within the formal community is one function of the CMT. Moving into the extended contractor network part of that responsibility lies with specialist contractors to communicate with their supply chain partners. This is one area the Community Manager acknowledges could be improved.
The extended community can be interested and eager to know about the scheme they are working on.

“It’s amazing how much they do want to know...and how much we don’t tell people about what we’re doing...When you get talking to them, you discover they’d like to know that they’re working on a £5M scheme and it’s high profile to the HA... They’re quite interested in things like that. And also it helps to gain their commitment. If you are working on a high profile scheme where it is going to require a bit of extra work, extra hours here and there, weekends, for them to know why we’re putting extra pressure on them, makes it easier for them to give us that commitment. Once they buy into it, then you’re half way there in terms of having a successful scheme.

An implication for managers is that time needs to be invested in communication not only for the exchange of day-to-day information, but also to build the relational commitment through which resources can be exploited for the maintenance of positive adjustment.

**Community Commitment**

When contractors become formal members of the CMF they agree to a commitment to engage in the community element of the framework. Although there is no contractual requirement, the community are expected to participate in continuous improvement initiatives. As the current framework nears full term, some respondents (r1, r3, r6, and r10) claim enthusiasm for the community element of the framework is waning.

“You can tell people are petering off...You’re not seeing the same faces... people are looking at schemes that potentially they might not get...there’s that bit of your mind thinking am I doing everything to help someone else, probably a competitor, who come into it, might not have the same philosophy as us, might not really understand what’s happening. It might take them 2 years to buy into it and they’re going to take the benefit of everything we’ve done for the last 7 years...” (r10)
Contractors are being asked to do preparatory work for projects they may not be involved in if they do not secure CMF2 membership (August, 2009). Despite this, all respondents claimed they were prepared to undertake preparatory work for projects planned for 2010 and had a positive attitude towards securing membership on the next framework which may be a reflection of the commitment to the stability and continuity of the community and recognition of CMF benefits over traditional methods of contracting.

Another factor that can influence commitment to the community is an individual’s characteristics and their suitability for working within the CMF.

“we’ve got some fantastic people that work for our company but you couldn’t have them on this. They’re too abrupt or abrasive… And similarly we’ve some people on CM that couldn’t cut the mustard outside of it because they rely on it being a close knit relationship and relying on others to help them…” (r6)

Recognising the suitability of people based on their individual characteristics appears to be an important element of enabling commitment to the community. From a management perspective, this suggests no matter how long one attempts to build social capital in a social structure, it might be difficult if the personalities are not conducive to the desired community culture.

According to the Community Manager, when the CMF was established, the intention was for each member to participate in an off-line group. A key criterion was getting people with a passion for the area in which they were to become involved.

“There is no point in getting somebody who thinks measurement involved in culture or vice versa. There is no point in getting somebody who thinks process involved in culture and vice versa. But it is important to recognise that the community needs all those people” (r3)

Sutcliffe and Vogus (2003) claim “individual resilience is more likely when there is sufficient access to quality resources including human, social, emotional, and material capital so competence can be developed”. In addition, “resilience is more likely when an individual’s mastery motivation system is mobilised; that is, when individuals have experiences that allow them to experience success and build self-
efficacy and that motivate them to succeed in their future endeavours” (Sutcliffe and Vogus, 2003, p.100). The off-line group initiative provides a structure for group members to access quality resources from diverse community membership. The selection criterion, especially a passion for the subject area, and therefore a likely commitment to the group’s activities, may be conducive to group success thus building self-efficacy and motivation to succeed in future endeavours.

The MAC mindset can influence the stability and continuity of the community. The current Area 10 MAC joined the CMF in 2007; their predecessor being unsuccessful at contract renewal. Although the Community Manager suggested this was because they were not performing as expected, r10 claimed they were not suited to the coordinating element of the MAC function because they were consulting agents rather than managing agents.

“***** were a consultant and they weren’t used to being a MAC... the civils contractor took the lead role... unfortunately that went on for about 2 years. ***** just sat back as a consultant, sat monitoring but it wasn’t what they were meant to be doing” (r10).

The previous MAC was unable or unwilling to interact with the community, and therefore did not influence the stability of the community as expected. An implication is that in organisations explicitly designed to bring members together in order to undertake their primary task, actors have to be selected and be conducive to the culture that is being developed.

Site foreman r16 expressed concerns regarding the continuity of site engineers/managers.

“In this scheme they keep changing the site managers which can hold things up” (r16)

This was an issue where r16 favoured a traditional framework over the CMF. According to r16, on a traditional framework a resident engineer coordinates all works for the duration of the project. The advantage of this arrangement was an established one-to-one relationship and efficient exchange of information. A disadvantage of the CMF is that rotation of free-lance site engineers can make the decision making process slower as decisions seem to have to go through various
levels of management before it is acted upon. Although the free-lance engineers work for the MAC, they can have limited understanding of the CMF culture.

The example suggests the stability and continuity of the social structure can be interrupted by discontinuity of actors. r16 favours continuity of working relationships.

“When relationships have continuity, it helps build rapport…” (r16)

From a social capital perspective, one could argue the role of the site engineer is routine and a cohesive social structure or ‘closure’ may be more suitable for continuity than the freelance or ‘brokered’ site managers whom r16 claims are a hindrance to work continuity. Lack of site management continuity appears to have had a negative influence on interaction and effective communication. Development of social capital is significantly affected by factors that shape social relationships and interaction is one such factor (Nahapiet and Ghoshal, 1998, p. 256). In this instance, if resources that become accessible through social capital are to be exploited for resilience, then continuity of site management may need to be maintained.

Although continuity of site managers appears to be a contractual issue, the multidimensionality of complex systems suggests a perceived tension in one domain may actually be a problem in another domain. For example, Mitleton-Kelly (2003) illustrates what on the surface appeared to be a technical problem involving the integration of a bank’s information systems across Europe, was partially resolved by paying attention to some social and cultural issues. From a CBT perspective, this is one area where the CMF community might consider exploring their ‘space of possibilities’ for ‘enablers’ to overcome site management continuity.

Continuity of Work and Commitment

“...we’re talking 40% of our turnover for the year on one secured framework. So you want it to work…” (r10)

As a general observation, contractors securing high value through a continued workload do commit time to the community element of the framework. When work value reduces, commitment reduces.
“...commitment to the community element of the CMF is dependent on how much work or value we can get from the framework. I don’t have the resources to commit without getting more value from the CMF” (r4)

Although the CMF attempts to provide each member with an equitable share of work, some specialist contractors get more work than others. For example, surfacing specialist c10 secure three to four millions pounds of work representing 25% of their annual turnover. r10 claims to fully commit to community initiatives. Specialist contractor r1 claimed to be involved in up to five CMF projects at any one time, also drawing much value from the framework. A benefit for them is they know roughly their workload via the framework which is an incentive to commit to the community. The five to seven year term of the framework combined with reasonable assurance of continued work load is a strong incentive for many specialist contractors to commit to the stability and continuity of the community. On the other hand, the Community Manager suggested a contractor that draws only 5% of their work via the framework is unlikely to invest time into activities such as off-line groups.

Whenever possible, community specialists and supply chain partners are expected to engage resources from within the CMF as each firm has been approved by the HA. There is also an expectation that all members will engage when requested to do so by others. Although this is normally the case, a situation was observed where a specialist contractor was reluctant to respond to a works request because the work was of low value.

...There is an unwritten expectation that that situation shouldn’t arise and these people should turn up even if it’s only £200, they should come and do it because they’re getting much more benefit out of the framework...It’s not good behaviour really” (r6)

Community members are expected to engage in both high and low value works. A reluctance to engage can stress the relationship between two or more parties; trust (relational social capital) may be jeopardised as trust demands a belief in the good intent and concern of exchange partners, and a belief in their reliability (Mishira, 1996). Not engaging thus affects the resourcefulness of the community, which in turn may have a negative effect on community resilience.
From a CBT perspective, the notion of co-evolution is one of empowerment, as it suggests all actions and decisions affect the social ecosystem. But as Mitleton-Kelly (2003, p.30) points out, “co-evolution invites notions of responsibility as once the ecosystem is influenced and affected it will in turn affect the entities (other contractors) within it.” A community is a social ecosystem if it provides mutual support and sustenance. “When firms and institutions cease to function like a community or social ecosystem, they may break down” (ibid, p.31). The example of reluctance to respond to a low value works requests may be conducive to community break down and suggests community values may need to be reinforced.

**Threats to Community Stability, Continuity, and Resilience**

**Free-riding**

Free riding constitutes a lack of commitment to community stability and continuity. Although most formal member respondents suggest there is high level buy-in to the CMF culture, r10 suggested:

“a small number of contractors will take the work and the benefits of being part of the framework but are not prepared to commit fully to the community element of the framework”

Respondents r1, r6, r10 claim free-rider behaviour was more evident in the first two or three years of the framework, but still persists in a minority.

“... this one specialist just wasn’t performing, wasn’t resourcing it right. I know from experience, the work he did in 3 weeks, if it was a traditional contract he’d have had done in 2 days” (r10)

Lack of commitment evident in free-riding is contra to the community’s values and may have potential to destabilise the community. Again, it is evident that it may take considerable time and continued effort to develop and maintain social capital that can be levered for building resilience.

Initiatives have been implemented to help overcome free-riding and reinforce the community’s values. For example, expectation forms are completed by contractors
and displayed on site notice boards as a reminder of what the community expects of each other. Facilitated company performance reviews aim is to identify better practice that can be shared and poor practice that can be improved. The initiatives impose peer pressure on members to commit to the community’s values and to maintain the stability and continuity of the framework. Rather than an external control, the community seek ways to empower members to address poor performance and undesirable behaviour.

Performance reviews enable healthy challenge to perceptions of poor or better practices. Healthy challenge may be considered an ‘attitude of wisdom’ - the capacity to question what is known, to appreciate the limits of knowledge, and to seek new information (Weick, 1993) and may be an important aspect of organisational learning. Performance reviews may contribute to enabling an ‘equal voice’ culture. This may be seen as respectful interaction, a potential source of resilience - respecting the reports of others and being willing to act on them; reporting honestly to others; and respecting one’s own perceptions and trying to integrate them with others (Weick, 1993). The comments of one specialist contractor implied that whatever comes out at the reviews may be anticipated beforehand.

“A lot of the time though there’s nothing that comes out that you don’t know… And probably if you’re criticising someone else, the bloke next to you is thinking I’m thinking exactly the same here” (r10)

An implication for managers seems to be providing the enabling conditions for actors to comfortably ‘have their say’, as only then will there be an ‘equal voice’.

**Incentivised Commitment**

It is understood that allocation of work in the CMF2 will be based on past performance which will include participation in community initiatives. Under the current arrangement, the intention has been to provide each member with an equitable share of the work. A contractor who is performing well and participating in community initiatives receives no reward above a contractor who is not. All respondents felt that this arrangement is unfair. Performance based allocation of work is anticipated to ensure commitment to community initiatives.
“...everyone has been more than happy with what we’ve done – on time, to budget, good quality and we’ve inputted with off-line groups, ECI, we’ve gone in on everything...Those who perform and input into the community should get a bigger share of the work load because you’re dedicating time, effort and resources whereas some people aren’t but are still having the same amount of work... there’s probably about 5% of people who don’t really do everything they should do but, apart from that, the community really does work well” (r10)

Although some respondent’s favoured change to performance based work allocation, r6 voiced concerns regarding the measurement of performance.

“...you could be very poor and still get the same amount of work as a guy who’s very good. So that doesn’t seem quite fair really but, again, it’s how you measure that and how that’s seen to be measured and managed, because it can be subjective. ...It’s like borrowing their machine rather than us bringing one in if we only need it for a couple of hours and that sort of thing. There’s a lot of that goes on but it’s never recorded” (r6)

r3 was asked if she thought formalising aspects of the framework that have been undertaken on an informal basis may affect the spirit or ownership that has developed within the community. She replied:

“The Highways Agency has recognised for some time that establishing a community provides them with additional benefits. The community model has formed the basis of other HA communities such as the Major Projects Community and the Maintenance Community. Putting the community element into the contract is a reflection that the HA think that it is best practice.”

An alternative explanation, based on the previous discussion of performance based work allocation may be that making the community element contractual might help to eradicate free riding by some members. The Community Navigator preferred to seek ways in which the community could become more empowered to encourage commitment and compliance with community rules rather than relying on formal controls. To do the latter may be seen as a missed opportunity to embed ownership of consequence mechanisms within the community. The Community Navigator, now
retired, claimed he would have liked to have addressed more fully ‘consequences’ for community members not performing and argued:

“If I go to my golf club in jeans there would be consequences. Similarly, there must be consequences if a contractor entering into a 5 year CMF contract fails to play the game.”

The Navigator described being part of ‘this club’ as being part of the ‘elite’, but not exclusive, because it is also about people engaging their supply chain.

“An external audit could look at how a contractor is treating their suppliers, and see if he is forming his own sub-community. A peer group, on a rotating basis could go out and do an audit underpinned by the values that have been adopted by the community”

The Navigator claimed being part of the CMF involves doing certain things everyday in terms of commitment to the continuity of the community.

“It doesn’t need to be contractual; it can be made fun or different, but it does need commitment… Lack of commitment or departure from community rules gets a yellow card. Give him six months to improve, otherwise he gets red and he is out. It has got to be meaningful”

Along with more formal incentives for encouraging commitment to community initiatives, informal rewards can be effective. For example, a MAC will often award a case of beer, or B&Q voucher to the person with the best innovation.

**Erosion of Social Capital**

As the CMF has evolved some individuals have moved or been promoted away from the community. The CMT became aware they were losing talented people. They also recognised ‘up and coming’ managers within the community and attempted to ‘tap’ those managers to be influential on site. Although the intention was to try and develop a sub-network of ‘influence’, as people were singled out it had a detrimental effect on the motivation of others. High levels of social capital are usually developed in contexts characterised by high levels of mutual dependence. However if the
dependence becomes one sided (as attempted above), the social capital resource can erode. A less motivated or less resourceful community may be less able or willing to commit to maintaining positive adjustment - resilience.

Two features of complexity are of interest here. First,

“In human systems, connectivity between individuals or groups is not a constant or uniform relationship, but varies over time, and with the diversity, density, intensity, and quality of interactions between human agents. Connectivity may also be formal or informal, designed or undesigned, implicit with tacit connections or explicit... [T]he degree of connectivity determines the network of relationships and the transfer of information and knowledge and is an essential element in feedback processes” (Mitleton-Kelly, 2003, p. 28).

Second, is that complexity does not argue for ever-increasing connectivity, as high connectivity implies high interdependence. A move by one entity may affect other entities in the same or related systems.

“When one entity tries to improve its fitness or position, this may result in a worsening condition for others. Each ‘improvement’ in one entity therefore may impose associated ‘costs’ on other entities, either within the same system or on other related systems” (ibid, 27).

A challenge for managers is to create an enabling infrastructure that seeks optimum levels of connectivity, whilst at the same time recognising connectivity is in constant flux, and being mindful of potential improvements and costs.

Another factor that can influence erosion of social capital and community culture is lack of work continuity. Although the formal membership enjoys some security in terms of workload via the CMF, there is agreement in the comments of the supply chain partners that the greatest disappointment with the CMF is lack of work continuity.

“The greatest downfall of the CMF is lack of continuity of work. We were promised more work continuity at the start of the framework” (r14)
“...we did a lot of contracts in the first couple of years of the CMF which allowed us to build up a team that were used to working in the CMF. We had a project team leader who was used to the CMF culture, understood the CMF culture and therefore could work along those lines. I think the CMF at the time were assuming that you would do that, that you would be able to dedicate a team within your organisation...For a while there was enough work for us to do that but for the last 5 years there hasn’t been...We can’t dedicate a team to it, there isn’t enough work” (r4)

There is an understanding within the supply partner network that it is impossible to keep everybody involved in the CMF all the time. Whilst lack of work continuity for some contractors may have a negative influence on commitment to the community, it most likely has an eroding affect on social capital and CMF culture. Lack of work continuity implies less interaction and interdependence. Since interaction is a precondition for the development and maintenance of social capital, and since social capital is eroded by factors that make people less dependent on each other, lack of work continuity will likely result in the erosion of both CMF culture and social capital. Since social capital fosters resilience (Sutcliffe and Vogus, 2003, p.105; Lengnick-Hall and Beck, 2003, p.23; 2005, p.752), a lack of work continuity may erode the social capital that may be exploited for resilience.

**Adaptive Capacity – a ‘complexity-based thinking’ perspective**

From a CBT perspective, this chapter recognises several features of complexity that contribute to an ‘enabling infrastructure’ for exploiting social capital for resilience. It was argued when the CMF was being proposed as an alternative means of procurement, a history of hostility and aggressive tendering associated with traditional contracting had pushed the highways industry away-from-equilibrium. Drawing on aspects of complexity (dissipative structures, history, and far-from-equilibrium), the architects of the CMF created conditions for a bifurcation and an opportunity for an element of the construction industry to take an alternative path and self-organise into a new coherence underpinned by new values and a new vision.
The history of a complex system is an essential feature of emergent patterns. The evolution of the system is the result of iterative interaction between its agents - past history helps to produce present behaviour. As the CMF has matured, many interactions and exchanges have taken place and trust has evolved and become part of the community’s behaviour which in turn feeds back and reinforces the community’s values and identity. As part of an iterative process, when agents interact, new behaviours co-evolve and become part of a new history which can comprise a greater repertoire of responses that may be selected for maintaining positive adjustment under challenging conditions - resilience.

Complexity suggests agents can change their rules of interaction, act on limited local knowledge without knowing what the rest of the system as a whole is doing. The emergence of local rules or scheme for mutual and community benefit was evident in a local agreement between suppliers - one routinely provides a bowser and the other provides sweeper. The local schema co-evolved, without the requirement or desire for any external control.

In complexity, the notion of co-evolution is one of empowerment, as it suggests all actions and decisions affect the social ecosystem. In a human social ecosystem such as the CMF, co-evolution invites notions of responsibility as once the ecosystem is influenced and affected it will in turn affect the other contractors within it. Reluctance by contractors to respond to a low value works request lacks the responsibility for mutual support and may have a negative effect on the stability and continuity of the community or ecosystem.

Although continuity of site managers appears to be a contractual issue, the multidimensionality of complex systems suggests a perceived tension in one domain may actually be a problem in another domain – social, technical, economic, or political. This is one area where the community might consider exploring their ‘space of possibilities’ for site management continuity ‘enablers’.

“if... new order is ‘designed’ in detail, then the support needed will be greater, because those involved have their self-organising abilities curtailed, and may thus become dependent on the designers to provide a new framework to facilitate and support new relationships... if organisation re-design were to concentrate on the provision of enabling infrastructures (the
socio-cultural and technical conditions that facilitate the emergence of new ways of organising), allowing the new patterns of relationships and ways of working to emerge, new forms of organisation may arise that would be unique and perhaps not susceptible to copying. These new organisational forms may be more robust and sustainable in competitive environments” (Mitleton-Kelly, 2003, p.35).

The potential for social capital erosion focused on the dynamic nature of connectivity and the notion that actions or moves by an entity can have an affect (create an improvement or impose costs) on entities in the same or related systems. It was suggested a challenge for managers is to create an enabling infrastructure that seeks optimum levels of connectivity, whilst at the same time recognising connectivity is in constant flux, and being mindful of potential improvements and costs.

The CBT perspective for Time, Continuity, and Network Maintenance Feedback is summarised in Table 6.1.
Table 6.1 Summary of a ‘complexity-based thinking’ perspective of CMF Time, Continuity and Network Maintenance Feedback

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<tr>
<th>Characteristic</th>
<th>Description</th>
<th>CMF Example – Interdependence</th>
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<td>Connectivity</td>
<td>A decision or action by any individual (group, organisation, or institution) may have an impact on related individuals and systems.</td>
<td>CMT attempts to exploit ‘up and coming’ managers de-motivates other people and thus results in a ‘cost’</td>
</tr>
<tr>
<td>Co-evolution</td>
<td>One domain or entity changes in the context of others</td>
<td>Co-evolution invites notions of responsibility. Reluctance to engage in low value works threatens the stability of the community or ecosystem</td>
</tr>
<tr>
<td>Far-from-equilibrium</td>
<td>Away from behavioural norms</td>
<td>The proposed CMF identified and exploited a bifurcation – a new road, new values and new vision</td>
</tr>
<tr>
<td>Space-of-possibilities</td>
<td>Exploring the ‘adjacent possible’</td>
<td>Continuity of site management may be resolved by exploring the adjacent possible</td>
</tr>
<tr>
<td>Feedback</td>
<td>Reinforcing and balancing loops</td>
<td>As trust has evolved, feedback reinforces CMF values and identity</td>
</tr>
<tr>
<td>Schema</td>
<td>Agent based rules</td>
<td>c10 &amp; c13 change rules for interaction based on local knowledge</td>
</tr>
<tr>
<td>Self organisation</td>
<td>Spontaneous coming together of a group to perform a task – no one outside the group directs those activities</td>
<td>c10 &amp; c13 co-evolve local schema by self organisation without the requirement or desire for any external control</td>
</tr>
<tr>
<td>Emergence</td>
<td>CAS are dynamic; that is their history is an important part of their emergent patterns</td>
<td>A history of hostility and aggressive tendering created away-from-equilibrium’ conditions from which a bifurcation emerged</td>
</tr>
</tbody>
</table>
Chapter Summary

This chapter explored Time, Continuity, and Network Maintenance Feedback as enablers for exploiting social capital for building resilience. The chapter opened recognising social capital constitutes a form of accumulated history - reflecting investments in social relations and social organisation through time, and that time is important for the development of social capital because all forms of social capital depend on stability and continuity of the social structure. A commitment to continuity of the social structure facilitates other processes known to be influential in the development of social capital - interdependence, interaction, and closure. As social capital can foster resilience it was suggested that time may be an important factor in developing and exploiting social capital for organisational resilience. The chapter comprised four sections which explored CMF: history and investment in social relationships; contractor commitment to stability and continuity of the social structure; threats to the stability, continuity, and resilience of the social structure; and adaptive capacity - a complexity-based thinking perspective.

In terms of history and investment in social relationships, when the CMF was established many people were sceptical of the culture being nurtured. This may have been influenced by the adversarial nature of the wider ‘traditional’ construction environment. As the CMF developed a history, contractors became more willing to buy into the culture and more trusting of other community members. With time and buy-in to the new culture, behaviour changed from ‘falling out’ over claims to being able to go onto future projects with established good working relationships.

Although the CMF has been established for nine years, some of the contractors have maintained working relationships for twenty five years or more. In part, the social capital embodied within these relationships enabled ‘appropriable organisation’ when for example, c10, c13, and c14, having been engaged for CMF works, were able to provide without contract, an emergency response capacity as part of a turn maintenance agreement. In this instance, better practices were shared across contractual and non-contractual boundaries and works were undertaken based on verbal agreement; payment and paperwork being sorted out afterwards. The relationship between these particular contractors was such that despite being competitors in a traditional arena, they established local norms to maximise on
shared resources and routinely shared resources when either party was ‘stretched’ in one way or another. These relationships show how social capital and the flexibility and redundancy it can provide can be exploited for competitive advantage and building resilience.

Only a couple of respondents r11 and r5, presented as currently sceptical of the CMF. One factor appears to be limited experience of working within the CMF which suggests it can take time to adapt to the culture (cognitions) being developed in the framework. Another factor appears to be a reluctance to give up the control that some contractors have been used to in traditional frameworks. Scepticism will likely constrain commitment to the stability and continuity of the community which suggests additional energy might be invested in new relationships as newcomers join the community.

Emergent questions for practitioners and policy makers:

- Social capital and trust, can take time to develop. Do our network relationships have sufficient history and social capital to enable the resourcefulness that can help us build resilience?
- Are our business relationship expectations in terms of resourcefulness and resilience commensurate with the history and social capital within those relationships?
- In terms of trust – a willingness to be vulnerable to another party; a belief in their competence, capability, and reliability (Mishira, 1996), are we investing sufficiently in relationships with the right people to build resilience?
- In what ways can we better manage our social capital investments (formal and informal) to develop and maintain new relationships, established relationships, and dormant relationships for building resilience?
- In what ways might our investments in network relationships be appropriable for other, related or unrelated purposes that might support sustainable competitive advantage (resilience)?

Although the CMF contract and values influence formal membership commitment to the framework, maintaining wider community commitment is seen as an ongoing challenge by the Community Manager. The formal membership’s funding of the
CMT and the Phil Stanton Award may be seen as a financial commitment. At the discretion of the MAC, prizes can be awarded for best innovations on a project. The CMF working environment was a factor that influenced contractors to commit. Other factors which appear to influence contractor commitment included the engaging role of the CMT in seeking feedback from the community, communicating the scale, scope and profile of works with the people who are actually doing the work, and selecting people with suitability and continuity for working within the framework. Each of these requires a commitment by the CMT, the individual contractors or both.

Another key factor influencing commitment is the workload contractors receive from the framework. As a generalisation, contractors that secure high value through a continued workload do commit time to participation in the community element of the framework. When work value reduces, commitment to the community reduces.

Emergent questions for practitioners and policy makers:

- How can we encourage and enable our establishment and network partners to commit to the stability and continuity of the social structure?
- What can we do to nurture a working environment which can influence a ‘willingness to go the extra mile’?
- In what areas could we:
  - Invite financial commitment to network initiatives?
  - Recognise and reward (formally or informally) innovation and excellent performance?
- What might we learn from evaluating our communication and feedback methods, and the suitability and commitment of our people for our purpose?
- Are our expectations for commitment from our people and partners commensurate with the workload, benefits and rewards they receive?
- What else can we do to manage desirable commitment?

There are also threats to the stability and continuity of the CMF. Free-riding whilst more common during framework infancy, now appears to be restricted to a minority. Again, it would appear that time may be needed for actors to buy into the CMF culture and cognitions that shape social behaviour. Performance reviews in part,
created an enabling environment for contractors to comfortably ‘have their say’ regarding others’ commitment and performance.

In the CMF2, it is anticipated that performance based continuity of work will be an incentive to commit to the community element of the framework as this will form part of performance evaluation. Whilst all respondents agreed this was fair compared to an equitable share of work regardless of performance, one specialist contractor anticipated difficulty in effectively measuring performance. Performance based work allocation represents a more formal approach to managing contractor commitment. An alternative, preferred by the Navigator was to seek novel ways to empower, create and reinforce ownership within the community. To some extent, the community already achieve this through various collective investment strategies underpinned by the community’s values.

Discontinuity of CMF work may contribute to the erosion of community culture. Without work continuity, community interaction and interdependence and thus social capital will likely erode. If social capital erodes, that capital may become increasingly difficult to exploit for building resilience.

Emergent questions for practitioners and policy makers:

- The CMF imposes peer pressure to check behaviour that threatens the stability and continuity of the community. In what ways can we use peer pressure to eradicate or reduce behaviours that threaten the stability and continuity of our organisation?
- In what ways can we combine peer pressure or any other community action to reinforce commitment to our values and purpose?
- Work discontinuity and thus network discontinuity may result in social capital erosion. Should work become discontinuous or infrequent, what can we do, formally or informally, to avoid erosion of our social capital?

This chapter identified and applied some of the principles of complexity (summarised in Table 6.1) that may be seen to contribute to an ‘enabling infrastructure’ for the CMF community to co-evolve within its ecosystem; notably,
the identification and exploitation of a bifurcation which enabled the co-evolution of a new coherence, much different from traditional contracting.

“Complexity is not a methodology or a set of tools... The **theories of complexity** provide a conceptual framework, a **way of thinking**, and a **way of seeing the world**. …[C]haracteristics of complex evolving systems are closely related and we need to understand their interrelationship to gain the maximum benefit from application of the theory…” (Mitleton-Kelly, 2003, p.26 & 43).

The notion of identifying or creating bifurcation points as an approach to change, without for example, thinking about schema, connectivity, interdependence and co-evolution, may not only impose limitations on our understanding, but if the approach fails it will likely be labelled as another management fad. Rather than attempting to pose questions based on individual principles of complexity, a more meaningful proposition may be for organisations to pursue “the identification, development, and implementation of an **enabling infrastructure**, which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

This chapter has in part, responded to research objective one by identifying ways in which organisations can exploit their social capital for resilience; objective two by exploring how Time, Continuity, and Network Maintenance Feedback as ‘enabling conditions’ contribute to the exploitation of social capital for building resilience; and in part, objective three by identifying questions that will form part of a reflective framework to help organisations identify how they can build and exploit their own social capital for building resilience.

The next chapter explores CMF Interaction and Participation as an ‘enabling condition’ and as part of an ‘enabling infrastructure’ for the exploitation of social capital for building resilience.
Chapter Seven

Interaction and Participation

Creating opportunities for interaction and participation within the CMF community emerged as an ‘enabler’ for exploiting existing and new social capital for building resilience.

Interaction is a precondition for the development and maintenance of social capital (Bourdieu, 1986). Weick (1993) identified ‘respectful interaction’ as a potential source for organisational resilience. Weick defines respectful interaction as respecting the reports of others and being willing to act on them; reporting honestly to others; and respecting one’s own perceptions and trying to integrate them with others. The notion of interaction spans social capital and resilience constructs.

From a complexity-based thinking perspective, Ashmos et al., (2002) argue:

“Participation in decision making enhances connectivity in organisations, which in turn, gives the organisation the opportunity to self-organise and co-evolve in more effective ways than when there is minimal connectivity (p.189)... Participative decision making will enhance and make denser the organisation’s web of relationships, and at the same time set free a broad range of ideas and strategies which can lead to the organisation developing a larger behavioural repertoire” (p.203).

A ‘larger behavioural repertoire’ may be likened with a ‘complex varied action inventory’, an element of ‘behavioural resilience’ (Lengnick-Hall and Beck, 2005).

Several CMF structures, formal and less formal, facilitate community interaction and participation. These ‘collective investment strategies’ (Nahapiet and Ghoshal, 1998, p.259) include Early Contractor Involvement, ‘setting the scene’ meetings prior to
commencement of site works, multidisciplinary on-site progress meetings, Off-line Groups, facilitated 360 degree company performance reviews, PartnerNet (community intranet), ‘buddy forums’, and social events away from the work place. These structures promote multidisciplinary interaction and provide: an opportunity to develop and maintain good working relationships; a space for ‘continuous conversation’ (Lengnick-Hall and Beck, 2003); and opportunities for exchange of knowledge, ideas, and better practices.

This chapter explores how social interaction and participation within the CMF can be exploited for building resilience. The first section explores **Early Contractor Involvement** (ECI) which brings together various contractor disciplines during the design phase of a scheme to identify and solve potential problems which can contribute to maintaining positive adjustment during the build phase. ECI can enable the development and maintenance good working relationships facilitating a resourcefulness that can be linked with resourcefulness. CMF **Empowerment** enables the membership to participate in various community initiatives. Underpinned by the community’s values, empowerment can promote respectful interaction. A third section identifies **Extended Community Interaction** for building and maintaining CMF resilience. Participation in various community initiatives can foster the development of a larger behavioural repertoire which can be drawn upon for maintaining positive adjustment – resilience. The fourth section recognises how the CMF facilitates **Supportive Relationships**. For example, how ‘buddy partners’, often competitors outside the framework, engage in assimilating specialist guidance and identifying better practices for mutual benefit. To overcome poor performance, the community may assist by supporting informal ‘supplier development’ which can carry expectations for reciprocity – a useful resource when faced with challenging conditions. Each section emerged from the data and is supported by relevant literature. Figure 7.1 presents a chapter map linking data to social capital and resilience constructs. To gain insight into the adaptive capacity aspect of resilience, the chapter integrates and culminates in a fifth section, **Adaptive Capacity: A ‘complexity-based thinking’ (CBT) perspective** (Gilpin and Murphy, 2008).
Figure 7.1 Chapter map linking data to social capital and resilience constructs.

**Early Contractor Involvement**

ECI is a process where stakeholders (client, scheme designers, managing agent contractor, and specialist contractors) come together during the design and planning phases of a scheme to discuss and overcome interdisciplinary issues that emerge. The aim is to minimise potential disruptions during the operational phase enabling delivery on time and within budget. ECI appears to be an adaptation of Early Supplier Involvement (ESI), generally defined as a form of vertical cooperation in which manufacturers involve suppliers at an early stage of product development and/or innovation process (Bidault et al., 1998).

All respondents had worked within the CMF and on traditional contracts, thereby enabling them to make comparisons. Site foreman (r16) with limited experience of two CMF projects compared a traditional contract building an IKEA store with a CMF project. According to r16, the IKEA project was “done on the cheap” and did not facilitate any ECI. One outcome was his company having to work for three months on remedial works not undertaken properly during the project.
“An access road had to be re-laid three times to get the levels right... that would never have happened with ECI...” (r16)

“The [IKEA] project finished eighteen months ago, and I know they are still fighting for money...” (r16)

From a CBT perspective, connectivity is multidimensional and all dimensions (social cultural, technical, economic) interact and influence each other. For example, lack of ECI (interaction) not only failed the project delivery (economic dimension), the failed delivery and related claims process reinforced the hostile conditions (social dimension) the community associate with traditional contracting. Conditions that lead to ‘fighting for money’ may not be conducive to the relationships and resource sharing that the CMF seeks to develop.

Respondents agreed ECI provides a setting for relationship building and collaboration. There were no detractors. Moving from traditional contracting towards the collaboration promoted in the CMF has been difficult for some contractors and ECI has helped to forge a collaborative mindset.

The CMF employs a community model; the same people tend to be involved on different projects and relationships have developed through repeated interaction.

“Over the years we’ve developed relationships and for me, somebody will ring me up and say, will you come and have a look at this and I’ll be really up for that... And for me that’s really good because on a traditional job that wouldn’t happen. And even if there was ECI on a traditional job, it would be a one off and there wouldn’t be that relationship developed...” (r6)

Experiences of this nature can influence community ‘buy-in’ because members experience the value of participating in ECI and maintaining established relationships. An ECI process on a traditional scheme might not be as effective because there may not be a community. The job-by-job nature of such a contract may disrupt the development and maintenance of relationships. Social relationships generally, though not always, are strengthened by interaction but die out if not maintained (Nahapiet and Ghoshal, 1998, p.258).
From a CBT perspective, as new relationships co-evolve at ECI each participating entity has a new degree of connectivity which can lead to greater resourcefulness. When solutions or knowledge emerge from multidisciplinary interaction they form part of the community’s history which may influence future actions. “… about 3 jobs ago we had the same problem and this is how we solved it” (r6). In other words ECI (interaction and historicity) may develop a larger behavioural repertoire (Ashmos et al., 2002) or a ‘complex and varied action inventory’ - an element of ‘behavioural resilience’ (Lengnick-Hall and Beck, 2005).

**From Scapegoat to Egalitarian**

All works and maintenance on the highways involves traffic management (cones, lighting, signage etc). Any project changes can involve significant changes in traffic management which takes time and resources to implement. Traditionally, r7 claimed this often resulted in his company being used as scapegoats for work delays. Some corroboration can be drawn from the Community Manager’s comments:

> “We talk about equal voice a lot and everybody having the same status but for people like our traffic management guys, if they go out onto a traditional contract, they are back at the bottom of a heap really” (r3)

With CMF equal status, traffic management specialists participate in ECI. An advantage for the community can be the identification of traffic management issues before work begins. An advantage for the traffic management specialist is “… being involved in the design of the job rather than designing around the job” (r7). This enables proactive rather than reactive resourcing. Underpinned by community values and culture, ECI enables participation and respectful interaction and limits any temptation to blame ‘scapegoats’ for delays.

According to r7, it is relatively easy to design each element of a highways project in isolation, but bringing different contractors together can help determine whether a project design is achievable. ECI combined with equal voice enables the community to voice multiple perspectives and specialism specific concerns that may otherwise be overlooked.
From a CBT perspective, ECI provides a space for multidisciplinary interaction influencing connectivity and co-evolution among participants. Co-evolution implies empowerment. ECI provides a space for traditionally disempowered contractors to exercise the empowerment the CMF seeks to exploit through equal voice and status.

**Repertoire of Responses**

Specialist contractor r10 claimed CMF resilience is grounded in ECI and a risk register enabling contractors to evaluate risks and consider alternatives for anticipated scenarios.

“... you know before you start how that scheme’s going to run...you look at the job and say that can be done better, or we can do this and we’ve got a robust programme of what we’re going to do with the materials we’re going to use and the people that are going to do it. So the resilience to it is that... And we know that if point B changes, we look at the risk register and say that’s what we’re going to do to mitigate that...” (r10)

ECI contributes to the development of a larger behavioural repertoire (Ashmos *et al.*, 2002) or a complex varied action inventory (Lengnick-Hall and Beck, 2003), a useful resource when faced with maintaining positive adjustment under challenging conditions – resilience.

Although the community is encouraged to record innovations during the physical phase of a project there may be many innovations recorded during the ECI period. Depending on the scale of a project, ECI can run over long periods – several months or years. New innovations are shared throughout the community and may be taken forward onto future schemes. ECI is therefore a pathway for continuous improvement, and a means of both exploiting known knowledge and practices, and exploring or adapting new ideas and innovations, a ‘trade-off’ scholars recognise as necessary for building adaptive capacity (March, 1991) and resilience (Robb, 2000; Sutcliffe and Vogus, 2003).
Supply chain partner r12 described being introduced to ECI for a bridge repair. Invited by a specialist contractor (ex-colleague) with knowledge of his expertise, r12 was asked for his opinion on the proposed methods of drilling the bridge for repairs.

“I said you can’t do that because the bridge has got concrete repairs, so if you use hammer action drills it will start falling off, you need to use diamond core and this is how I want to do it” (r12)

An alternative method was suggested eliminating the risk of vibration. The scheme also entailed overhead water cooled drilling exposing workers to awkward conditions. r12 designed a remote controlled rig that avoided workers having to endure those conditions.

“My relationship with that specialist has been excellent ever since. The scheme was awarded second place in the annual Phil Stanton Award for knowledge and innovation” (r12)

Several points emerge from this story. A combination of established relationships, knowledge and expertise, and ECI enabled improvisations to overcome challenging conditions. In terms of social capital, Burt (1992) suggests benefits from network ties come in three forms - access, timing, and referrals. The resourceful loose ties between community members provided the access, timing, and referral (reputation) to exploit the expertise of the drilling contractor. Supported by CMF values and culture, ECI provided the space to challenge traditional ways of doing things – ‘an attitude of wisdom’ and improvisation, two potential sources of resilience (Weick, 1993). Further, the relationship between the engaging specialist contractor and r12 is stronger resulting in enhanced social capital. Figure 7.2 depicts this as a positive feedback which suggests social capital and resilience can co-evolve.
Figure 7.2 Reinforcing (positive) feedback between social capital (loose ties) and resilience (attitude of wisdom).

Another aspect to this story is the willingness by r12 to share ideas (design of a remote controlled rig) with the wider community. He recognises potential benefit through enhanced reputation.

“I want to be known as someone who solves problems for people” (r12)

From a CBT perspective,

“… to survive and thrive an entity needs to explore its space of possibilities and generate variety; the search for a single ‘optimum’ strategy may neither be possible nor desirable as any strategy can only be optimum under certain conditions. When conditions change, the strategy may no longer be optimal… it may not be possible to explore all possibilities. It may, however, be possible to consider change one step away from what already exists - what is sometimes called the ‘adjacent possible’. That is exploring one step away, using ‘building blocks’ already available, but put together in a novel way” (Mitleton-Kelly, 2003, p.36).

Multidisciplinary interaction at ECI provides one means for the community to explore its space of possibilities. Via loose network ties, the community accessed existing knowledge and resources – the expert drilling contractor and his ability to construct bespoke drilling rigs and explore those possibilities to produce a novel solution to a problem. CMF multidimensionality is also evident here. Access to expertise via the social dimension (loose network ties) influenced a technical adaptation, which in turn reinforced the social capital between participants.
Virtual Roles and Bricoleurs

As community relationships have matured, contractors have developed tacit interdisciplinary knowledge and an ability to anticipate others’ behaviours or actions.

“... you're sat in with 10 other people who you know really well, especially now it’s 7 years... you get to know how people work and how they think” (r10)

“You start thinking what he is thinking and the answers become self explanatory” (r16)

On one hand, this could represent ‘group think’ (Janis, 1972). One symptom of group think is that members are under pressure not to express arguments against any of the group’s views. However, this may be unlikely as the CMF actively invites interaction to challenge existing views as part of continuous improvement. On the other hand, knowledge of roles that others’ fulfil, to some extent, may help to shape ‘virtual role systems’ (Weick, 1993). A potential source of organisational resilience,

“virtual roles preserve intact in each person’s mind a conception of the system of which they are a part. Each person mentally takes all roles, so that even in situations of peril and disruption everyone is able to maintain a shared vision of risks, goals, and possible actions. This allows people to both fill in for an absent member (one who is either physically or cognitively absent) and to refer to that conception in order to continually align their actions with the shared goals of the group” (Weick, 1993).

As Sutcliffe and Vogus (2003) point out, resilience emerges from relatively ordinary adaptive processes that promote competence, restore efficacy, and encourage growth, as well as the structures and practices that bring about these processes. Highways maintenance can be a dangerous environment. In this context virtual roles might apply to understanding the roles of other specialist contractors and the issues they routinely face; knowledge that might not develop without ECI.

Although all respondents agree ECI can be beneficial and resourceful, r4 suggested:
“It was a team without a leader and that’s not necessarily a good thing. Somebody has to lead the team and if everything’s a consensus you don’t actually decide anything” (r4)

Facilitating multidisciplinary interaction may be perceived as messy but for most respondents it represents an engaging environment for diverse interaction, identifying and resolving problems. Attendees at ECI may be seen as bricoleurs.

“Bricoleurs remain creative under pressure, precisely because they routinely act in chaotic conditions and pull order out of them. Thus, when situations unravel, this is simply normal natural trouble for bricoleurs and they proceed with whatever materials are at hand. Knowing these materials intimately, they then are able, usually in the company of other similarly skilled people to form the materials or insights into novel combinations” (Weick, 1993, p. 639).

Bricoleurs may benefit from a space to practice their craft, and ECI is one structure that provides that space. It may be that some ECI sessions are messy, but it is the messy nature of multidisciplinary interaction that can enable members to identify novel solutions.

From a CBT perspective, at least two points emerge. First is the similarity between ‘bricolage’ and the ‘adjacent possible’— that is exploring one step away using ‘building blocks’ already available but put together in a novel way (Kauffman, 2000). Both ideas encapsulate notions of improvisation and novelty. Second is the potentially ‘messy’ nature of empowering multidisciplinary interaction.

“Participation, as a social process, creates a platform such that self-organizing becomes an expression of organisational learning and sense making. Putting people together and setting them free to solve problems can have profound benefits for an organisation, even if in the short run, things seem unclear, messy, and slow” (Ashmos et al., 2002, p. 198).

Wheatley and Kelner-Rogers (1996, p. 71) describe this mess:

“From such local, autonomous, and messy negotiations, something large, complex, and useful emerges. Individual freedom leads to global stability.
Through messy parallel activities, life organizes its effectiveness. It looks like a mess. It is a mess. And from the mess, a system appears that works.”

**ECI and the Managing Agent Contractor**

Respondents put ECI at the core of a comparison between the ways different Managing Agent Contractors (MAC) go about their role, which in turn can influence community interaction.

“In Area 9 [non focus community]...they get you more involved earlier, in design and that sort of thing...So the specialists are evolving with the job and they’re learning about the job and that ultimately must have some benefit... In Area 10 [focus community], you’re given a job when it’s too late... you’ve no input into design. So it’s too late to say this really isn’t good to do this, it’s difficult to build or it won’t work or whatever...” (r6)

The Area 9 MAC engage contractors earlier enabling learning as a scheme evolves. Within the community this is seen as a good practice for building interdisciplinary relationships, identifying problems, and draws on at least two aspects of resilience. First, resilience is not just a reactionary phenomena, it emerges from relatively ordinary adaptive processes that promote competence, restore efficacy, and encourage growth, as well as the structures and practices that bring about these processes (Sutcliffe and Vogus, 2003, p.95). Second, it facilitates ‘mindfulness’ about errors that have already occurred and to correct them before they worsen and cause more serious harm (Weick and Sutcliffe, 2001). In Area 10, the MAC assigns specialist contractors to schemes when there is limited, if any, time remaining for contractor input.

“... the scaffold was put up in such a way that it was a problem for us to do the concrete repair. The scaffold had to be taken down and re-sited. It wasted a day and created a lot of unnecessary tension. With greater discussion and involvement with the MAC before hand, this could have been avoided” (r11)

In Area 10, the MAC appears to be trying to retain the control to which they have become accustomed in a traditional contracting.
“Another difference we see is the way they manage, or the attitude of their managers to the specialists. In Area 9, if there is a problem it’s everybody’s problem. In Area 10, it’s more like a principal contractor managing sub contractors. You’ve got to do that; do it when and how we say you do it. So although on paper the MAC is supposed to be equal status and level with the specialists...they haven’t moved away from the traditional principal contractor role that they’ve been used to in a more traditional environment” (r6)

By attempting to retain control without collaborating with specialist contractors, the MAC is behaving contrary to spirit and culture of the CMF. The community’s espoused values: respect; integrity; and reliability, carry notions of listening, openness and commitment respectively.

“That was the problem, they weren’t listening to us. It was, we’re the big civils company, we’ve done all this before, and we know what we’re doing... I’m a specialist in my field contracted to the HA because we’ve proved we know what we are doing... You might know what to do but I know the fine detail... what can be a hazard, what can’t...” (r10)

Plausible explanations why the MAC in Area 10 behaves in this way may be related to the relatively short time period (two years) they have had to adapt from traditional contracting to the collaborative style of the CMF. Reinforcing the findings in Chapter Six relating to the suitability of individuals for Off-line Groups, another issue is the suitability of individuals for roles within a MAC and how well those individuals have bought into the CMF.

“[Area 10 MAC] people are used to ‘telling’ people to do things the way they want things done, but the CMF is a very different way of doing things, more collaborative” (r6)

“...woah, hang on a bit. This ain’t how it works. And there were two or three very forceful characters who were trying to push it that way. And we held our ground and said, wait a second, this isn’t how it works. I don’t work for you, I work with you, I work for the HA” (r10).
From a CBT perspective, the difference between the MAC in Areas 9 and 10 can be seen in the degree of control they attempt to assert over the community. In Area 9, the MAC engages the community - “the specialists are evolving with the job and they’re learning about the job and that ultimately must have some benefit” (r6). In Area 10, by not exploiting multidisciplinary interaction the MAC is failing to enhance and make denser the organisation’s web of relationships, and failing to set free a broad range of ideas and strategies which can lead to the organisation developing a larger behavioural repertoire (Ashmos et al., 2002). The MAC is failing to promote respectful interaction; failing to exercise an attitude of wisdom; and failing to provide the enabling conditions that can facilitate improvisation, and the development of virtual role systems. The MAC is failing to exploit Weick’s (1993) potential sources of resilience.

CBT may inform why some individuals from the Area 10 MAC have been reluctant to buy into the CMF.

“In a human system, connectivity and interdependence means a decision or action by any individual (group, organisation, institution, or human system) may affect related individuals and systems. That affect will not have equal or uniform impact and will vary with the ‘state’ (history, constitution, organisation, and structure) of each individual and system at the time” (Mitleton-Kelly, 2003, p.26).

The affect may not always be beneficial throughout a community or ecosystem. Any action to improve fitness or position by one entity may result in a worsening condition for others. “Each ‘improvement’ in one entity may therefore impose ‘costs’ on other entities within the same or related systems” (ibid, p.27). The CMF has changed the way contracts are procured. Equal status, equal voice, and ‘levelling the playing field’ are all actions associated with creating an alternative means of procurement and working. Connectivity and interdependence between contractors is such that as the specialist contractors (many of them normally 2nd or 3rd tier on traditional contracts) are empowered to participate in community initiatives. This, the community see as an ‘improvement’. However, the MAC traditionally charged with greater authority and control has become less empowered. This, some perceive as a ‘cost’ and has had varied affects on the traditional mindset. The history, traditional
ways of contracting, coupled with the constitution of individuals (suitability for working in the CMF) are at least two aspects of the ‘state’ of the system that influence ‘an affect’, in other words – the degree of ‘buy-in’ to the CMF.

In contrast to approaches based on control,

“The complexity approach to managing is one of fostering, of creating enabling conditions, of recognising that excessive control and intervention can be counterproductive. When enabling conditions permit an organisation to explore its space of possibilities, the organisation can take risks and try new ideas. Risk taking is meant to help find new solutions, alternative ways to do business, to keep evolving through established connectivities while establishing new ways of connecting” (Mitleton-Kelly, 2003, p. 47).

Empowerment

Innovations Initiative

“Guys out there innovate all the time... see a problem, come up with a good idea to resolve it, and what I ask in addition is that they write it down in enough detail so that somebody else can pick that idea up and put a value to it. Once that is all recorded I can report back to the client that we are offering them extra benefits in terms of the added value we’re giving them, which the client is very keen on. But also I can make sure that any similar schemes are sharing those ideas and that ideas are being passed from one site to another” (r3)

Figure 7.3 CMF innovations site poster

Whilst ECI can provide for multidisciplinary interaction, more exploratory and tacit in nature, the innovation recording initiative can capture more explicit knowledge.
Combined, these forms of knowledge and their respective means of acquisition respond to March (1991) who contends organisations with adaptive capacity focus on exploitation and exploration.

Innovation recording is encouraged at all levels within the CMF, and site-level champions and posters (Figure 7.3) help to keep the community active. According to the Community Manager, initially this required much effort to get people to engage:

“It’s been a long hard slog. I think now we get them from across the board. We’ve done a lot to promote them coming from the guys on site, from the guys actually doing the work. It’s been hard trying to convince them that (a) the good idea that they’ve come up with is worth writing down and (b) to actually get them to put pen to paper or to take the time to go back to the office” (r3)

The CMT is committed to ‘closing the cycle’. Closing the cycle means putting a value on the innovation if it is adopted which is then reported to the HA to evidence the benefits of community initiatives, and also feeding back any outcome to the innovator. It may be that the innovation cannot be implemented on that scheme, but put forward to designers to be implemented on future schemes.

Managed well, innovation recording serves several purposes. Along with saving money and improving standards of safety, it has potential to reinforce the ‘equal voice’ with which the community identify. Communities with identity are conducive to information sharing, learning and knowledge exchange (Nahapiet and Ghoshal, 1993), each of which may be desirable when faced with maintaining positive adjustment under challenging conditions - resilience.

Performance and Safety

Specialist contractors are empowered to make local decisions without necessarily seeking higher authority; there is deference to expertise, a characteristic of High Reliability Organisation (Weick and Sutcliffe, 2001). Specialists have been selected for the CMF because they have evidenced competence. On a traditional contract, respondents claim they are less empowered which can mean having to stop work,
follow protocol, whilst a decision is made by a higher authority. r10 claimed on a traditional contract he would not do anything without asking the main contractor first, because he might not get paid for it.

“I wouldn’t dare do anything without getting permission because if you did (1) if it’s wrong it comes straight back on you, there’s no we were trying to do the best for the scheme, (2) you might not get paid for it because they’ll say we never told you to do that, who instructed you to do that? It’s these sorts of boundaries that sometimes stop you being as effective and efficient as you can. In the CMF a lot of those boundaries are taken away and it’s not necessarily just contractual, it’s about trust and people understanding that what you’re doing, you’re doing for the best of the scheme” (r10)

Safety is high on the agenda because of the inherent danger of highways maintenance. Everybody is empowered to report dangerous occurrences but there is deeper concern for embedding a safety culture.

“More people are killed on the hard shoulder than in any other lane so we do work in a dangerous environment. What we’ve got to have is people who are honest and if somebody does something wrong we’ve got to know about it because the idea is that you’re not supposed to cover it up… And the near hit form is just a way of recording it. It’s more about enrolling everybody in to that culture. Of not being frightened to speak up” (r1)

In reporting dangerous behaviours, the aim is not to expel an actor but to educate them towards behaviour conducive to the stability and continuity of the community, and the benefits those behaviours can bring. Although a contractor might not be removed from the framework they would be expected to show a commitment to improvement following any report of unsatisfactory behaviour or standards of work.

Being aware of the dangers involved with motorway maintenance, contractors are keen to engage. Weick and Sutcliffe (2001) speak of being mindful about errors that have already occurred and to correct them before they worsen and cause more serious harm. For example, discussing High Reliability Organisation on US aircraft carriers, Weick and Sutcliffe (2001, p.29) note “…although the captain’s commands usually take precedence, junior officers can, and do, change these priorities when
they believe that following an order will risk the crew’s safety”. The key seems to be empowerment to voice opinions or concerns which again can be seen as an element of respectful interaction, a potential source of resilience (Weick, 1993).

**Extended Community Interaction**

The formal community comprises specialist contractors who have a contractual relationship with the HA. There is also an extended community of supply chain partners approved by the HA. There is no contract between the specialist contractors and the supply chain partners. Any formal agreement at this level would be on a scheme by scheme basis.

**Maintenance of CMF Culture in the Extended Community**

The CMT routinely facilitate Workforce Workshops. The aim is to reinforce the CMF culture. Typical questions include:

- *Is there anything that needs improving?*
- *Do your managers listen to you?*
- *Are you being given enough information?*
- *Have you got any problems in terms of safety?* (r3)

“...once you get people working in the same direction and to provide the evidence of the success they have doing that, then that’s what it’s all about really. That’s why we’re here. And it works. And it does make for more successful teams. And it makes for a happier workforce...” (r3)

When problems emerge on site, the CMT may attend and help resolve them. In this role, they may be seen as partnership brokers.

“*If I get feedback either in the cultural side from lads on site that things aren’t going as well as they should or in terms of evidence, measurement data, if I get anything back that shows things aren’t working as we’d expect them to, then we get together and we go out on site and have a look at it.*
People seeing that, that if things do start to go wrong, there are people out there trying to help put it right, it makes a big difference in terms in people seeing the value of doing that work in the first place” (r3)

An observation then, is whilst values or schema guiding community behaviours may become more or less embedded over time and with feedback of success, maintaining community culture can require ongoing investment.

Resurfacing contractor r10 have had long term relationships with their main supply chain partners. They encourage the suppliers to be involved in the community and claim each has subsequently bought into the spirit of the CMF.

“We ask for the same people so when we have a road brush, we ask for the same road brush driver. The planer company we use only has 3 planers and about 12 operatives – we know them all. They’ve all been inducted into the CMF and they all know what we’re aiming for. So the people on site, everyone knows each other and not just us, the client might come, someone from the MAC, they get to know the people and it’s oh it so and so, he was on the last job wasn’t he. It’s that sort of a rapport” (r10)

Motorway resurfacing can be considered a routine activity. Engaging the same contractors can lay foundations for good working relationships and reliability. r10 employ r13 who have teams of workers allocated with their own machines. r13 claims the teams take great pride in the maintenance of their machines which contributes to performance and reliability.

There are constraints on community interaction:

“The kind of work we do only comes up now and again but we do want to be part of the CM Community” (r4)

In contrast to the formal community’s equal voice, supply chain partners claim they have limited participation in community initiatives. r14 claimed his company do want to be part of the community but currently only attend social events when invited by their engaging specialist contractor. As ‘equal voice’ is strongly promoted, one might argue there could be greater accessibility opportunities for the extended supply network.
Supply chain partner r8 claimed he has never been invited to a progress meeting. Any ideas or issues the partner may have are expressed through his engaging specialist contractor who should feed back accordingly. As with other supply chain partners, r8 was unaware there is a Supply Chain Group where he can voice any concerns.

Although some supply chain partners draw limited work via the CMF, r4 and others suggest they would like greater participation in community initiatives. A related issue appears to be ability or willingness of specialist contractors to facilitate supplier participation (addressed in Chapter Eight - Interdependence). Perhaps supply chain partners need to be more proactive if they want to be involved. Part of a solution may be that the CMT frequently communicates the Supply Chain Group opportunity. One goal at the specialist contractor/supply chain partner interface appears to be creating and maintaining the enabling conditions for respectful interaction.

**Predisposition and Participation**

From a CBT perspective, a few simple rules can influence complex organisational behaviour.

“Although the behaviour that emerges is complex, the rules that guide it are necessarily simple…. it is their simplicity that creates the freedom to behave in complicated adaptive and surprising ways” (Brown and Eisenhardt, 1998, p. 18).

Ashmos *et al.*, (2002) contend that participative decision making is such a simple rule:

“A… rule of thumb is that there should be widespread participation in organisational decision making. This… ‘complexifies’ the organisation and its responses because it draws on and enhances connections within the organisation… Through decision processes that involve many decision makers, multiple informants, multiple interpretations and a broad set of information, the organisation positions itself for developing more complex responses that may be needed to succeed in a turbulent environment” (p.190)
This is a good time to introduce and apply Ashmos et al., (2002) predisposition → participation → environmental sensitivity feedback loop.

“Organisational predisposition affects how much participation occurs in organisations because of institutional forces that exert continual pressure on organisations to do things a certain way. The amount of participation affects how sensitive organisations are to their environment because multiple participants create multiple perspectives which usually lead to new and different ways of viewing the environment. Environmental sensitivity affects predisposition because organisations that are environmentally sensitive are complex and have the ability to alter the organisation’s predisposition” (ibid, p.202).

Figure 7.4 shows a self-reinforcing feedback loop that suggests participation ultimately changes predisposition.

![Figure 7.4 Predisposition / participation / environmental sensitivity loop (Ashmos et al., 2002).](image)

The feedback loop is useful for looking at how contractor participation in various CMF initiatives may have changed the predisposition of community (Figure 7.5). In
general, respondents claim prior to the CMF, or when compared to the CMF, the highways industry represents a ‘hostile’ environment. The institutional forces: rules, roles, and history that appear to have influenced this predisposition include the extremely competitive tendering processes accompanied by aggressive claims for recouping additional costs. In such a hostile environment, clients were predisposed to “screwing the supply chain” (r9); principal contractors were predisposed to a ‘control’ role; and contractors were predisposed to a silo mentality, shielding knowledge and resources from others in pursuit of a perceived competitive advantage. Under these conditions, inter-organisational or participative decision making appears to have been minimal – “nobody would lend anybody anything” (r7).

**Figure 7.5** Ashmos et al., ’s (2002) predisposition, participation, environmental sensitivity loop applied to the CMF.

Level of participation affects how sensitive organisations are to their environment (an organisation’s willingness to overcome predisposition) because multiple participants create multiple perspectives which usually lead to new and different ways of viewing the environment (Ashmos et al., 2002). With minimal participation a contractor community would likely be ‘environmentally insensitive’ thus maintaining its original predisposition - hostile.
The CMF seeks change from previous institutional forces. To replace hierarchical structures associated with traditional contracting, the CMF introduced a community model at the heart of which lies value driven participation; a move that appears to both soften and compliment competition. The traditional principal contractor ‘control role’ has been replaced with a MAC who, of equal status, *should* coordinate by facilitation rather than control. With emphasis on relationship building, the entire membership is encouraged to participate in community initiatives. Increased participation appears to have enhanced environmental sensitivity. For example, along with ECI there are Off-line Groups - Process, Culture, and Measurement. These are supported by sub-groups – Safety Communication, Innovation, Supply Chain Integration, and Environment. In addition to participation on these groups, respondents (r1, r7) have expressed environmental sensitivity in their comments regarding Journey Time Reliability (JTR) and UK PLC. A new environmental sensitivity appears in part to have significantly changed (adapted) the disposition of the community. In general, specialist contractors participate in the community initiatives. Length of membership and work continuity has some influence on participation – these have been discussed in Chapter Six - Time and Continuity.

**Supportive Relationships**

Attending fortnightly progress meetings enabled observation of the community engaged in problem solving. During one meeting, it became apparent that damage to existing concrete exceeded an initial survey. The scheme already complex, involving railway and motorway, unexpectedly could have changed into a much larger project. The problem and solutions were discussed calmly and openly. The ‘feel’ of the meeting was engaging rather adversarial. There was no suggestion that this was the concrete repair specialist’s problem in isolation. The community addressed the problem collectively and worked through any additional issues that emerged.
**Buddy Forums**

The CMF has at least two contractors for each of nine specialisms and encourages buddy partnering and buddy forums, where ‘like’ skilled specialists discuss issues relating to their specialism.

“...there’s been some reasonably large developments in traffic management... some quite hefty guidance notes have been issued from government and you get the 3 organisations in a room together and they discuss how that has an effect on their specialism. And it’s that element of support…” (r3)

Although ‘buddies’ may be competitors, they share information because they share the same community values, incentive system, and pursue the same goals.

“There is quite a bit of that. I used to sit down with the other civils guy and we used to go through things and he used to tell us where he was having difficulties and likewise” (r6)

The ability to interact and draw upon the support of other specialists helps to build and maintain good relationships. In terms of the cognitive dimension of social capital, it is “through action within communities of knowing that we make and remake our language and knowledge” (Boland and Tenkasi, 1995, p.353). Buddy forums provide a space for conversation, action, and interaction and for codes and language to develop. That space for conversation represents an element of Lengnick-Hall and Beck’s (2003) behavioural resilience.

r6 described how he used to ‘buddy up’ regularly with a competitor over several years. The relationship ceased when the competitor changed jobs.

“The rapport with his replacement is not the same; has not had time to develop and there is minimal if any collaboration and sharing of ideas... The dialogue has broken down and with only three or four months to go with the current CMF it is not worth re-establishing” (r6)

If both actors were to secure CMF2 membership, r6 suggested he would be keen to re-engage. This story supports the notion that relationships can take time to build and there must be an expectation of benefit before people are willing to engage in buddy
partnering. Buddy partnering appears to be a useful strategy for developing relationships, knowledge sharing, and providing mutual support, each of which may be a valuable resource in maintaining positive adjustment under challenging conditions - resilience.

From a CBT perspective, the degree of connectivity in a social ecosystem is changing all the time as members join and leave. In the CMF, relationships developed through collective investment strategies such as ECI and buddy forums will have an influence on the degree of connectivity. This is a dynamic process as agents (contractors) may be part of several groups or forums and any contribution depends partly on the other individuals in the group and the way they relate to each other.

When a new member joins a team, for example the replacement for r6’s buddy partner, the degree of connectivity changed and interaction ceased.

“The contribution that a new member will be allowed to make to… [a] team may depend on the other members of the team and on the space they provide for such a contribution, as much as the skills, knowledge and expertise brought by the new member” (Mitleton-Kelly, 2003, p.28).

r6 suggested that as the framework neared full term, the new relationship was not worth re-establishing. However, an implication of this decision is the reduced potential for feedback because “the degree of connectivity, which determines the network of relationships and the transfer of information and knowledge is an essential element in feedback processes (ibid, p.28).

Community Networking - Resourcefulness

“I was at ***** but I got a better offer from ***** so I’m over there now. We’ve got a job on... I’ll give you a shout” (r7)

A view expressed by at least five respondents (r1, r4, r6, r10, r11) is that although the construction industry is a massive industry, the construction community is relatively small. A networking process whereby contractors maintain knowledge of the whereabouts of key people enables contact when necessary.
“... it involves following their career moves and keeping the relationship alive” (r4)

This networking, maintaining network ties which provides access to resources also noted in the preliminary Network Rail case study, may be described as a functional habit, an element of Lengnick-Hall and Beck’s (2003) behavioural resilience. Most community members recognise these relationships as a valuable resource that can be accessed routinely and rapidly during unexpected events. Resourcefulness and rapidity are cited by Kendra and Wachtendorf (2003) as features of resilience.

There is usually at least one social event per project. There are conflicting views regarding the benefits from social events. r6 acknowledged benefit during the early stages of the framework where socials acted as an ice breaker, but claimed interest has faded.

“We have all been to the horse racing... we have all been golfing... we have all been go-carting, bowling, and beer drinking” (r6)

r10 described the benefits from socialising with competitors every couple of months.

“... It enables us to discuss the industry, and anything we can do to help each other and push each other forward” (r10)

“If there is a problem on site, people are approachable because you know them, the ice is already broken” (r14)

“Apart from the racing, **** got a lot from the social side of the event; he met a lot of people from [the MAC] and exchanged a lot of views. In a non-contractual atmosphere he really enjoyed it” (r4)

r4 asserted he would like to be able to commit more time to the social and community element of the CMF, but would also like to be able to secure more work from the CMF. This comment supports the findings in Chapter Six - Time and Continuity, which suggest commitment to the community can depend on the level of value that can be drawn from the framework.

From a CBT perspective, the multidimensionality of the CMF is apparent. The socials are an informal means of influencing the ‘degree of connectivity’ dynamic.
An ‘effect’ is that formal workplace relationships, comprising knowledge and other potential resources can become more accessible for the maintenance of positive adjustment.

**Adaptive Capacity - a ‘complexity-based thinking’ perspective**

ECI provides for multidisciplinary interaction and participative decision making. r14’s comments regarding the IKEA project suggest lack of ECI failed the project delivery - an access road had to be re-laid three times taking the project over schedule. The lack of interaction appears to have constrained any existing or potential relationships and ideas that may have resolved the immediate problem or the development of a larger behavioural repertoire. The story also exhibits the multidimensionality of complex systems; the failed delivery (economic dimension) and related claims process reinforced the hostile conditions – “fighting over money” (social dimension) associated with traditional contracting methods. An implication for organisational architects and managers is to identify and facilitate enablers for interaction which recognise the multidimensionality of systems, related systems, and the wider environment.

ECI facilitates connectivity and an opportunity for participants to co-evolve. In particular, ECI provides an enabling environment for traditionally disempowered contractors to exercise the empowerment the CMF seeks to exploit through equal voice and status. As relationships are forged each participating entity has a new degree of connectivity which can lead to greater resourcefulness. Any solutions or knowledge that emerges from multidisciplinary interaction becomes part of the participant’s history and may become part of a new and larger behavioural repertoire or resourcefulness.

Interaction and connectivity in the CMF is also evident in the support that the CMT provide to the membership. The CMF represents a structure, a way of relating that is very different from traditional contracting and may be considered ‘away-from-equilibrium’ (established norms). The CMT provides support through workforce workshops, promoting ‘buddy forums’, and facilitating peer reviews. These structures are more formal means of creating connectivity and interaction.
Connectivity may also be implicit with tacit connections, for example through informal networking and social events organised by the community.

The degree of connectivity in a social ecosystem changes all the time. When a new member joins a team, for example the replacement for r6’s buddy partner, interaction ceased and the degree of connectivity changed. Any decisions regarding the maintenance or otherwise of interaction and connectivity may be better informed by the notion that the degree of connectivity, which determines the network of relationships and the transfer of information and knowledge is an essential element in feedback processes (learning).

Complexity suggests,

“There is no single point(s) of control. Systems’ behaviors are often unpredictable and uncontrollable, and no one is “in charge.” Consequently, the behaviors of complex adaptive systems usually can be influenced more than they can be controlled” (Rouse, 2000, p.144).

A difference between the MAC in Areas 9 and 10 can be seen in the level of control they attempt to assert on the contractor community. In Area 9 the MAC engages the community. r6 claimed specialist contractors evolve and learn with the job, a view that really captures the connectivity and co-evolution of a social ecosystem. In contrast, the Area 10 MAC seemed reluctant to relinquish the control that the community associate with traditional contracting.

Complexity suggests that although connectivity and interdependence means a decision or action by an individual may have an effect on related individuals and systems, that affect will not have equal or uniform impact and will vary with the ‘state’ of each individual and system at the time (Mitleton-Kelly, 2003, p.26). Further, the effect may not always be beneficial throughout a community or ecosystem. For some the effect may be an improvement, for others the effect may impose costs. The CMF replaced traditional hierarchical structure with a flatter equal status structure. Depending on the position and mindset of the individual, the change may be seen as an improvement or a cost – empowerment or disempowerment. It was argued that this tension, along with the constitution of individuals may lie at the core of the willingness to ‘buy-in’ to the CMF concept. An implication for
organisational architects and managers is to consider the ‘state’ of a system when considering change, and the potential improvements and costs that may result from any decisions or actions taken.

The application of a predisposition → participation → environmental sensitivity model suggests how the ‘simple rule’ of participation in collective investment strategies helped to enhance environmental sensitivity which changed the disposition – from aggression to collaboration; from control to relationships; from silo mentality to knowledge and resource sharing.

CMF collective investment strategies promote and encourage interaction and participation and provide an ‘enabling environment’ for the community to explore their ‘space of possibilities’. The similarity between bricolage (Weick, 1993) and the ‘adjacent possible’ (Kauffman, 2000) was noted. Both speak of using existing ‘building blocks’ to improvise and create novel solutions. In complexity theory, this is one means of creating requisite variety (Ashby, 1969), which in terms of resilience may be seen as a complex varied action inventory (Lengnick-Hall and Beck, 2003). An example of the CMF community’s ability to explore its space of possibilities was evident in the expert drilling story. By exploring one step away, using ‘building blocks’ already available (established relationships, knowledge and expertise, and the ECI process) the community were able to construct a special rig to overcome a drilling problem and improve awkward working conditions.

The drilling story leads to other related characteristics of complexity – multidimensionality and feedback. Access to expertise via the social dimension (loose network ties) influenced a technical adaptation, which in turn reinforced (feedback) the social capital between participants.

Complexity suggests “Agents’ needs or desires, reflected in their rules, are not homogeneous and, therefore, their goals and behaviors are likely to conflict — these conflicts or competitions tend to lead agents to adapt to each other’s behaviors” (Rouse, 2000). r6 claimed some contractors had had difficulty adjusting from traditional contracting methods to the CMF. Interaction and relationship building at ECI appears to have provided an ‘enabling environment’ for contractors to adapt their schema or mindset to the behavior and goals of the CMF. A complexity-based thinking perspective of Interaction and Participation is summarised in Table 7.1.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
<th>CMF Example – Interdependence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity</td>
<td>A decision or action by any individual (group, organisation, or institution)</td>
<td>ECI - a space for r7 to exercise the empowerment (equal voice and status) that CMF seeks to exploit.</td>
</tr>
<tr>
<td></td>
<td>may have an impact on related individuals and systems.</td>
<td>Multidimensionality – lack of ECI fails IKEA project delivery (economic)</td>
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<td></td>
<td></td>
<td>Claims process has an adverse affect on relationships (social).</td>
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<td></td>
<td></td>
<td>Support initiatives (formal workshops &amp; peer review, informal socials)</td>
</tr>
<tr>
<td>Co-evolution</td>
<td>One domain or entity changes in the context of others</td>
<td>ECI - building relationships and multidisciplinary knowledge to co-evolve – creating a greater repertoire of responses.</td>
</tr>
<tr>
<td>Historicity</td>
<td>An entity’s history influences future decisions</td>
<td>MAC attitude (control) influences interaction and co-evolution.</td>
</tr>
<tr>
<td>Space-of-possibilities</td>
<td>Exploring the ‘adjacent possible’</td>
<td>r6 solutions developed at ECI become part of the community’s history and may influence future actions.</td>
</tr>
<tr>
<td>Feedback</td>
<td>Reinforcing and balancing loops</td>
<td>Exploring r12’s known expertise in a novel way – adapting drilling rigs for remote use and improved working conditions.</td>
</tr>
<tr>
<td>Schema</td>
<td>Agent based rules</td>
<td>Predisposition → Participation → Env. Sensitivity → Predisposition</td>
</tr>
<tr>
<td>Self organisation</td>
<td>Spontaneous coming together of a group to perform a task – no one outside the group directs those activities</td>
<td>Interaction at ECI enables schema to be adapted – behaviour adjusts from traditional contracting to CMF.</td>
</tr>
<tr>
<td>Emergence</td>
<td>CAS are dynamic; that is their history is an important part of their emergent patterns</td>
<td>Collective action/resource sharing – value (schema) driven rather than ‘controlled’.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Industry histories influence perceptions of ‘improvements’ and ‘cost’ and thus buy-in to the CMF.</td>
</tr>
</tbody>
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Chapter Summary

This chapter explored Interaction and Participation as enabling conditions for exploiting social capital for resilience. The chapter comprised five sections: ECI; Empowerment; Extended community interaction; Supportive relationships; and a CBT perspective.

The focus community give high regard to ECI which provides opportunities for building and maintaining good working relationships. Multidisciplinary interaction at ECI enables the community to identify and manage problems before they escalate and threaten a project schedule; the community would be penalised for late project delivery, and incur costs. ECI provides for an appreciation of others’ roles (virtual role systems), and invites improvisation and bricolage when problems emerge. ECI helps the community to develop a broad repertoire of responses or a ‘complex varied action inventory’ that is associated with organisational resilience (Lengnick-Hall and Beck, 2003). Structurally, ECI facilitates access to resources and channels for resource transmission; for example, facilitating the exploitation of drilling expertise and knowledge by engaging loose-ties. ECI provides a space for ‘continuous conversation’ which in part, enables the community to exploit their ‘equal voice’ and respectful interaction for advantage and resilience; this was evident in the traffic management shift from scapegoat to egalitarian.

One factor the community identified as key to interaction is the way the MAC exercise their role. At the core of this issue is the MAC mindset and suitability of individuals for working within the MAC. Where a traditional mindset prevailed, the MAC delayed ECI and sought control over the community; an approach contrary to CMF values and culture. Where the CMF mindset had become embedded, the MAC engaged and collaborated much earlier enabling the community to ‘evolve and learn with the job’; an approach that at r10 identified with resilience.

Emergent questions for practitioners and policy makers:

In what areas might we engage early multidisciplinary interaction to help us:

- Build and maintain good working relationships?
- Identify and manage problems before they escalate into something more serious?
Develop an appreciation of others’ roles (virtual role systems)?
Invite improvisation and wisdom routinely and when problems emerge?
Develop a broad repertoire of responses or a ‘complex varied action inventory’?
Facilitate access to expertise and other resources, for example via loose network ties?
Provide a space for ‘continuous conversation’?
Invite respectful interaction and reinforce our values?
ECI is one means of exploiting social interaction for resilience. Is our mindset and culture conducive to enabling social interaction through ECI?

CMF interaction empowers its membership in several ways. One way is through encouraging participation in the innovation recording initiative. Whilst ECI seeks to explore tacit multidisciplinary knowledge, the innovation recording initiative targets more explicit knowledge. Combined, these contribute to the exploitation/exploration ‘trade-off’ for developing adaptive capacity and thus resilience. Much emphasis is given to ‘closing the loop’ or feeding back to innovators; success stories reinforce the community values and encourages innovation recording. Another way in which the CMF empowers its members is by encouraging them to ‘speak up’ and address dangerous situations. The emphasis is less on punishment, more on learning. In the extremely dangerous motorway setting, the community exercise ‘deference to expertise’ – a feature of High Reliability Organisation (Weick and Sutcliffe, 2001).

Emergent questions for practitioners and policy makers:

- Is our organisational culture empowering or disempowering?
- Respectful interaction is a potential source of resilience. Where in our business networks can we empower respectful interaction:
  - Innovation initiatives?
  - Performance monitoring and management?
  - Safety awareness and management?
  - Cultural awareness and management i.e. checking opportunism?
• In what ways can we empower people to explore tacit multidisciplinary knowledge, and more explicit knowledge? Combined, these contribute to the necessary ‘trade-off’ for developing adaptive capacity and resilience.
• In what areas might our business benefit from empowering ‘deference to expertise’?
• How can we evidence the benefits or advantage of empowering social interaction; and how can we exploit the evidence to reinforce our desired identity and culture? Communities with identity are conducive to information sharing, learning and knowledge exchange – qualities that may influence positive adjustment.

The CMT facilitate and encourage interaction in the extended community; they facilitate Workforce Workshops; help contractors to forge good relationships; and may help resolve any problems that emerge. A key part of the CMT role is feeding information back to the community and reinforcing the communities espoused values. With no contractual arrangement between specialist contractors and the supply chain partners, their relationships can become more determinate in terms of the degree and quality of interaction. For r10 and r13, the longevity of their relationship and frequent interaction seems to be at the heart of embedding the CMF culture. The application of a predisposition → participation → environmental sensitivity ‘loop’ (Ashmos et al., 2002) suggests how participation in various collective investment strategies in part, enabled to community to adapt its predisposition from one aligned with a traditional hostile environment to one aligned with CMF culture.

Emergent questions for practitioners and policy makers:

• Do we have resources (individuals or teams) formally or informally ‘positioned’ to facilitate interaction and relationship building in our networks? Can we identify areas where we could develop and exploit this role?
• Can we identify informal relationships (perhaps based on longevity or frequent interaction) in our extended network that we can lever for mutual resourcefulness and reliable interaction?
• Can we identify informal relationships in our extended network that we can exploit for mutual benefit or advantage in terms of ‘change’ or embedding new ideas?
• In what areas (processes and procedures) might we facilitate ‘participation’ to help us adjust our predisposition?

Evidence of supportive interaction was observed at on-site progress meetings. Supportive relationships were also reported in ‘buddy partners’ where contractors, often competitors, interact and discuss any issues of concern for mutual benefit. Although poor performance is largely checked by community peer pressure, the aim is not necessarily to punish but to find ways to support performance improvement. As well as the various formal structures for interaction, social events enable the community to interact informally away from the workplace.

Emergent questions for practitioners and policy makers:

• What elements of our business/networks might benefit from more supportive relationships? In what ways could we facilitate supportive relationships to help us to:
  o Solve problems collectively
  o Assimilate information
  o Share expert knowledge (e.g. buddy forums)
  o Improve performance – supplier development
• What are the formal and informal possibilities for creating supportive relationships and where might peer pressure be levered as part of that process?

Table 7.1 summarises the application of some of the principles of complex adaptive systems to CMF interaction and participation for a fuller appreciation of the adaptive capacity element of resilience. “Complexity is not a methodology or a set of tools... The theories of complexity provide a conceptual framework, a way of thinking, and a way of seeing the world” (Mitleton-Kelly, 2003, p.26). Rather than attempting to pose questions based on individual principles, a more meaningful proposition
based on a CBT perspective may be for organisations to pursue “the identification, development, and implementation of an enabling infrastructure, which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

The chapter has in part, responded to research objective one by identifying ways in which organisations can exploit their social capital for resilience; objective two by exploring how Interaction and Participation as ‘enabling conditions’ contribute to the exploitation of social capital for building resilience; and in part, objective three by identifying questions that will form part of a reflective framework to help organisations identify how they can build and exploit their own social capital for building resilience.

The next chapter explores interdependence as another emergent enabling condition for the exploitation of social capital for building resilience.
Chapter Eight

Interdependence

A third condition that emerged as an ‘enabler’ for CMF contractors to exploit their social capital for building resilience is the degree of interdependence within the contractor network. Social capital is developed in contexts characterised by high levels of mutual dependence and eroded in conditions that make people less dependent on each other. Interdependence implies co-ordination, increases social identification, and encourages norms of cooperation and risk taking (Nahapiet and Ghoshal, 1998, p.257).

“Interdependence establishes certain limits as to what individual actors can do, as well as providing opportunities to increase the efficiency and innovativeness in supply chains” (Dubois et al., 2004).

Thompson (1967) distinguishes between three types of interdependence: (1) pooled, (2) sequential and (3) reciprocal, to co-ordinate action of interdependent elements within an organisation. Pooled interdependence describes a situation in which each part renders a discrete contribution to the whole and each is supported by the whole. If direct interdependence can be pinpointed between parts, and the order of that interdependence can be specified, there is sequential interdependence. Reciprocal interdependence refers to a situation in which the outputs of each become inputs for the others’. Thompson discusses how interdependence can be managed within an organisation. With pooled interdependence, co-ordination by standardisation is suitable; with sequential interdependence co-ordination by plan is used; and with reciprocal interdependence co-ordination by mutual adjustment is necessary. It may be that organisations will accommodate more than one type of interdependence, or methods will differ by industry type (Skipper et al., 2008). Discussing the contextual
resilience of communities, Lengnick-Hall and Beck (2003, p25) claim communities are embedded with reciprocal interdependence. The CMF community told many stories in which reciprocal interdependence coordinated by mutual adjustment resulted in the maintenance of positive adjustment under challenging conditions – resilience.

Interdependence within the CMF can be influenced by different factors and at different levels of the network. At the formal contractual level, interdependence appears to be influenced by the nature of the contract and ‘buy-in’ to the community’s espoused values and culture. Interdependence or *dependence* at the non-contractual supply chain partner level can be influenced by the type of the service (core or niche) provided and the number of specialist contractors a supplier serves. For example, one supply chain partner providing a core service receives ninety per cent of their work from one specialist contractor thereby making them highly *dependent* on them. Supply chain partners providing niche services can serve many specialist contractors, often at the same time. It may be that the latter arrangement carries greater *interdependence* because (a) the supplier may be one of a limited number able to provide the niche service, and (b) the supplier relies on the specialists collectively to provide work continuity. But network configuration represents only a structural element of social capital. For a fuller appreciation of how interdependence can enable contractors to exploit their social capital for resilience, the relational and cognitive dimensions must also be taken into account. For example, community values and trust respectively appear to be of significant influence.

This chapter explores ways in which interdependence can enable organisations to exploit their social capital for building resilience. Comprising four sections, the first suggests **Reciprocal Interdependence** coordinated by **Mutual Adjustment** can contribute to the maintenance of positive adjustment under challenging conditions – resilience, for example, by developing a ‘learned resourcefulness’ that Lengnick-Hall and Beck (2003) identify as an element of behavioural resilience. The second section explores the influence of **Community Values** in creating interdependence and maintaining positive adjustment. For example, the community’s primary value – trust, can enable rapid access to resources when unanticipated events unfold, without the necessity for formal orders thereby saving time and maintaining or improving
project schedules. Rapidity has been noted as a measure of resilience (Kendra and Wachtendorf, 2003). A third section, **Interdependence versus Dependence** explores how different community dependencies can increase vulnerability as well as resilience. Each of these sections emerged from the data and is supported by relevant literature. Figure 8.1 provides a chapter map linking data to social capital and resilience constructs. To gain insight into the adaptation aspect of resilience the chapter integrates and culminates in section four, **Adaptive Capacity: A ‘complexity-based thinking’ (CBT) perspective** (Gilpin and Murphy, 2008).

![Figure 8.1 Chapter map linking data to social capital and resilience constructs.](image)

**Reciprocal Interdependence and Mutual Adjustment**

Thompson (1967) refers to reciprocal interdependence co-ordinated by mutual adjustment. Mutual adjustment has been developed by Mintzberg (1980) as a coordinating mechanism in adhocracy type organisational structures where “individuals coordinate their own work by communicating informally with each other” (p.324). In some ways, CMF multi-specialist project teams resemble Mintzberg’s adhocracy which he describes as “one that is able to fuse experts drawn from different specialties into smoothly functioning project teams” (p.336).

“Reciprocal interdependence requires the use of mutual adjustment or coordination by feedback, in which the interrelated parties must communicate...
their own requirements and be responsive to the needs of the other group… For example, design decisions regarding the weight and thrust of a jet engine and the aerodynamic design of the fuselage and wings must be made taking each other into account” (Scott, 1981, p.212-213).

Similarly, in the CMF, traffic management contractors, resurfacing contractors, general civils contractors and others, routinely mutually adjust to overcome design issues and problems. Respondents acknowledge the need to be responsive to the needs of other contractors.

“Everybody has to be supportive of everybody else... rely on everybody else and work with everybody else, otherwise it doesn’t work. If you are not prepared to work like that, you are not going to survive in this framework” (r5)

Resourcefulness

Interdependence influences interaction which in turn can help forge trust and resourceful relationships. Resourceful behaviour was observed in the willingness of contractors to share resources and information. In a sense this behaviour is a ‘learned resourcefulness’, an element of behavioural resilience (Lengnick-Hall and Beck, 2003).

“Resourceful organisations have the ability to take whatever is at hand and turn it into a useful purpose that moves the firm forward. This can lead to several advantages including quick and effective action and the ability to capitalize on rapid response opportunities” (ibid, p.17).

Reciprocal interdependence may be considered a latent resource stock. As equipment loans usually tend towards positive outcome, a ‘learned confidence’ emerges.

“Learned confidence [an element of cognitive resilience] is based on the experience ability to mobilise the motivation, cognitive resources, and courses of action needed to meet given situational demands” (ibid, p.11).
One event referred to by several respondents (r1, 7, 10, 12) occurred in 2002 when the bearings on a motorway viaduct failed.

“… they realised the bearings had failed… it was literally get everything off this viaduct, it can’t cope” (r10)

Two resurfacing specialists shared the work.

“… we split the contract. They [c18] were one side; we [c10] were the other. And there were times when we had plant break down and they’d lend us one of their rollers” (r10)

A willingness and ability to share resources during breakdowns enabled contractors to continue without interruption and the motorway being reopened on schedule. The contractual nature of the CMF means the community as a whole benefits from projects being delivered on time and within budget – the community is interdependent.

On another occasion the same contractors engaged in similar collaboration.

“We did exactly the same… one night their asphalt plant broke down so we supplied them material… Each night myself and their supervisor would meet up for a coffee and chat about what we were doing for the night and if anything went wrong, we’d keep liaising… So at that point we’re competitors but we’re working together to complete a contract and we’re helping each other out…” (r10)

r10 supplied r18 with materials to overcome an equipment failure. This may be seen as reciprocity or obligation based on the previous exchange. Their relationship suggests more than ‘tit for tat’ reciprocity. Pre-shift discussions and liaising to deal with problems during a shift are informal agreements that suggest the contractors have bought into the culture of the CMF despite being competitors elsewhere.

“… the surfacing industry is very competitive. In the past, if two firms didn’t get on they might not have been willing to work together. The CMF seems to overcome those tensions and enables people to work together towards the same goal” (r10)
Resource sharing is undertaken on the understanding that similar behaviour will be reciprocated to maintain schedules. Materials (asphalt) will have to be paid for, but there is no requirement for formal paperwork, there is sufficient trust between contractors to allow for financial matters to be settled later. r10 was asked if this kind of reciprocity was common in traditional frameworks:

“Traditionally if that ever happened it would be, yeh, there’s a massive bill, we pulled you out of the shit, you can pay for it or we’re not helping you because we want to see you fail. There’s none of that” (r10)

The example supports Nahapiet and Ghoshal’s (1998) assertion that high levels of social capital are usually developed in contexts characterised by high levels of mutual dependence. Reciprocal interdependence and associated social capital developed in the CMF in part enables maintenance of positive adjustment under challenging conditions - resilience.

r7 described a bridge repair spanning two HA Areas. To improve project delivery, contractors agreed to extend services beyond their respective Area boundaries. This may seem an obvious solution but did involve relaxing formal contracts.

“... we had a job on that was going into their area... they’re in the framework but this wasn’t a framework job... they put a closure on for us for nothing... we did the same for them... it wasn’t a case of we want paying for that, there was a willingness there... That’s where we’ve shown what we’ve learnt, to work together, not against each other” (r7)

r7 claimed the behaviour was influenced by both parties having worked in a CMF where they had become culturally aware of the benefits of collaboration. The story thus suggests that creating interdependence may in part be an enabler for cultural re-adjustment (Turner, 1978) with potentially powerful change management implications.

From a CBT perspective the CMF has been designed in such a way that it requires interdependence from the formal membership which, underpinned by a few simple rules (values), encourages collaboration. Two further inter-related features of complexity arise here. First, whilst actions of contractors are influenced by their history, their subsequent actions become part of a new history which may
accommodate a new broader repertoire of responses that can be mobilised in the future. Second, when contractors collaborate and develop a broader repertoire of responses, they may be seen to have co-evolved to a new level of coherence. The new level of coherence is evident in their subsequent collaborations for mutual benefit and positive adjustment - resilience.

**Expectations and Obligations**

When c24 were struggling with their work schedule because of unanticipated problems, c6 resourced part of the work to maintain the project schedule.

“We said we can resource some extra men... We won’t get paid for it, but it’ll mean we get the end game the same... When you finish the job on time it’s not just you who looks good, everybody looks good. If you don’t, everybody is tarred with the same brush... it’s a team game... it’s in all our interest” (r16)

On another occasion during an elevated motorway repair, c6 received an unexpected instruction to trim and move spoil.

“...sixty tonne of spoil... they wanted us to get a Hiab (machine). ...Anything to do with lifting has to be on the critical plant register... a lot of paper work that would take at least four or five days. So we were in a predicament” (r16)

Two other contractors working on a different element of the scheme combined to resource the instruction. According to r16 no orders or monies were exchanged but the exchange did carry an expectation for the favour to be returned.

“... we’ve took your barriers out – job done! Then c27 in turn, took all the muck away with their grab wagon which was already on the critical plant. We didn’t have to get someone hired in so there was no cost...when it came to 'your turn to scratch our back', it was no problem, they put a man on it straight away...” (r16)
Coordination by mutual adjustment overcame a constraint that could have added four days to the scheme. When asked, if this sort of cooperation would have occurred in a traditional framework the respondent replied “never in a million years” (r16).

Embodied in the examples is an expectation for reciprocation. Interdependence implies coordination and encourages cooperation and risk taking (Nahapiet and Ghoshal, 1998, p.257). The examples exhibit contractor coordination, cooperation, and evidence of willingness and capacity to mutually adjust to maintain positive adjustment - resilience.

From a CBT perspective, the community demonstrated a degree of self-organisation. Self-organisation may be described as “the spontaneous coming together of a group to perform a task (or for some other purpose); the group decides what to do, how to do it; and no one outside the group directs those activities” (Mitleton-Kelly, 2003, p.41). Contractors can be seen to have explored their ‘space of possibilities’ and used their existing resources – plant, machinery, and labour, in novel ways, or at least ways for which they were not originally engaged to overcome a problem. In terms of resilience, it has already been noted that exploring the space of possibilities may be likened to Weick’s (1993) improvisation and bricolage – potential sources of resilience.

Interdependence can exist between specialist contractors and their supply chain partners. It is in the specialists’ interest to ensure their suppliers maintain standards of performance and safety.

“Although the HA may contract a firm into the CMF, they don’t have to give them work if they don’t perform well. There is more than one contractor capable of undertaking a specialism in the framework” (r11)

Supplier development opportunities can endow resourceful obligations. For example, r1 became aware that one of their suppliers was under resourced evident in their poor performance. r1 suggested ways in which the supplier could improve and supported them through the process. The supplier has subsequently been praised for excellent performance and has secured more work from r1. An obligation on behalf on the supplier was reciprocated when r1 requested their services at short notice during a weekend emergency.
“...they have helped get us out of a sticky situation two or three times since”

Similar to the preliminary Network Rail study, investment in supplier development can create a sense of obligation. Over the longer term, this may be seen as reciprocal interdependence and suggests one way that organisations can exploit their social capital for the maintenance of positive adjustment under challenging conditions - resilience.

**Interdependence and Values**

Previous research shows that teams whose members share egalitarian values at formation develop highly interdependent task approaches and exhibit patterns of social interaction (Wageman and Gordon, 2005). The values espoused by the CMF community (Figure 8.2) were identified by community members at conception. The prime value is **Trust**, supported by:

**Integrity** – humility, honesty, openness and unselfishness;

**Respect** – listening, courtesy, cooperation, responsive and tolerance;

**Reliability** – support, communication and commitment.

![Rules of the Game](image)

**Figure 8.2 CMF values poster**

**Values**

Community values may be seen as shared codes – an element of cognitive social capital. Values may also be seen as rules or schema shaping behaviour in complex adaptive systems. Values thus transcend social capital and the adaptive capacity aspect of resilience.
Collins and Porras, (1994) claim firms with genuine core values are more resilient than firms without such guiding principles. Argyris and Schon (1978, 1996) argued that espousing values alone is not enough to convince and unite people in an organisation. Values cannot be expected to be effective if they remain just ideal aspirations; newcomers must hear examples of the application of these values to become committed (Gundry & Rousseau, 1994). The corporate philosophy needs to be credible in that it becomes part of the daily activities of the firm (Argyris, 1991; Kouzes & Posner, 1995). From the comments and stories of the formal (contractual) community, it would appear that the community values are enacted in their ‘buy-in’ to various collective investment strategies (ECI, off-line groups, innovation recording, company performance reviews, and ‘buddying’) which in turn, feedback to reinforce the values (Figure 8.3).

**Figure 8.3** Feedback loop – community values and collective investment strategies

For example, in terms of Integrity evidenced through honesty and openness:

“We’ve all got an equal voice. Everyone should be clear with each other, there’s no need to not be honest with each other” (r7)

“… that [performance review] was the forum to actually say, “I don’t think you’re performing”. It was open and honest... that was the forum where as a specialist, we did have the facility to criticise or praise other people” (r10)

“There’s a questionnaire...It does allow that open honest communication... the culture side promotes that. You put down your thoughts... Everybody on site, all the lads...” (r1)

In terms of respect, evidenced through listening to other contractors, cooperation, responsiveness, and tolerance:
“Somebody not involved in a project will go to site and sit down with the work force...Is there anything that needs improving...Do your managers listen to you...Are they giving you enough information...Have you got any problems in terms of safety? We ask those questions” (r3)

“They [the MAC] listen a little bit more and they’re able to understand the commercial implications of certain things that you do... more willing to understand them” (r8)

... “fair play they [the MAC] have bought into that a lot more now. And they’re listening to us... the relationships, how people work together... people know that when you speak you’re listened to, your ideas” (r10)

Reliability, evidenced for example, in support, communication, and commitment:

“...about £500,000 – I supported them through that. I effectively funded that job for them and I wasn’t one that went knocking... to break Director’s legs because I haven’t been paid” (r8)

“...if people didn’t perform, others would be standing in and help them. All the support and systems were there... ” (r6)

“...it’s that element of support. It’s being able to call on the other specialists... who assist with problems and to add their expertise...” (r3)

“Everybody has to be supportive of everybody else. Everybody has to rely on everybody else and work with everybody else. Otherwise it doesn’t work” (r5)

“That’s all it’s about, people, communication and how people interact with each other... 95% of the people have bought into it” (r10)

Equipped with a degree of interdependence and closure, the CMF community can impose expectations (relational social capital), and if necessary, sanctions to reinforce community values. Chapter Nine – Closure and Brokerage, discusses how peer pressure can be a powerful resource to reinforce value driven behaviour. For example, if a contractor is behaving contrary to the community values, the CMT may
assemble and facilitate a peer group review where the values and community interdependence can be reinforced (Figure 8.4).

![Feedback loop – community values and collective investment strategies.](image)

**Figure 8.4** Feedback loop – community values and collective investment strategies.

In 1996, specialist contractor c6 went into receivership. Part of the company continued to trade with help from the CMF community.

“It was not large sums of money… it was help that cannot really be measured” (r6).

A hire company agreed to temporarily waive charges and keep the equipment on site to enable schemes to continue. Although the gesture carried an element of risk, r6 claimed there was sufficient trust that they would be paid when the receivership had been resolved. The community identified member contractors to adopt c6’s responsibilities during the receivership. A Traffic Management specialist took responsibility for site cabins and facilities. According to r3 “they had no prior experience of managing site facilities whatsoever, but took on those responsibilities to enable the schemes to continue”.

The Community Manager was asked if this kind of behaviour would have taken place outside of CMF:

“There is no incentive for people elsewhere to help in this way; they are actually putting themselves under liability in helping another specialist. The incentive is partially due to the contract, because the Highways Agency is in contract with c6 and the Traffic Management contractors” (r3)
What is driving this behaviour?

“High levels of social capital are usually developed in contexts characterised by high levels of interdependence. Interdependence implies coordination, increases social identification, and encourages norms of risk taking” (Nahapiet and Ghoshal, 1998).

The CMF has created contractual interdependence; there is financial incentive for contractors to collaborate routinely and when problems emerge. CMF values (trust, respect, integrity, and reliability) may have helped shape emergent task interdependence (Wageman and Gordon, 2005). These two forces (contract and values) represent a combination of formal (explicit) and less formal (implicit) influence respectively, upon which high levels of social capital appears to have developed. When c6 became temporarily disabled, the community were able to exploit their social capital, self-organise and coordinate by mutual adjustment. In terms of social identification, the traffic management contractor in particular, has demonstrated buy-in to community values. They have exercised respect by cooperating and being responsive and tolerant. They have demonstrated reliability by being supportive and committed to the stability of the community. In terms of integrity however, r6 claimed there were two schools of thought regarding the support from other contractors. The first is that people thought they would try and take over the work and capitalise in an opportunistic sense.

“... some of the people thought they’d take our work, they’re on the job – opportunity, we can do that...” (r6)

If this is the case, then the behaviour would represent a departure from value driven interdependence. The second is that the community genuinely wanted the scheme to continue.

“... if we were on a job and we weren’t able to perform, the whole job would have stopped... So I think people thought the best thing to do here is step in, help where we can” (r6)

If this is the case, then the behaviour would represent value driven interdependence. Reference by c6 to two schools of thought suggests there may be opposing mindsets in terms of buy-in to community values. One implication is that organisational
architects and managers constantly seek ways in which to reinforce values and value driven behaviour.

Interdependence appears to have been part of a process for creating and mobilising the community’s values or shared codes (cognitive social capital). The values, enacted in the community’s willingness and ability to help c6 through financial difficulty and secure project delivery on time and within budget may be regarded as positive adjustment under challenging conditions - resilience. The story offers at least one pathway through which organisations can exploit their social capital for resilience.

From a CBT perspective, when c6 went into administration, part of the social ecosystem may be seen as having been pushed ‘far from equilibrium’. Complexity suggests agent (contractor) behaviour is driven by a few simple rules or schema. It is useful to think of the community’s values as a few simple rules or schema. Rather than an external controlling force intervening, the community were able to self-organise and co-evolve to create a new coherence. A few simple rules created something extraordinary. Connectivity and interdependence appear to have been part of an enabling environment for this to happen.

Supply chain partner r8 claimed values are not always active in the CMF:

“…we were on a very tight programme...As part of that work we had to do some kerbing work. Now the rules said that for us to do that safely and properly there needed to be a proper barrier erected. But because of the effect that would have on traffic management, traffic flow, they wouldn’t put that barrier up and said that that was an acceptable risk. Now to me that is a damming indictment of the whole principle of honesty, integrity, trust. To paraphrase the boys on site, it’s just bollocks. ...And when we pushed the matter, they said “if you don’t do it we’ll get somebody that will”. How good does that make you feel? The principles of the CMF fold when commerciality or the perception of the customer demands” (r8)

Argyris and Schon (1978, 1996), argued espoused values have to be enacted in day-to-day activities if they are to be accepted, believed in and embedded. The story suggests that for r8, on this occasion, the values have not been enacted. The
experience appears to have reinforced his sceptical perception of the CMF (Figure 8.5).

![Figure 8.5 Failure to enact values reinforces community scepticism](image)

**Trust**

Trust is the CMF prime value. Although social scientists have afforded considerable attention to the problem of defining trust, a concise and universally accepted definition has remained elusive (Kramer, 1999). In a social capital context, Nahapiet and Ghoshal’s (1998, p.244) cite Mishira (1996) who identifies trust as a willingness to be vulnerable to another party – a willingness arising from four aspects: a belief in the good intent and concern of exchange partners; belief in their competence and capability; belief in their reliability; and belief in their perceived openness. Further, there is a two-way interaction between trust and cooperation: trust lubricates cooperation, and cooperation itself breeds trust (Nahapiet and Ghoshal, 1998, p.255).

“Under normal conditions we’d want some sort of comfort or formal order before committing to do anything. On a CMF job it is different. Once it has been established that we are part of the scheme we will provide all sorts of things – expertise, information. That helps the project because it brings the approval and design process forward in the programme. This can be done before there is a formal order, which gets the job to site faster and delivers the end job much faster” (r4)

Outside the CMF, the need for some sort of comfort before committing to do anything implies lack of trust – ‘a willingness to be vulnerable to another party’ (Mishira, 1996). In contrast, the CMF provides the comfort that enables contractors
to engage before a formal order is in place. Further, the speed or rapidity, in terms of collective action that trust facilitates has been noted as a measure of resilience (Kendra and Wachtendorf, 2003). Also implicit in r4’s comments is that getting to site and delivering the job faster represents a **competitive advantage**. Competitive advantage is an element of some transformational conceptualisations of organisational resilience (Robb, 2000; Lengnick-Hall and Beck, 2005). It is plausible that trust is in part influenced by community interdependence. Interdependence can be seen as ‘enabler’ for relational social capital which in turn can be exploited for building resilience.

**Information Sharing**

r4 described a willingness to openly share information with other CMF members even though under different circumstances they may be competitors.

“Outside [CMF] we would try and produce something that they can’t do... undercut them on price. With CMF you have to forget all that... We openly share information with people we would normally consider competitors” (r4)

The quote supports Nahapiet and Ghoshal’s (1998) view that interdependence encourages norms of cooperation and risk taking. Trust – a belief in the good intent and concern of exchange partners (Mishira, 1996) can promote respectful interaction, a potential source of resilience (Weick, 1993). Contractors also have to be willing to commit to a different way of doing things which can demand an attitude of wisdom, also a potential source of resilience (Weick, 1993).

Interdependence can be an enabler for ‘continuous conversation’; it enables contractors of various disciplines to discuss the best way to integrate elements of a programme.

“... the CMF makes it easier to say... If we do this first and you do that second, does that suit your programme or should we swap those round? It makes that kind of conversation much easier. Now that isn’t the kind of thing that I mind talking to a potential competitor about because we’re not
competing for the job, we’re both going to do the job...it makes it better for all concerned, delivers the job faster and cheaper for the client” (r4)

Collaborative sense-making, constructive interdependence, self organisation, and mutual adjustment require continuous communication (Thompson, 1967; Weick, 1993). Interdependence and the ‘conversation’ it can foster can also enable actors to develop an appreciation of the issues and problems faced by other disciplines. This in turn can help contractors to consider the roles of others’ when planning their own work schedules. An appreciation of others’ roles may be seen in terms of virtual role systems, a potential source of resilience (Weick, 1993).

**Network Knowledge**

The CMF upon which this research is focused expired in August 2009. According to r3, the HA wanted to release some documentation regarding members and their processes as part of the tendering process for a new CMF2. Members were concerned this could place competitors in a better position when tendering. r3 suggested all of the work the CMF has done belongs to the HA because the community are in contract with the HA.

“If the HA ask a member for information, it is unlikely that the member wouldn’t oblige, especially at this time of retendering. There is definitely an element of wanting to perform but needing to be seen to perform” (r3)

According to Dyer and Nobeoka (2000), the advantages that Toyota and their suppliers have held over their competitors in part lies in their ability to create a high-performance knowledge-sharing network.

“Toyota has achieved this by creating a strong network identity with rules for participation and entry into the network. Most importantly, production knowledge is viewed as the property of the network. Any actor not willing to share information would receive sanctions. Toyota’s highly interconnected strong tie network has established a variety of institutionalized routines that facilitate multidirectional knowledge flows among suppliers” (Dyer and Nobeoka, 2000, p.345).
From a CBT perspective:

“The logic of complexity suggests that learning and the generation and sharing of knowledge need to be facilitated by providing the appropriate socio-cultural and technical conditions to support connectivity and interdependence and to facilitate emergence and self-organisation” (Mitleton-Kelly, 2003, p.42).

CMF collective investment strategies (ECI, Off-line Groups, and ‘buddy forums’) can be enablers for a knowledge sharing network, but the finite conditions of the framework contract can restrict knowledge sharing. As the CMF approached full term, an antithesis might suggest the fear of losing the socio-cultural and technical conditions that support CMF connectivity and interdependence can have a negative affect on network-level knowledge-sharing processes. This may explain why some contractors became ‘cagey’ about knowledge sharing.

The following example exhibits knowledge sharing within the CMF network. When contractors were unable to build to designers plans, they collaborated with the designers to overcome build problems.

“... we spent the first 2 months helping them redesign it. But we took all the information out of that and we produced a file and r18 [competitors] had to do the same sort of job so we passed the file over and said we did it like this”

(r10)

The behaviour may be seen as reciprocal interdependence (the outputs of one become the inputs for others) and suggests a novel view of how competitive advantage can be achieved. A traditional view may have influenced r10 to have guarded the dossier from competitors, advantage being perceived in exclusivity. However, r10 recognised the potential advantage for the community in sharing the information. They have extended a favour to competitors, with whom relations were already good, and there is an expectation (relational social capital) that information sharing or another favour will be reciprocated at some time in the future.

“... If we said you’ve done this, how did it go, can you give us a hand?”

Interviewer: They wouldn’t withhold anything?
This example shows how trust (relational social capital) – a willingness to be vulnerable to another party (Mishira, 1996) can be exploited for building resilience. The good relationship between competitive contractors influenced a ‘learned resourcefulness’ (Lengnick-Hall and Beck, 2003). Learned resourcefulness enabled: the challenge of existing norms – an attitude of wisdom; adaptation of a design to a contextual fit – improvisation and bricolage; and sharing the improvisation for the benefit of the community – respectful interaction (Weick, 1993). With similarity to Toyota’s knowledge sharing supply network, r10 and their competitors collaborated for the benefit of the community resulting in the maintenance of positive adjustment under challenging conditions - resilience (Weick, et al., 1999).

From a CBT perspective, “Complexity suggests to survive and thrive an entity needs to explore its space of possibilities and to generate variety…” (Mitleton-Kelly, 2003, p.35). Although the original scheme design was not buildable, r10 and the designers were able to engage and explore their ‘space of possibilities’. By using their existing building blocks (design and resources) but put together in a different way, they were able to create a new buildable design. Further, the new design became part of r10’s repertoire of responses and their new history. When a similar problem emerged, r10 were able to mobilise the new knowledge for the benefit of the CMF community or social ecosystem.

**Interdependence versus Dependence**

Although the theme of this chapter is contractor interdependence, the data suggests relationships between some contractors are based more on dependence than interdependence. Supply chain partners have no contractual relationship with the HA; they are more or less dependent on their engaging specialist contractors for the workload they receive via the framework. Specialist contractors are also positioned to influence the level of involvement their supply chain partners have in the community element of the framework. Respondent’s comments suggest specialist contractors engage and shield suppliers from the community.
From a CBT perspective, specialist contractors are positioned to influence the degree of connectivity and therefore the co-evolution within the community or social ecosystem. The following sections offer examples of specialist contractor/supply chain partner relationships and associated dependencies in view of how the arrangements might influence community social capital and resilience.

1) Supply chain partner - c12

c12 are drilling and surfacing providers and draw approximately four percent (£250k) of their annual workload through the CMF. The company serves most of the specialist contractors and has developed many network ties. They also secure work through the same specialist contractors outside the CMF.

“With seven hundred customers, orders range from small jobs involving one man for one shift to much larger jobs... resurfacing **** Airport runway which took six weeks to complete and was worth £700,000” (r12)

With four percent of their workload via the CMF, c4 has limited dependency on it. With seven hundred customers c4 has many network ties and relationships. In terms of social capital they would appear to have many weak ties to access, or be accessed through in times of need.

2) Supply chain partner - c4

r4 described his company as a niche propping and jacking company and expressed a clear dependency on the HA.

“We are in a niche... we are far too reliant on the whim of the HA... when the 40 tonne European vehicles came over here, they prioritised to make the bridges stronger...as their priority changes, our business ebbs and flows”

C4 also work with many of the same contractors outside the CMF.

“... we have relationships with the major contractors in the UK...we approach it from as many different directions as we can to make sure if there is work in our little niche then we know about it” (r4)

r4 stressed he was dependent on c6 (engaging specialist contractor) for CMF work. He also claims to have relationships with other major contractors. In terms of social
capital, a strong tie with c6 may enable the efficient transfer of known or routine information; many weaker ties can be beneficial when there is a search for information, for example when the system is exposed to some form of shock or unanticipated event.

Because c4 occupy a non-contractual niche, r4 claimed they are not invited to participate in community initiatives.

“We’ve never shied away from any of the groups... but because we are on the fringes of the work, we don’t get asked very often” (r4)

3) Supply chain partner - c13

c13 are engaged by at least two specialist contractors (c10 and c18) for surfacing within and outside the CMF. Surfacing work may best be described as a core process in motorway maintenance “it is pretty standard stuff” (r13). r13 suggested he has an excellent relationship with r10, but claimed he does not get invited to ECI or other community initiatives.

“We depend on r10 for information, putting our ideas forward, and any feedback” (r13)

Although r13 suggested there might not be much benefit from attending routine meetings, he argued he might be able to contribute expertise on unusual or non-routine jobs.

“... poor road levels and pot holes needed attention... If I had been consulted I could have saved the scheme from being delayed by two days” (r13)

r13 claimed the ‘setting the scene’ meetings he has attended did not cover much about the actual job and stressed his interest is in things like access when there is contra-flow in place. This sort of detail is discussed at ECI, which suggests there is an argument for supply chain partners attending ECI, or at least better communication between the engaging specialist contractor who does attend ECI, and the supply chain partner.

“You get the feeling at times that there is the main partners and anyone else just togs along” (r14)
An impression taken was that c10 and c18 provide c13 with most of their work which suggests c13 are highly dependent on those specialist contractors.

4) Specialist contractor - c11

c11 are concrete repair specialist contractors. The nature of their work involves engaging “very specialised” (r11) supply chain partners (electricians) for installing Cathodic Protection.

“We have to manage the interfaces of our sub contractors and there are a few key ones that are absolutely crucial… They [the HA] are relying on us to call in the right people to solve these problems for them” (r11)

According to r11, the electricians are few in number, and are constantly used by his company. The ‘very specialised’ nature of Cathodic Protection suggests c11 are highly dependent on their sub-network of expertise.

5) Supply chain partner - c8

c8 (civil engineering contractors) draw ninety percent of their annual turnover from the CMF. r8 describes his relationship with c6 (engaging specialist contractor) as “a good working relationship for over twenty years”, but claimed his company have become dependent on them.

“I didn’t target the CMF. I’m parasitic on c6. …It’s one of the weaknesses of our business that we’re too reliant on it quite frankly…Despite what the programmes might show you, you are very often asked to go within a few weeks… without much warning at all… so it prevents you from developing a lot of other relationships that you might otherwise do because you’ve really got to be ready to go when they say” (r8)

Several issues influence why r8 is “often asked to go within a few weeks… without much warning at all”. On one hand, r8 presented as sceptical of the CMF. On the other hand, he argues for more involvement in community initiatives. Both the scepticism and desire for more involvement appear to be by-products of his long-standing relationship with c6. One issue that concerned r8 was the lack of communication from c6 which appears to reinforce his dependence on them.
“We’re dependent on c6 feeding us the information and the work. I’m not sure where the failing lies. If you believe the programmes which show design, consultation periods, and contractor involvement and the like, then there shouldn’t be this problem of you’ve got to hit the ground running…” (r8)

Despite this, r8 contends his company are c6 on the jobs they do.

“We do everything... They’ll not deny that. I supply all the materials, the labour, the plant, and they put the offices and some management in there... I don’t think there’s any secret about that”

When c6 reformed after receivership in 1996, they outsourced more to suppliers. Their business lever in part, is in holding formal assurances – quality, safety, environmental management and so on, that many suppliers do not possess. This is one area where c8 are dependent on c6.

Another factor that may influence r8’s scepticism is not being invited to community initiatives, which in turn restricts networking opportunities.

“I’ve never been to a progress meeting... I’m not invited...My view is that the construction industry without the ethos that’s being offered here is a fairly aggressive industry and the people that are doing these jobs are from the construction industry”

Although sceptic, r8 avoids dismissing the CMF ethos, but implies a traditional ‘aggressive’ construction industry mindset has a negative influence on the framework. When asked how the CMF could be improved, he suggested more direct involvement, and an ability to put a view forward rather than being dependent on c6.

“It could be that we’re in a peculiar position where we’re the flea on the back of c6, and that by virtue of our really close relationship with them, we’re not a confirmed part of the supply chain. The only time we have any contact with anyone at [the MAC] is when they ring up and see if we’ve been paid…” (r8)

Although r8 has a long standing relationship with c6 and secure ninety percent of their work load through them, their dependence on c6 and their limited ability or willingness to seek work elsewhere could render them vulnerable if for any reason c6
fail to provide work continuity. Also emerging is a trend that suggests the benefits that specialist contractors enjoy through ECI such as forward planning, resource allocations, and relationship building, do not necessarily extend to the supply chain partner level of the network.

Summary - specialist contractor/supply chain partner relationships

At least two issues emerge. First, is the tension between too great a dependence on a customer(s) and too little engagement to secure the benefits of community partnerships and participation. The service provided, niche or core, can influence the number of customers a supplier serves which in turn can influence the level of mutual dependence and the nature of social capital, for example the number of accessible network ties. Highly developed social capital may be seen in contexts characterised by high levels of mutual dependence (Nahapiet and Ghoshal, 1998). The niche suppliers (c12 and c4) claimed to have or to pursue many customers. The core suppliers (c13 and c8) secured greater workload but were highly dependent on one or two engaging specialist contractors. If a supplier receives a high workload, but at the same time becomes highly dependent upon one specialist contractor, this may constrain the development of other relationships elsewhere, within or beyond the CMF – what Gargiulo and Benassi (2000) term ‘being trapped in your own net’. On the other hand, if a niche supplier’s dependencies are widely dispersed via many network weak ties, that contractor may not get close enough to any one specialist contractor to be able to exploit the benefits of various community initiatives. This issue is related to the trade-off between closure and brokerage covered in Chapter Nine.

The second issue concerns specialist contractors’ willingness or ability to enable or restrict their suppliers’ involvement in the community element of the framework. Although the suppliers all claim they have good relationships with their engaging specialist contractors, this appears to be in a commercial context. In terms of communication, information exchange, and community initiatives, the specialist contractors can restrict participation.

There are at least two reasons why suppliers may experience restricted access to the community element of the framework. First, some specialist contractors rely on outsourcing. Part of their business lever is holding formal assurances that many
suppliers do not possess. If suppliers were to become closer to the client it is possible that they could replace specialist contractors elsewhere. Another possible reason is the ‘control’ mindset that respondents claim prevails outside the CMF has been retained by some specialist contractors and this restricts communication, information sharing and interdependence.

If a specialist contractor/supply chain partner relationship is perceived as a barrier, the relationship will restrict connectivity and interdependence within the community which in turn will affect the ability of contractors to co-evolve. In other words it will affect the adaptive capacity and thus the resilience of the community or social ecosystem.

**Restricted Connectivity and Interdependence**

A CBT perspective may be useful for thinking about CMF connectivity and interdependence. Simon (1999) discusses homeostasis, membranes, specialization, and near-decomposability among principles of complex system design.

“Homeostasis is facilitated if the system possesses some kind of skin that greatly attenuates the transmission of environmental changes into the interior of the system, and the same principle can be applied to insulate the various subsystems of a system from each other” (Simon, 1999, p.6).

But as Simon points out, there is more to membranes than insulation alone.

“… membranes may contain specialized transport mechanisms that move particular… substances or information from the external to the internal environment, or vice versa… Instead of adjusting uniform surfaces to handle the complex mix of substances [or information] that have to enter and leave the system, particular regions of the surfaces are specialized for the transport of specific substances” (p.7).

Informed by Simon (1999) and Mitleton-Kelly (2003), Figure 8.6 depicts the CMF as a social ecosystem in the form of a nested hierarchy. The HA is at the highest level of the hierarchy. At the next level is the formal (contractual) membership – specialist contractors, designers, and the MAC. The supply chain partners occupy the lowest
level (the non-contractual extended network). This does not suggest suppliers are in any way less important than specialist contractors, rather, the degree of connectivity may be less at the extended network.

The dotted lines suggest membrane permeability and the potential for entities to co-evolve; entities may influence and be influenced by other entities in the same and related systems. The diagram could be reversed with the HA at the outer layer and the supply chain partners at the centre. The point being made is that as a social ecosystem there is interdependence between related entities; the fitness of one entity may in part, be dependent on the fitness of related entities.

The contractual and cultural influence of the CMF acts as a skin providing some insulation from an otherwise aggressive industry. At the formal (contractual) level of the community or ecosystem, membrane permeability seems to allow information to pass freely between members. There is frequent and healthy interaction, exchange of information, and resource sharing evident in respondents’ stories of reciprocal interdependence coordinated by mutual adjustment. It may be helpful to think of the membrane between specialist contractors and their supply chain partners as ‘specialized transport mechanisms that move particular… substances or information from the external to the internal environment, or vice versa…’ (Simon, 1999). Membrane permeability here varies; some relationships exhibit openness whilst
others - c6-c4, c10-c13, c6-c8, reportedly restrict communication and information exchange - the specialized transport mechanisms are restricted (Figure 8.7).

Intuitively, one course of action could be to try and increase membrane permeability by attempting to bring extended network suppliers closer to the centre. But interdependence may not necessarily reside in closeness. Simon (1999, p.8) discusses ‘near-decomposability’ as a principle of complex systems design:

“The property of near-decomposability has important consequences for the behaviour of a system that possesses it. Suppose that a system has a number of layers of subsystems. Because of the hierarchical arrangement of interactions, if the system is disturbed, subsystems at the lowest level will come to their internal steady states before the systems of which they are components at the next level above. Because their subsystems return rapidly to a steady state, the system above can be described in terms of the average behaviour of the subsystems”.

Although some of the contractors in the extended network are highly specialised, the implication is not necessarily to bring these specialists closer contractually, but
maintaining the membrane permeability and specialized transport mechanisms between subsystems so that when the system experiences a shock, the extended network will stabilise rapidly and at the same time enable specialized resources and information to be transported through the hierarchy. A CBT perspective thus suggests the resilience of the CMF may lie as much in the extended non-contractual supply chain partner network as it does in the formal contractual membership.

**Adaptive Capacity – a ‘complexity-based thinking’ perspective**

A CBT perspective is useful for thinking about how interdependence can influence the adaptive capacity and thus resilience of the CMF community. To recap, connectivity and interdependence are key characteristics of complex adaptive systems. These features in part, influence interaction between entities in a system and related systems. Interdependence can be an enabler for entities to self organise, co-evolve, and create a new coherence.

Interdependence influenced in part by a few simple rules or schema enabled the CMF community to self organise and find ways to resource unanticipated problems; to consider knowledge as network knowledge rather than proprietary knowledge; support a member through a period of financial difficulty. Being pushed ‘far from equilibrium’ the community were able to explore their ‘space of possibilities’ (use existing building blocks but put together in different ways) and create novel solutions to enable project continuity. Each of these adaptations resulted from self organisation undertaken without any externally imposed control. Complexity suggests:

“There is no single point(s) of control. Systems’ behaviors are often unpredictable and uncontrollable, and no one is “in charge.” Consequently, the behaviors of complex adaptive systems usually can be influenced more than they can be controlled” (Rouse, 2000, p.144).

Connectivity and interdependence means a decision or action by an entity will have an effect on other entities in the same or related systems, but the effect will vary depending on the ‘state’ (history and constitution) of each related entity and the system at the time (Mitleton-Kelly, 2003). The current state of the CMF suggests high level buy-in to community values and culture reflected in reciprocal
interdependence coordinated by mutual adjustment. Whilst contractor actions are influenced by their history, their subsequent actions become part of a new history which may accommodate a new broader repertoire of responses. When r10 and r18 collaborated they developed a broader repertoire of responses; they co-evolved to a new coherence evident in their subsequent collaborations for mutual benefit. The CMF thus exhibits another characteristic of complexity - feedback loops; experience of positive adjustment feeds-back to reinforce the community’s values.

A CBT perspective can also inform potential and actual conflict resolution. For example, “… complexity suggests that learning and the generation and sharing of knowledge need to be facilitated by providing the appropriate socio-cultural and technical conditions to support connectivity and interdependence and to facilitate emergence and self-organisation” (Mitleton-Kelly, 2003, p.42). As the CMF approached full term, fear of losing connectivity and interdependence may partly explain why some contractors became concerned about knowledge sharing. However, given the multidimensionality of complex adaptive systems, what may be perceived as an economic constraint may actually be a social constraint – or vice versa.

Thinking about the CMF community as a human social ecosystem helped in understanding and depicting some of the relationships at different levels of the community. Principles of complex system design - homeostasis, membranes, specialization, and near-decomposability (Simon, 1999) were applied to the CMF. The CMF itself may be considered a skin facilitating homeostasis by providing a degree of separation from an otherwise hostile sector. Specialized membranes allow the transportation of information and resources between entities in the same or related systems. Membrane permeability appears to facilitate healthy flow of information within the formal community. At the specialist contractor/supply chain partner interface membrane permeability varied. Some relationships suffered from limited, often last minute information exchange.

One course of action to create greater connectivity and interdependence may be to bring the extended network closer, impose more formal control in an attempt to improve communication and coordination. But:
“Complexity theory… does not argue for ever-increasing interconnectivity, for high connectivity implies a high degree of interdependence. This means that the greater the interdependence between related systems or entities the wider the ‘ripples’ of perturbation or disturbance of a move or action by any one entity on all the other related entities. Such high degree of dependence may not always have beneficial effects throughout the ecosystem. When one entity tries to improve its fitness or position, this may result in a worsening condition for others. Each ‘improvement’ in one entity therefore may impose associated ‘costs’ on other entities, either within the same system or on other related systems” (Mitleton-Kelly, 2003, p.27).

Simon’s (1999) near-decomposability principle suggests the resilience of the CMF may lie as much in the extended non-contractual supply chain partner network as it does in the formal contractual membership. Structurally, an implication for organisational architects and managers may be to maintain the ‘looseness’ at the extended network, but relationally endeavour to maintain appropriate membrane permeability to exploit the specialised transport pathways for information and resources when the system is exposed to some sort of shock.

Simon’s (1999) explanation of a system returning to a steady state, which may be recovery to the original state or transformation into a new state, can provide more meaning to terms such as loose-coupling as a feature of adaptive capacity (Staber and Sydow, 2002); to loosening of control as an enabling condition for resilience (Sutcliffe and Vogus, 2003); in terms of social capital, more meaning to Granovetter’s (1983) ‘strength of weak ties’, and is a strong argument for the limitations of the traditional notion of centralised ‘command and control’. Moreover Simon’s explanation helps to bring social capital, adaptive capacity and resilience together to provide a fuller understanding of how social capital can be exploited for building resilience. A complexity-based perspective of CMF interdependence is summarised in Table 8.1.
Table 8.1 Summary of a ‘complexity-based thinking’ perspective of CMF interdependence

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
<th>CMF Example – Interdependence</th>
</tr>
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<tbody>
<tr>
<td>Connectivity</td>
<td>A decision or action by any individual (group, organisation, or institution) may have an impact on related individuals and systems.</td>
<td>Nested hierarchy - lower order entities (suppliers) may influence the resilience of the CMF or social ecosystem. Finite contract – potential negative impact on knowledge sharing network.</td>
</tr>
<tr>
<td>Co-evolution</td>
<td>One domain or entity changes in the context of others</td>
<td>Collaboration resulted in cultural readjustment - a new coherence for resource sharing. Receivership - community self-organise &amp; maintain contract schedule</td>
</tr>
<tr>
<td>Far-from-equilibrium</td>
<td>Away from behavioural norms</td>
<td>Receivership - community self-organise &amp; maintain contract schedule</td>
</tr>
<tr>
<td>Space-of-possibilities</td>
<td>Exploring the ‘adjacent possible’</td>
<td>r10 and designers solve build problem using available resources</td>
</tr>
<tr>
<td>Feedback</td>
<td>Reinforcing and balancing loops</td>
<td>Values → collective investment strategies → reinforced values</td>
</tr>
<tr>
<td>Schema</td>
<td>Agent based rules</td>
<td>Values influence mutual adjustments (resource sharing) and positive adjustment - resilience</td>
</tr>
<tr>
<td>Self organisation</td>
<td>Spontaneous coming together of a group to perform a task – no one outside the group directs those activities</td>
<td>r16 and others assemble to resource ‘spoil removal’ and overcome a potential schedule disruption</td>
</tr>
<tr>
<td>Emergence</td>
<td>CAS are dynamic; that is their history is an important part of their emergent patterns</td>
<td>Collaborations facilitates ‘learned resourcefulness’ i.e. greater repertoire of responses emerges for future use</td>
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Chapter Summary

This chapter explored interdependence as an enabling condition for the exploitation of social capital for building resilience. The chapter comprised four sections: reciprocal interdependence and mutual adjustment; value driven interdependence; interdependence versus dependence; and adaptive capacity - ‘complexity-based thinking’ perspective. As high levels of social capital are usually developed in contexts characterised by high levels of mutual dependence, any emergent questions referring to interdependence assume related social capital.

Reciprocal interdependence coordinated by mutual adjustment appears to be a strong characteristic of the CMF. This is evident in stories of contractors’ willingness and ability to engage in resource sharing; behaviour that respondents claimed would not happen in the traditional contracting arena, and therefore may be considered a competitive advantage. Contractors who are normally competitors outside the framework evidenced collaborative working through liaising to overcome problems in order to meet shared targets. Interdependence in part, appeared to contribute to cultural re-adjustment evident in a ‘learned resourcefulness’ as competitors continued their collaborations, sometimes beyond the boundaries of the CMF. Interdependence made it easier for parties to relax formal contracts and extend services beyond jurisdictional boundaries improving project delivery. Interdependence encouraged one specialist contractor to invest in the development of a supply chain partner; the gesture was reciprocated helping the specialist out of a ‘sticky situation’. CMF interdependence enables the community to commit to resourcing much faster without formal orders which suggests it generates trust. Interdependence can enable ‘continuous conversation’ which allows contractors to adjust a project schedule for mutual benefit thereby maintaining or improving the project delivery schedules. Interdependence was influential in reinforcing a culture that promotes network knowledge rather than proprietary knowledge. This was evident in c10 sharing a design problem dossier with competitors. Although CMF collective investment strategies are potential enablers for a knowledge sharing network, the finite conditions of the framework contract can restrict knowledge sharing.
Emergent questions for practitioners and policy makers:

- In what ways can we exploit interdependence for:
  - Maintenance of positive adjustment under challenging conditions?
  - Weick’s four potential sources of resilience?
- Where and how might we leverage interdependence for cultural re-adjustment as part of building resilience, for example, in nurturing ‘learned resourcefulness’, or the ‘continuous conversation’ that can speed up processes, procedures, or project delivery?
- In what areas of our business could interdependence help us collaborate with competitors for sustainable competitive advantage, for example, in:
  - Creating shared targets?
  - Sharing physical resources – plant, processes, equipment, collective purchasing, and property?
  - Sharing information, developing ‘network’ knowledge and learning?
  - Supplier development initiatives that carry expectations for reciprocity?

CMF interdependence has created network ties and configuration that enabled access to resources and channels for resource transmission – elements of structural social capital. Embodied in the examples of mutual adjustment is an expectation or obligation for reciprocity, ‘your turn to scratch our back’ – elements of relational social capital.

The CMF values, espoused at conception contribute value driven interdependence. An assemblage of respondent quotations suggests the community values – trust, supported by respect, integrity, and reliability are enacted in day-to-day activities; a key example being the community helping a specialist contractor through a period of receivership in order to maintain project schedules. Although respondents’ comments suggest community values are enacted in their ‘buy-in’ to various collective investment strategies which in turn, feedback to reinforce the community’s values, one respondent claimed the principles of the CMF fold when commerciality or the perception of the customer demands. A managerial implication for embedding values is to focus on enacting values in day-to-day activities.
Emergent questions for practitioners and policy makers:

- When and how might we go about identifying and embedding shared values that influence interdependence and patterns of social interaction that can be exploited for building resilience?
- In what areas might we build/demonstrate/evaluate trust (a willingness to be vulnerable to another party) in our networks?
- How might we exploit trust in developing high performance knowledge sharing networks?
- How might we exploit trust for sustainable competitive advantage?

The CMF contract and values influence interdependence and represent a combination of formal and less formal influence respectively, upon which high levels of social capital appears to have developed. Although interdependence within the formal community can facilitate openness, resourcefulness, and coordination by mutual adjustment, at the specialist contractor/supply chain partner interface a tension was identified between too great a dependence on a customer(s) and too little engagement to secure the benefits of community partnerships/participation. Although one of two niche suppliers claimed to be over dependent on the CMF, both suppliers’ workload is spread across many clients within and outside the framework, suggesting limited dependence. In contrast, a supply chain partner providing a core service claimed to be parasitic on their engaging specialist contractor. The dependence in this instance was linked to the formal assurances that enabled them to undertake the works.

From a social capital perspective, the niche suppliers may have greater network ties through which resources may be accessed, and more channels for resource transmission when faced with challenging conditions. It would appear that apart from the relationship with c6, c8 has no other ties at all with the CMF. When faced with challenging conditions their access to resources may be limited. c8’s tie with c6 is so strong it appears to restrict business possibilities elsewhere. Burt (2005) might argue to exploit opportunities for advantage as considers brokering new links in other clusters of activity by bridging structural holes.
Related, is the degree to which specialist contractors engage or restrict their suppliers from the community element of the CMF. Whilst some specialist contractors maintain openness with their suppliers, plausible reasons for restricting them may be fear of being replaced by core suppliers, and retention of the control mindset associated with traditional contracting.

Supply chain partners (r4, r8, r13) voiced a desire to be more involved in community initiatives but claim they have not been invited to participate; their voice is through their specialist. The level of participation can be linked to the degree of interdependence. High levels of social capital are usually developed in contexts characterised by high levels of mutual dependence (Nahapiet and Ghoshal, 1998). Conversely, low levels of social capital (interaction) may develop in contexts characterised by low levels of mutual dependence. This seems to be an area that could be bridged. Should the onus be on the specialist to keep their suppliers informed? Could supply chain partners participate in more of the community initiatives? Not all supply chain partners are interested in the community element of the framework, but it may be beneficial to enable those who are, to become more involved. This seems to be an untapped resource and an opportunity where the community may benefit from exploring their space of possibilities (Mitleton-Kelly, 2003).

Emergent questions for practitioners and policy makers:

- Are we fully aware of our network interdependencies and dependencies?
- In what areas do our network dependencies render us vulnerable, for example, restricting access to information, other resources, and broader network opportunities?
- In what areas might we seek higher levels of social capital through greater network interdependence, and where can we afford less interdependence in favour of a spread of dependencies?
- What can we do to convert dependency into interdependency or vice versa for mutual benefit, sustainable competitive advantage, and resilience?
Table 8.1 summarises a CBT perspective of CMF interdependence for a fuller appreciation of the adaptive capacity element of resilience. “Complexity is not a methodology or a set of tools... The theories of complexity provide a conceptual framework, a way of thinking, and a way of seeing the world” (Mitleton-Kelly, 2003, p.26). Rather than attempting to pose questions based on individual principles, a more meaningful proposition may be for organisations to pursue “the identification, development, and implementation of an enabling infrastructure, which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

The chapter has in part, responded to research objective one by identifying ways in which organisations can exploit their social capital for resilience; objective two by exploring how interdependence as an ‘enabling condition’ contributes to the exploitation of social capital for building resilience; and in part, objective three by identifying questions that will form part of a reflective framework to help organisations identify how they can build and exploit their own social capital for building resilience.

The next chapter explores Closure and Brokerage as elements of an enabling infrastructure.
Chapter Nine
Closure and Brokerage

The CMF social structure exhibits closure and brokerage. Together, these emerged as potential ‘enablers’ for exploiting social capital for building resilience. In terms of closure, the Community Navigator emphasised the need to create a sense of membership, identity and rules that guide behaviour and make it ‘different’ from traditional contracting. In terms of brokerage, he stressed:

“[Membership is] not exclusive because we’ve got to engage the next supply chain... What else can we do? Who else can we bring in? Are there people out there in other industries doing stuff with relationships in communities? ...Are there people we can bring in that stimulate us, can show us things that we haven’t even thought of? ...Bearing in mind we’re changing members all the time.”

To recap, social capital is a metaphor about advantage (Burt, 2005, p4; Coleman, 1988, S98). The metaphor is that people who do better are in some way better connected. Disagreements emerge over what being better connected actually means. Coleman (1988) argues advantage is leveraged through closure in the social network: that is all actors are connected in a way that obligations as well as sanctions can be imposed upon its members. But closure can also limit exposure to wider and resourceful networks. For Burt (2001), advantage can be exploited through weaker connections or ‘ties’ in a social structure. Weak connections between groups or firms represent ‘structural holes’ in a social structure that can create competitive advantage for actors whose relationships span the holes. Burt suggests any contradiction between network closure and structural holes can be resolved in a more general
model where brokerage across structural holes is the source of value added, but closure can be critical to realizing the value buried in structural holes.

“Brokerage is about coordinating people between whom it would be valuable, but risky, to trust. Closure is about making it safe to trust. The key to creating value is to put the two together, building closure around valuable bridge relations” (Burt, 2005, p97).

Discussing the constraining and enabling effects of networks structures, Gargiulo and Benassi (2000) contend that actors are faced with trading off safety (associated with cohesive networks) and adaptability (associated with structural holes).

This chapter explores how the CMF manages the trade-off between network closure and brokerage in order to build resilience. Comprising six sections, the first identifies the Benefits of Community Closure. For example, one contractor exploits association with the CMF in their marketing strategy with potential for sustaining competitive advantage – resilience. The second section explores how the Power of Peer Pressure can reinforce value driven behaviour and support maintenance of positive adjustment under challenging conditions – resilience. The Influence of Identification through artefacts such as language and symbols can influence respectful interaction – a potential source of resilience. A fourth section explores what the community describe as a Pleasant Working Environment. For example, how a work-life balance can lead to a willingness to go the extra mile – a useful resource when faced with challenging conditions. A “trade-off” between Closure and Brokerage is linked to the trade-off between exploiting old certainties and exploring new possibilities (March, 1991) for building resilience. These five sections emerged from the data and are supported by relevant literature. Figure 9.1 provides a chapter map linking data to resilience construct.
Figure 9.1 Chapter map linking data to resilience construct.

To gain insight into the adaptation aspect of resilience the chapter integrates, and culminates in section six - **Adaptive Capacity: A ‘complexity-based thinking’ (CBT) perspective**. From a CBT perspective, closure and brokerage influence the connectivity in a system and related systems.

“Complex behaviour arises from the inter-relationship, interaction, and interconnectivity of elements within a system and between a system and its environment… In a human system connectivity and interdependence means that a decision or action by any individual (group, organisation, or institution) may affect related individuals and systems. That affect will not have equal or uniform impact and will vary with the ‘state’ [history, constitution, organisation, and structure] of each related individual and system at the time” (Mitleton-Kelly, 2003, p.26).
Benefits of Community Closure

Derived Pricing

Formal organisations by definition imply a measure of closure through the creation of explicit legal, financial, and social boundaries (Kogut and Zander, 1996). The CMF has created a derived pricing system. At the start of a CMF, specialists are asked to price five sample schemes from which initial pricing is derived. Over the duration of a framework, completed projects become a source from which prices can be derived. As well as saving time that would otherwise be spent on job-by-job tendering, derived pricing provides an ongoing learning process and a guide for contractors to pitch prices on tasks for which a price cannot be derived.

“I think on the surface the jobs cost more money but once a job’s finished it’s finished and people walk away and there’s no big claims” (r6)

“We’ve become very good at understanding what’s required of us in terms of programme is king, quality is king, safety’s king, and the commerciality can be put on the back burner a little bit...” (r8)

Derived pricing removes adversarial claims at the end of a project; enables contractors to concentrate on safety and quality; and allows resources to be more fully committed earlier. The derived pricing system seems to be an aspect of closure that reinforces community ‘identification’ (relational social capital) which separates the community from the adversarial nature of traditional contracting.

The influence of derived pricing is an example of the multidimensionality of a complex adaptive system; how all dimensions (social, cultural, technical, economic, and political) may impinge, interact and influence each other. Although the derived pricing system was primarily implemented as an economy move to save time by eliminating job-by-job tendering and dealing with claims at the end of a project, unexpected social outcomes emerged in that derived pricing reinforces community ‘identification’. Group identification may constitute a significant enabler for information sharing, learning and knowledge exchange (Nahapiet and Ghoshal, 1998) which may be a useful resource when faced with maintaining positive adjustment under challenging conditions – resilience.
**Benefit by Association**

CMF closure can provide benefits by association. c6 exploit association with the CMF in their marketing strategy. Marketing is a value creating activity and can be a means of competitive advantage. According to r6, potential clients outside the framework demand evidence of past performance. When evidence of nine years partnering within the CMF is provided, potential clients often show signs of disbelief.

"Being able to maintain a partnering relationship for nine years in a traditional framework would be highly unlikely because of the adversarial relationships" (r6)

Closure and the strong network ties that closure can accommodate enables access to resources within the community. However, taking knowledge, resources, or relationships forged within the community and exploiting those for advantage elsewhere may be considered a benefit by association and ‘appropriable organisation’ (structural social capital).

"... there isn’t an organisation involved who hasn’t improved their core business through being part of the community...As the parent company, c22 have been interested to learn what c21 have been doing in the community and have taken some of the ideas back to their main business. c23, a large construction company, has also adapted many of the ideas that started in the CMF for use in their organisation" (r3)

Coleman (1988) sees the creation of social capital as largely unintentional processes, emerging mainly from activities intended for other purposes - this he terms ‘appropriable organisation’. The examples suggest ‘appropriable organisation’ has been exploited for adaptation, a key aspect of resilience.

Another example of benefit by association came from a painting contractor who despite receiving no work via the framework for the first two years of membership, committed to being a member of the CMF Community Board and the Innovations Group.
“As well as various off-line groups, the means and settings for sharing best practice included workshops, and presentations. Together these provided exposure to a wide knowledge and resource base as well as developing individual and organisational relationships. They enabled opportunities for ‘cherry picking’ and embedding those ideas in one’s own company. Being associated with the CMF became advantageous as knowledge of the concept spread through the highways industry. There was a certain amount of kudos with the association” (recounted from telephone conversation with r15)

Through interacting with a variety of successful companies, and through a commitment to participate in community initiatives, r15 was able to benefit from new knowledge and shared better practices. He also gained knowledge of the key performance indicators (KPI) that the HA used to evaluate the community. In addition to practical benefits, there is also a degree of kudos from being associated with the framework and serving the HA which may offer a degree of advantage elsewhere. Kudos or ‘identification’ (relational social capital) may contribute to creating and sustaining competitive advantage. Many interpretations of resilience (Coutu, 2002; Robb, 2000; Hamel and Valikangas, 2003; Stoltz, 2004) stress the ability to sustain competitive advantage.

From a CBT perspective, the painting contractor’s benefit by association is another example of the multidimensionality of the CMF. For most, commitment to the community element of the framework is dependent on commercial turnover. Although r15 received no work for two years, a return was evident in gaining technical knowledge of best practices. A further benefit is the kudos that can be exploited in marketing. This last benefit leads to another aspect of complexity, the notion of permeable boundaries with related systems and the wider environment. As the reputation and knowledge of CMF has permeated the community boundary it has had an effect on related systems and the environment – the wider highways industry. Actions by the CMF community have influenced the perceptions of the highways industry; CMF contractors may be well reputed over other contractors who remain in an adversarial mode. Permeable boundaries also give rise to recursive feedback processes – in other words the co-evolution of a system and related systems with its environment. Feedback appears to have reinforced the reputation and most likely competitive advantage of CMF members who (with benefit by association or kudos)
may continue to exploit a collaborative mode within and beyond the CMF boundary. The examples of benefits by association exhibit elements of closure (within the CMF boundary) and brokerage (related systems and environment) and may be considered enabling conditions for the exploitation of social capital for building resilience.

Resourcefulness – Norms, Expectations, and Better Practices

CMF membership follows a rigorous selection process by the HA. Once a framework is established it is unlikely that additional formal members (specialist contractors) will join. Occasionally, a specialist contractor may wish to engage a new supplier. Traffic management specialist r7 claimed when new suppliers see how they might reap the benefits of the CMF they are usually keen to commit to the community element of the framework. For example, r7 engaged a motorway barrier supplier. During works, when the supplier’s excavator developed a fault they were loaned a similar machine from another member contractor. r7 claimed the supplier could not believe that a company they have never dealt with before would be willing to offer the use of an excavator.

“It’s a willingness now to get involved and this barrier company, when they realised, they couldn’t believe that with one phone call, they could get a contractor that they’d never dealt with, never spoken to, would quite willingly allow them to drive their machine” (r7)

The development of such norms, identification, and trust (relational social capital) has been shown to be facilitated by network closure (Coleman, 1990). A behavioural norm exists when the socially defined right to control an action is held not by the actor but by others and represents a degree of consensus in the social system (Coleman, 1990). This kind of community behaviour is an example of the resourcefulness that can be linked to maintaining positive adjustment under challenging conditions – resilience. The example suggests how closure not only influences the development of social capital, but also community resilience and is an indication that social capital and resilience may co-evolve.

To learn more of the scope and nature of resource sharing, the community was asked if the practice extended to labour sharing. Although there was limited knowledge,
r10 did comment that during a particularly busy period he had approached competitors within the framework in view of hiring labour.

“This time last year we were very busy and so was everyone else. We actually approached c18 [competitors] and said do you have any labour available that we could hire off you for a couple of weeks. Didn’t happen, but we asked the question” (r10)

Although no sharing or hiring of labour took place, the point is that there was sufficient confidence or trust - a willingness to be vulnerable to another party; a belief in the good intent and concern of exchange partners; belief in their competence, capability, and reliability (Mishira, 1996) between competitors to make the request. CMF closure appears conducive to the development of high levels of relational social capital (trust) and cognitive social capital. In terms of cognitive social capital, stories of resource sharing leading to positive adjustment feedback and reinforce the CMF norm of resource sharing (Figure 9.2).

![Figure 9.2](image)

**Figure 9.2** Positive feedback between cognitions suspended in narratives and positive adjustment – resilience.

There is a difference between a norm and an expectation. A norm exists when the socially defined right to control an action is not held by the actor but by others. Expectations are developed within particular personal relationships. In a community well endowed with social capital, there is likely to be a combination of norms and expectations influencing the resourcefulness that can be associated with resilience.

Specialist contractor r11 described a situation where he wanted to hire equipment at short notice. He requested the hire from a supplier he had used in the past. The equipment (worth about £20k) was promptly delivered without any paper work in
place. r11 promised the paperwork as soon as possible and the supplier trusted him. Structurally, the network tie enabled timely access to vital resources.

“We have created a personal relationship... that sort of relationship can be as powerful as a contractual relationship... If you can pick up the phone and somebody will do something for you because they feel they can trust you... why wouldn’t they do it when it is their business to do it. You can have a relationship even though something has failed to turn up or arrive on time. The relationship enables you to pick up the phone and say what the **** is going on?” (r11)

This story has two points of interest. First, creating a personal and trusting relationship has enabled a mutual confidence or expectation that may be drawn upon at some time in the future and therefore is a valuable resource. Second, relating to closure, in the same way that a reputation of trustworthiness is likely to be shared within a community, any negative experience is also likely to be shared and therefore carries the evidence upon which sanctions may be imposed. According to r1, the civil engineering community is relatively small and “you are only as good as your last job”. A relatively small community with closure can impose strong peer pressure. In the CMF, closure and peer pressure seem to influence respectful interaction (Weick, 1993) and ‘exceptional resource suppliers’ which Lengnick-Hall and Beck (2003) contend is a contextual element of resilience capacity.

From a CBT perspective, complex systems are dynamic; their history is an essential feature of their emergent patterns. Because the evolution of the system is the result of iterative interaction between its agents, past history helps to produce subsequent behaviour. The history between contractor and supplier has been part of the emergent trusting relationship which has contributed to the resourcefulness and resilience of the community. In terms of dynamism, one common way of change in a complex adaptive system is through altering the boundaries of the system. Boundaries change as a result of including or excluding particular agents and by adding or eliminating connections among agents, thereby changing the underlying pattern of interactions. Re-engaging with a previous supplier has altered the shape of the system. As Mitleton-Kelly (2003) points out, connectivity in human systems is not a constant or uniform relationship, but varies over time, and with diversity, density, intensity and
quality of interactions. As in this case between contractor and supplier, connectivity may be informal or tacit as well as more formal or contractual. Further, the degree of connectivity which determines the network of relationships and the transfer of information and knowledge is an essential element of feedback processes. The interaction between contractor and supplier now forms part of each entity’s history which may influence subsequent behaviour. In terms of social capital, this may be an expectation for a favour to be returned at some time in the future; a useful resource when faced with maintaining positive adjustment under challenging conditions - resilience.

**The Power of Peer Pressure**

“As a self-supporting community, the Highways Agency expects the [CMF] members to resolve any problems without having to intervene” (r3)

Closure is a feature of social relationships that is conducive to the development of high levels of cognitive and relational social capital (Nahapiet and Ghoshal, 1998, p.258). Cognitions such as shared codes, language and narratives shape relational trust, behavioural norms, expectations, and if necessary the imposition of sanctions. If a contractor is not behaving to the community’s espoused values, there are informal processes for addressing such behaviour that harness the power of peer pressure. The Community Navigator argued:

“People are bosses because they might know more, have more experience, or are better suited to a given role. But when it comes to behaviour, even the lowest person knows when somebody else has been out of order, has not been respectful, or shown unacceptable behaviour. There needs to be a mechanism for that person to be able to stand up and challenge that unacceptable behaviour. If the mechanism is owned by everybody it can be very powerful...” (r9)

r3 claimed contractors who do step out of line tend to get pulled back into line by the community. One process which seems to harness peer pressure is the interim and final company performance reviews which are facilitated 360 degree feedback sessions enabling members to ‘have their say’ regarding others’ performance. The
process brings to the fore the community’s espoused values and peer pressure helps to reinforce those values. Peer pressure can be supportive as well as a means of challenging unacceptable behaviour.

“... we’ve taken steps to identify where members aren’t performing. We’ve brought those members in and sat them with three of their peers to make sure that they’re aware of the issues or sometimes perceived issues. And perceptions are just as damaging certainly in a community like ours. A perception of non performance is as bad as non performance itself” (r3)

“I suppose if you see other contractors doing things very well, then you want to do things really well. I think that’s fair enough. If you think people are taking a very professional approach, you try to take a very professional approach and go the extra mile” (r11)

An interesting aspect of the CMF is that the community element is non-contractual; no member is contractually bound to participate in any of the community initiatives. Participation in part, is influenced by closure, various benefits of community membership including incentivised project delivery, and peer pressure. Closure and the peer pressure that closure creates can be a useful resource in terms of avoiding opportunism, providing support, and a means of reinforcing the values that are conducive to a resilient contractor community.

From a CBT perspective, agents behave according to system rules or schema. But:

“Agents’ needs or desires, reflected in their rules, are not homogeneous and, therefore, their goals and behaviours are likely to conflict – these conflicts or competitions tend to lead agents to adapt to each other’s behaviour” (Rouse, 2000, p.144).

An implication when designing organisational structures is to seek conditions that enable agents (contractors) to learn and adapt to each other’s behaviour. To some extent, the CMF appears to achieve this through the community initiatives (ECI, Offline Groups, and Peer Reviews). This follows more of a ‘learning environment’ (LE) or ‘learning space’ (LS) approach to Organisational Learning (Rifkin and Fulop, 1997) which take an emergent view of learning in terms of natural patterns that result from interaction at the local level. Rather than top-down outcome
orientated models that seek to meet goals set by management, LE and LS approaches relax controls and let learning determine its own course. LE and LS processes mirror some of the fundamental concepts of the complexity sciences: non linearity, emergence, and local interaction (Lewin and Regine, 2003).

Another implication is the ability of a system’s agents to exploit the degree of connectivity. Degree of connectivity means the strength of coupling and the dependencies known as epistatic interactions – the extent to which the fitness contribution made by one individual depends on related individuals. Since all CMF members are designated as equal status, and since risks and rewards are shared equally because of the contractual nature of the framework, the relationships may be characterised as highly epistatic. Seen as a by-product of the degree of connectivity in the CMF, the power of peer pressure can be a strong influence towards learning and adaptation in terms of avoiding opportunism, providing support, and a means of reinforcing the values (schema) that are conducive to a resilient contractor community.

The Influence of Identification

“Identification [relational social capital] is the process whereby individuals see themselves as one with another person or group of people. This may result from their membership in that group or through the group’s operation as a reference group, “in which the individual takes the values or standards of other individuals or groups as a comparative frame of reference”... where groups have distinct and contradictory identities these constitute significant barriers to information sharing, learning and knowledge exchange…” (Nahapiet and Ghoshal, 1998, p.256).

Looking for Something Different

According to the Community Navigator, when the first community workshop was held, it was clear that the participants were looking for something different to replace traditional contracts.
“An interesting aspect about the first workshops was that the participants, company owners and senior managers were less interested in the usual performance stuff, and more interested in behaviour issues. These people were looking for something different because the traditional working environment was so hostile” (r9)

The aim at the workshop was to identify the values to be adopted by the community.

“... all we talked about was establishing our values. For a whole day we did nothing but establish boundaries... we scribbled up... joining the community [and] it gave this thing called partnering, whatever you want to call it, it gave it an identity; it said we belong to something... It had to have its own way of doing things and it had to have something that was different...” (r9)

Collins and Porras (1994) note the role of a strong, value driven core identity that offers a prime directive for organisational choices is a prevailing theme in reports on organisational resilience. For example, Freeman et al., (2004) offer ‘moral purpose’ as an explanation for Sandler O’Neill & Partners resilience following the 9/11 attacks. The Highways Agency to some extent, may be exploiting a value driven identity through a ‘moral purpose’ in maintaining the strategic road network as part of the UK critical infrastructure or what r7 called ‘UK PLC’. r7 explained how methods of work have changed in recent times:

“There is emphasis on Journey Time Reliability (JTR), the effects on the country, the environment, waste management, and the impact on UK PLC. Four hours of queues in the morning affects the UK economy because people are not at work”

More highways maintenance is being undertaken during the night as this helps to ensure daytime JTR when there are more road users. The CMF community and the wider highways industry have had to adapt to different methods of working resulting from JTR and imposed environmental and waste management controls. Driven by strong value driven core identity it seems plausible that ‘identity’ guides the CMF community to adapt and maintain positive adjustment under challenging conditions – resilience.
From a CBT perspective at least three points are of interest here. First is the history of each entity which has an effect on subsequent actions; accounts of hostility in the highways sector appear to have had an effect in terms of a desire for change. Second, is the identification of values or schema to bring about change. And third, it seems plausible that the apparent ‘buy-in’ to the community’s espoused values or schema coupled with agent connectivity and interaction has enabled the community to adapt or co-evolve with changing environmental conditions. As Mitleton-Kelly (2003, p. 29-30) points out:

“In human systems, co-evolution in the sense of the evolution of interactions places emphasis on the relationship between the coevolving entities… co-evolution invites notions of responsibility, as once the ecosystem is influenced and affected it will in turn affect the entities (individuals, organisations, institutions) within it. This notion is not the same as a proactive or reactive response. It is a subtler ‘sensitivity’ and awareness of both changes in the environment and the possible consequences of actions. It argues for a deeper understanding of reciprocal change and the way it affects the totality”.

**Language and Symbols**

Closure implies a sense of sociological boundary that distinguishes members from non-members (Nahapiet and Ghoshal, 1998). Boland and Tenkasi (1995) claim the development of unique codes and language is assisted by the existence of community separation. Throughout the research, respondents used language that bore a strong sense of identification that expressed a satisfaction of being separated from traditional contracts. For example, r7 described CMF membership as “no us and them” and commented favourably on the open door policy for communication, something which for him, was different to traditional contracts.

“The daily meeting in the morning of each work day changed from being confrontational to being like meeting with friends. Problems became shared problems” (r7)
A sense of identification, difference or separation from traditional contracting is evident in the language used to describe daily meetings.

The Community Manager used the term ‘real world’ repeatedly to describe the traditional contracting environment, and suggested what has been created in the CMF is ‘special’ and different from elsewhere. Echoing claims by the wider community, the Community Manager associated the real world with a ‘cut throat environment’. One could argue the CMF separates or ‘cushions’ its community from an otherwise hostile environment, creating it a relatively safe place (Gargiulo and Benassi, 2000) providing members uphold the community values and culture. The development of identity has been shown to be facilitated by network closure (Nahapiet and Ghoshal, 1988). A strong ‘ideological identity’, that more or less distinguishes the CMF from the ‘real world’, is an element of cognitive resilience (Lengnick-Hall and Beck, 2003). The identification facilitated by network closure along with the ideological identity associated with resilience is an example of how social capital can be exploited for building resilience.

All respondents agreed CMF culture requires continual reinforcement to maintain the desired mindset. Terminology and accessible analogies has been a part of a strategy for embedding the community culture. For example, the informal ‘resolution and escalation’ process is a template to guide community members to overcome disagreements that may emerge. In a previous career the researcher served with the UK Fire Service. In that organisation a similar process is known as the ‘grievance procedure’. Terminology may be indicative of organisational culture. The term resolution ‘feels’ engaging - the objective is to resolve a problem. Terms like grievance are ‘loaded’ and potentially confrontational.

The Community Manager claimed the community have created their own ‘little language’. CMF first tier contactors are known as specialist contractors rather than sub-contractors. Each specialist will have their own supply chain known as supply chain partners. CMF terminology helps to establish a ‘level playing field’, equal status, and equal voice.

Implicit in creating their own ‘little language’ and trying to ‘level the playing field’ is an attempt to create shared codes, language and narratives – elements of the cognitive dimension of social capital (Nahapiet & Ghoshal, 1998). Cognitions
influence and are influenced by structural and relational social capital. With a flatter rather than hierarchical community structure, members tend to feel more empowered to engage in ‘continuous conversation’. Continuous dialogue provides the raw material for constructing meaning and direction in ambiguous circumstances (Lengnick-Hall and Beck, 2003, p.22). The collective investment strategies employed by the CMF act as structures and processes to exercise continuous conversation that in the main, seems to reinforce community values (cognitions) as well as respectful interaction (Weick, 1993). Figure 9.3 depicts this relationship as a reinforcing feedback loop.

**Figure 9.3.** Reinforcing feedback between social capital (shared codes) and resilience (respectful interaction and continuous conversation).

CMF community identity is reinforced in several ways. As well as community values and culture forming part of routine meetings, site offices are furnished with symbolic posters illustrating comparisons between traditional adversarial contracts and the CMF. Example posters are shown in Figures 9.4.

One poster offers a comparison between the struggle of a rugby scrum – everybody fighting for the ball, and a rowing team - everybody rowing together towards a common goal. Another poster compares boxing with relay runners handing over the baton. The boxing represents the ‘battle like’ claims process that contractors endure at the end of a traditional project to recover extra costs incurred. The relay handover represents interdependence in the CMF. The impact of the posters is evident in at least one respondent’s comments.
Figures 9.4 CMF symbolic community posters.
“I don’t know if you’ve seen the posters around about the before and after. The before was a rugby scrum and the after it was Steve Redgrave. ...in the scrum everybody’s fighting for the ball. They’re all going different ways. With the rowing, you’ve all got to row together...They’ve got to believe that this is the right way. And if everybody does, that’s when everyone’s a winner” (r7)

The posters may be seen as artefacts reinforcing the cognitive dimension of social capital (shared codes, language, and narratives). Another artefact with symbolic meaning is the Phil Stanton Award. All projects undertaken within the CMF are evaluated. The Phil Stanton Award is an annual award presented to the contractors (collectively) that have delivered the best project performance. The prestigious award is presented to the contractor assemblage at an annual event and is a symbol of achievement that carries much kudos within the community.

Social events, also termed ‘cultural events’ reflect the community element of the CMF and can contribute to relationship building and identification. The entire community, from project managers to yard man is entitled to attend social events. Traditionally, the specialist contractors rather than the HA have funded the events. Costs are shared between specialists regardless of numbers employed. The numbers of workers engaged may change considerably from project to project. This is another example of trust and a behavioural norm (relational social capital) within the community. The comments of a couple of respondents suggest socialising is more active in the CMF than in a traditional environment.

“It’s not as formalised as the CMF and it doesn’t try and create a culture...CMF are quite famous for having social events and all that kind of thing” (r4)

“Who’s gonna pay for it in the start?” (r7)

The social events may be seen as a potential contribution to closure - building a strong interconnected network, and a product of closure. Less explicit artefacts such as language and socials combined with more explicit artefacts such as symbolic posters and awards do appear to be linked to the development of an identification
shown to be facilitated by network closure (Nahapiet and Ghoshal, 1998). The bounded but strong connectivity helps to build and maintain relationships which ultimately can provide resourcefulness in terms of behavioural expectations and obligations, for example sharing of information and equipment – useful resources when faced with maintaining positive adjustment under challenging conditions.

From a CBT perspective, the strong local connectivity that closure implies coupled with a sense of empowerment embodied in ‘equal voice’ and ‘levelling playing field’ are conditions conducive to interaction and co-evolution. Agents (contractors) are able to interact and any decisions reached may include diverse contributions which in turn will have an effect on relating entities, systems and the environment. Again, these conditions seem suited to a ‘Learning Environment’ or ‘Learning Space’ approach to organisational learning.

A human social ecosystem includes the social, cultural, technical, and economic dimensions and co-evolution may affect both the form of institutions and the relationships and interactions between co-evolving entities. From the comments of the respondents, it seems that social events can affect embedding the CMF culture, which in turn may influence the economic success of the community. An implication for organisational design and managers is to recognise the multidimensionality of the community or ecosystem and seek to create an enabling environment for desirable co-evolution.

**Pleasant Working Environment**

As a generalisation, most respondents describe the CMF as a pleasant working environment.

“... a pleasant working environment. It’s a better place to work and you tend to find that if everybody gets on, there’s less confrontation so less chances to mess up” (r1)

“It’s a great working environment. We’d love to do more of it” (r4)

“It makes it a more pleasant environment to work in because you can shout across the corridor and wind him up...” (r11)
“It’s a lot nicer to go to work” (r7)

The Community Manager claimed contractors would rather work on the CMF than on other frameworks because they feel they are treated better than on traditional contracts.

“The CMF fosters a better working environment for everybody, which increases productivity and a willingness by people to go the extra mile” (r3)

This seems to imply a better working environment can influence a ‘resourcefulness’ that can be associated with resilience. Motivation appears to be at the core of this issue. Potentially, this presents an opportunity for future research – the relationship between motivation and organisational resilience.

In practice, creating a pleasant working environment has largely been influenced by value driven behaviour. In addition, the CMF recognises three building blocks for success:

- **Process** – what we do – if we are process led without the culture then we are all working separately
- **Culture** – the way we do it – if we are all playing together nicely but going in different directions then it doesn’t work. It’s about aligning everybody
- **Measurement** – how we prove it – if we can’t evidence what we have done then we lose (r3)

According to the Community Manager, the building blocks provide a mental model for contractors to work together, help each other, and to provide the evidence of success they have in doing that.

“This makes for successful teams and a happier work force. People going home at night thinking they would rather work on a CMF site... It is about giving the people that do the work the respect that they deserve” (r3)

Respectful interaction implicit in “giving the people that do the work the respect they deserve” can be a source of resilience (Weick, 1993).
Highways Agency ‘Areas’ are geographically bounded. Specialist contractors use local supply chain partners whenever possible thus avoiding travel and accommodation costs. An advantage for the community can be a better work-life balance. r6 claimed contractors prefer the CMF as it enables them to spend more time at home with family. According to the Community Manager, if unexpected conditions unfold there is arguably a better chance of an out-of-hours response from local workers, or those workers agreeing to work extra hours if requested to do so.

“Weekend working becomes more of a possibility using a local workforce. With a remote workforce, weekends become very contentious” (r3)

It may be that when compared to traditional contracts, CMF local working arrangements impose a degree of obligation on the community to respond to weekend or ‘out of hours’ work requests. Secured working in one Area means contractors are more likely to be working together more frequently. This may be considered a local form of closure and is another potential enabler for developing resourceful relationships.

As a result of JTR the CMT became concerned that some community members might find increased night working unacceptable and leave. However:

“Many of the workers from the local workforce prefer the night time working because they actually see more of their family than if they work regular day shifts. They might work six nights a week but get to collect their children five days a week from school” (r3)

“... it’s easier to work nights than it is on a conventional, go here, there. If you get into Area 9 or 10, you’re working within a certain Area. If you don’t work within the framework, you could be in Scotland, London, Cornwall, Bristol, or Birmingham. If you get in there, you’re keeping your family together effectively” (r7)

It is plausible that the conditions that the community associate with a ‘pleasant working environment’ are conducive to workforce retention and a willingness to ‘go the extra mile’. These may be valuable resources when faced with maintaining positive adjustment under challenging conditions - resilience.
From a CBT perspective, a human social ecosystem includes the social, cultural, technical, and economic dimensions and co-evolution may affect both the form of institutions and the relationships and interactions between co-evolving entities. Here the CMF culture that seems to have nurtured a ‘pleasant working environment’ appears to feedback and influence workforce retention and a willingness to ‘go the extra mile’; a new coherence that respondents claim does not exist outside the CMF.

“There is not the ‘dog eats dog’ culture in the CMF that pervades traditional contracting... The CMF was completely the opposite... price was almost secondary... because you knew it was a nice atmosphere to work in... There was more of a ‘deliver the job’ atmosphere... a lot of that has spread to the rest of the construction industry... A lot of it has come from the HA changing their procurement procedures, putting the emphasis on quality rather than cost. And a lot of that has filtered down to the main contractors who have had to do a lot of work in their supply chains. That puts more emphasis on the HA not to beat people up on just price, they have to look at whether the contractors they are engaging can actually provide the quality and service that they need” (r4)

The relatively small actions of an agent, such as the HA putting more emphasis on quality than cost, can have great impact on other agents within the social ecosystem. For example, work environment perceptions changed from a dog-eat-dog culture to a ‘nice atmosphere to work in’ and a ‘deliver the job atmosphere’. This may be seen as an example of micro actions influencing macro structures; a product of connectivity and recursive feedback as a system co-evolves within an ecosystem (Mitleton-Kelly, 2003).

Closure and Brokerage

“Like the tightrope walker who maintains his equilibrium by constant movements of his balancing pole, managers may have to learn how to continuously balance the trade-off between safe (i.e., cohesive) and flexible networks” (Gargiulo and Benassi, 2000, p.194)
The CMF has created a highly interconnected, strong tie net-work with a variety of processes that facilitate knowledge, information and physical resource sharing. The strong tie network is well suited for the exploitation of existing knowledge and resources that can be accessed through specialist contractors and supply chain partners. This suggests that structural holes are minimal. It is likely that brokerage across perceived structural holes occurred during the initial assembly of the framework community. However, this does not imply that community closure is so extreme that it is closed to new ideas and learning. As the Community Navigator explains:

“What is the five year vision for our relationships and what are we going to do to get there. The community needs to be continually innovative and creative. Don’t dump the good stuff - the bacon butties, but the community also needs constant renewal - new stuff. Who else can we bring in - other people from other industries that are doing stuff with relationships and communities than can be adapted? It is not about measuring each individual innovation that saves a quid... it is about measuring the innovation in terms of relatedness that demonstrates that we are performing more often... even when the bar continues to be raised”

Implicit in the community navigator’s words is recognition that in addition to exploiting existing knowledge via the strong ties associated with community closure, there is a need to seek and explore structural holes and broker new relationships that facilitate the exploration of new or different knowledge and resources. To some extent, this thinking agrees with Burt (2001) who suggests brokerage across structural holes is the source of value added, but closure can be critical to realizing the value buried in the structural holes.

*How can this be exploited for resilience?*

The balance or trade-off between closure and brokerage (Burt, 2001) and the trade-off between exploiting known knowledge and exploring new knowledge (March, 1991) and resources appear to be closely linked in terms of exploiting social capital for building resilience. Recall from the literature review, Sutcliffe and Vogus (2003) argue positive adaptation over the long term, which they interpret as evidence of resilience, requires organisations to manage the trade-off between ‘building
competence’ (efficiency, honing existing competencies) and ‘growing’ (enhancing variation, innovation). The ‘trade-off’ is evident in Robb’s (2000) view that resilience demands an ability to sustain competitive advantage over time through the capability to both deliver excellent performance against current goals and effectively innovate and adapt to rapid, turbulent changes in markets and technologies. The relationship can be depicted in a two-by-two box. Figure 9.5 depicts this relationship along with some of the CMF research findings.

Figure 9.5 Resilience and Social Capital trade-offs depicted as a two-by-two relationship.

Social capital theory suggests a social structure with closure is suited for exploiting known knowledge or ‘old certainties’. When there is a need to explore for ‘new possibilities’, brokers may bridge structural holes in the social system for access to new ideas. There is no one best position. An organisation that operates in a more stable environment may benefit from greater closure. Conversely, entrepreneurial organisations that target emerging opportunities may benefit more from an ability to
quickly broker new and resourceful relationships. Most likely however, is that various activities and functions within an organisation or network of organisations will require a mix of both closure and brokerage. The implication is for managers to identify those most suited for building resilience.

In the literature a broker is assumed to be on one side of the structural hole. Actors with ability to bridge structural holes are well ‘positioned’ to exploit the advantage of new knowledge. However, there may be social, technical, economic, or political constraints that make brokerage difficult if not impossible when attempted by an actor on one side of the structural hole. There is little, if any attention given to the advantages that might be created through an independent broker. An independent broker may be a preferable approach when there is a need for negotiating agreeable terms of engagement across the structural hole. In the CMF, the CMT may be seen as independent brokers of community relationships. Given the adversarial, aggressive history of the highways industry described by the community, the success of the CMF may, in part, be linked to the dedicated but relatively independent and supportive position of the CMT. The role of the CMT may be described as a boundary spanner. Exploring the role of boundary spanners in exploiting social capital for building network resilience presents an opportunity for future research.

Although various collective investment strategies employed within the CMF seem to support a cohesive community structure, there is also evidence of less formal pockets of closure in the contractor network. The following example suggests how a degree of informal closure between supply chain partners can influence the resourcefulness of each party and the community as a whole.

Supply chain partners r13 and r14 have a good relationship and at the same time compete for work outside the CMF. The competitive element of the relationship does not prevent sharing of resources. They share information, for example, where to off load recyclable road planings, thereby saving on expensive disposal fees. r14 claimed to have operated r13’s plant when they were short-staffed. A degree of trust, a belief in another’s competence, capability, and reliability (Mishira, 1996) enables this level of exchange to take place – a road planer is valued at £500,000. Although competitors, there is a reciprocal agreement that they can park trucks and plant in each others yard if necessary. r14 confirmed that this agreement would extend to the
use of office space should there be a fire or flood. This kind of information and resource sharing generates a reciprocal expectation/obligation which can be a mutually beneficial resource. Moreover, it would appear that the relationship makes them a safe bet, a reliable resource; they demonstrate the kind of ‘learned resourcefulness’ that Lengnick-Hall and Beck (2003) associate with behavioural resilience.

Where is the closure?

Where is the closure - the ability of a member to impose an expectation, obligation, or sanction in this story? Along with evident buy-in to the spirit of the CMF community, it was learned that there is a strong family tie involved in the relationship. r14 has a long standing friendship with a senior at c13 who is also the godfather to one of his children. Each year their families go on holiday together. r14 asserts however, that the working relationship has taken time to forge. It would appear that in addition to the formal strategies for collective action employed within the CMF, personal ties can influence an informal closure that can also provide for a resourcefulness that can be exploited for resilience.

Adaptive Capacity – a ‘complexity-based thinking’ perspective

Gargiulo and Benassi (2000) contend actors are faced with a trade-off between safety which they associate with cohesive networks, and adaptability which they associate with structural holes.

“…rather than hoping to find an ideal balance between cohesive networks and structural holes, scholars should fully assume the existence of a trade-off that is inherent to the dynamic of social structures and investigate how successful individuals and organisations actually deal with the trade-off” (ibid, p.194).

A complexity based thinking perspective may help in this pursuit. The Highway Agency’s move to direct contracting with traditionally 2nd or 3rd tier contractors creates a degree of community closure. Closure can create greater connectivity between related agents which in turn allows for participation in community
initiatives aimed at continuous improvement and learning. In a sense, the normally lower tiered contractors have been pushed ‘far-from-equilibrium’, away from previous behavioural norms as part of creating a new coherence. As Mitleton-Kelly (2003, p. 35) contends, if the new order is ‘designed’ in detail, then the support needed will be greater because those involved have their self-organising abilities curtailed and thus become dependent on the designers to provide a new framework to facilitate and support new relationships and connectivity. One key function of the CMT is to provide that support through for example, workforce workshops, promoting ‘buddy forums’, and facilitating peer reviews.

The multidimensionality of complexity-based thinking recognises social, cultural, technical, and economic dimensions may impinge upon and influence each other. The CMF derived pricing system was primarily implemented as an economy move to save time by eliminating job-by-job tendering and dealing with claims at the end of a project. Unexpected social outcomes emerged in that derived pricing reinforces community ‘identification’. Group identification (relational social capital) may constitute a significant enabler for information sharing, learning and knowledge exchange (Nahapiet and Ghoshal, 1998) which may be vital in an organisations ability to adapt and maintain positive adjustment under challenging conditions – resilience.

Although on one hand, the CMF exhibits a degree of closure in the social structure, viewed as a human social ecosystem it is also an open system with permeable boundaries to related systems. As the reputation and knowledge of the CMF has permeated the community or system boundary it has had an effect on related systems and the environment – the wider highways industry. For example, there is a certain ‘kudos’ associated with CMF involvement. Permeable boundaries also enable feedback processes – in other words the co-evolution (adaptation) of a system and related systems with its environment. Feedback appears to have reinforced the reputation and potentially the competitive advantage of CMF members who (with benefit by association or kudos) may continue to exploit CMF methods within and beyond the framework boundary.

Another example of feedback can be seen between social capital and resilience constructs. The cognitions or ‘schema’ that influence community behaviour may be
embodied in frequently told narratives of resource sharing and positive adjustment under challenging conditions. These narratives tend to feedback and reinforce the schemas that influence behaviour. The evidence lies in the high level of community ‘buy-in’ to the CMF concept.

In a similar way that social capital theory suggests successful exchanges between parties can influence trust and expectations of future exchanges, the history of a complex adaptive system is an essential feature of their emergent patterns. Because the evolution of the system is the result of iterative interaction between its agents, past history helps to produce subsequent behaviour. The history between contractor r11 and a supplier has been part of the emergent trusting relationship which has contributed to the resourcefulness and resilience of the community. The interaction now forms part of each entity’s history which will influence subsequent behaviour. In terms of social capital, this may be an expectation for a favour to be returned at some time in the future; a useful resource when faced with unanticipated events.

In terms of historicity, the community membership’s memory of hostility associated with traditional contracting serves as a reminder of undesirable conditions which seems to reinforce or give positive feedback to the CMF culture. Although the CMT helps to reinforce or embed the CMF culture, this is not a position of control, more of facilitation and influence. Complexity theory suggests:

“There is no single point(s) of control. Systems’ behaviors are often unpredictable and uncontrollable, and no one is “in charge.” Consequently, the behaviors of complex adaptive systems usually can be influenced more than they can be controlled” (Rouse, 2000).

The presence of sub-communities and subsequent pockets of closure speaks of the nested hierarchy aspect of complex adaptive systems – the notion of systems within systems or systems being part of larger systems. This means there may be different schema at different levels within a social ecosystem. Schema may be more formal as in the CMF values, or of informal tacit nature such as the godfather bond between competitors r13 and r14 which, when coupled with the dynamic nature of system connectivity suggests ‘influence’ rather than ‘control’ may be more realistic in terms of sustaining a social ecosystem.
The story of r13 and r14 engaging in informal liaison and sharing of plant and other resources to meet work targets exhibits a degree of self-organisation as no higher authority instigated these actions. It may be a stretch to suggest that the plant breakdowns represent far-from-equilibrium conditions from which entities self organise to create new order, but the community’s ability and willingness to collaborate and cooperate during unanticipated interruptions represents an adaptive capacity and seems indicative of what Kauffman (2000) terms exploring the ‘adjacent possible’. In complexity, that is, exploring one step away using ‘building blocks’ already available but put together in a different way. Kauffman’s notion of the adjacent possible seems to mirror Weick’s (1993) bricolage (the capacity to improvise and to apply creativity in problem-solving) – a potential source of resilience.

The closure and brokerage trade-off in the CMF may be seen in terms of complexity theory’s degree of connectivity and interdependence. The dynamic nature of complex adaptive systems recognises the degree of connectivity changes as the community or ecosystem and the entity’s within co-evolve. The CMF has created a highly interconnected, strong tie net-work with a variety of specialisms - conducive to exploiting known knowledge and resource sharing, whilst at the same time recognising the need for constant renewal and exploring for new knowledge and opportunities. This trade-off, to a greater or lesser degree responds to March (1991) who contends organisations with adaptive capacity focus on both exploitation and exploration. The CBT perspective is summarised in Table 9.1.
### Table 9.1 Summary of a ‘complexity-based thinking’ perspective of CMF Closure and Brokerage

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
<th>CMF Example – Interdependence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity</td>
<td>A decision or action by any individual (group, organisation, or institution) may have an impact on related individuals and systems.</td>
<td>Closure creating greater connectivity of 2nd and 3rd tier contractors enabling interaction and learning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multidimensionality – economic dimension (derived pricing) unexpectedly influences social outcomes (identification) conducive to information sharing, learning and knowledge exchange</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CMT provide support for new relationships and connectivity and a new coherence</td>
</tr>
<tr>
<td>Far-from-equilibrium</td>
<td>Away from behavioural norms</td>
<td>As the CMF reputation permeates to the wider industry, positive recursive feedback reinforces the competitive advantage of the membership</td>
</tr>
<tr>
<td>Feedback</td>
<td>Reinforcing and balancing loops</td>
<td>Schema (e.g. resource sharing) embodied in success narratives feedback to reinforce schema</td>
</tr>
<tr>
<td>Schema</td>
<td>Agent based rules</td>
<td>Different schema at different levels of a nested hierarchy (formal CMF values versus tacit arrangements between suppliers) suggest control is neither possible nor desirable</td>
</tr>
<tr>
<td>Self-organisation</td>
<td>Spontaneous coming together of a group to perform a task – no one outside the group directs those activities</td>
<td>Competitors r13 and r14 self-organised to overcome routine and emergent problems such as plant break-downs by exploring the ‘adjacent possible’</td>
</tr>
<tr>
<td>Emergence</td>
<td>CAS are dynamic; that is their history is an important part of their emergent patterns</td>
<td>Previous exchange between r11 and supplier influenced the emergence of a resourceful relationship. This in turn becomes part of a new history that carries an expectation for reciprocity</td>
</tr>
</tbody>
</table>
Chapter Summary

This chapter has conducted a deeper exploration and analysis of Closure and Brokerage as enablers for the exploitation of social capital for building resilience. The chapter comprised six sections: benefits of closure; the power of peer pressure; influence of identification; pleasant working environment; closure and brokerage; and a CBT perspective. Benefits of closure included derived pricing. It was argued that derived pricing removed adversarial claims at the end of a project; enabled contractors to concentrate on quality; allowed resources to be more fully committed earlier to a given project; and seemed to be an aspect of closure that reinforces community ‘identification’ (relational social capital) separating the community from the hostile nature of traditional contracting. Identification may constitute a significant enabler for information sharing, learning and knowledge exchange - a useful resource when faced with maintaining positive adjustment (resilience). Benefits by association included learning of better practices in safety, quality and potentially useful knowledge of indicators used to evaluate contractor performance. CMF membership carries a degree of kudos in the highways industry, an association or ‘identification’ that c6 exploits for competitive advantage (resilience) in their marketing strategy.

Closure is conducive to the development of high levels of relational and cognitive social capital. In terms of the relational element, examples of resource sharing such as loaning plant to cover breakdowns, driving competitor’s machines to cover staff shortages, or parking plant in a competitor’s yard, are indicative of a community practicing behavioural norms, expectations and obligations underpinned by shared goals. The examples exhibit resourcefulness that can be exploited for the maintenance of positive adjustment under challenging conditions – resilience.

Emergent questions for practitioners and policy makers:

- Formal organisations by definition imply a measure of closure through the creation of explicit legal, financial, and social boundaries (Kogut and Zander, 1996). Within these boundaries, what structures and processes can we develop for social capital, for example work force identification, that in turn can help us build resilience?
• In what ways can we mutually exploit our association with partners, clients, or networks, for example, for learning of better practices, innovations, or leveraging kudos in marketing for competitive advantage and resilience?
• In what ways can we exploit our existing or potential closure to impose expectations and obligations, or develop behavioural norms for reciprocity to benefit from sharing resources (technical, social, economic, and political), in order to maintain positive adjustment under challenging conditions?
• What can we do to ensure stories of success feedback to develop and reinforce a resource sharing culture?

Peer pressure underpinned by community values in a strongly interconnected social structure can be a powerful means of guiding and reinforcing desirable behaviour, and eliminating or reducing undesirable behaviour. Peer pressure can be formal and informal; CMF peer groups are non contractual and voluntary. Although the CMF facilitates peer groups for checking poor performance or opportunism, peer groups can also be brought together as a supportive influence.

Emergent questions for practitioners and policy makers:

• In what ways, formally or informally, can we create and exploit peer pressure to a) promote desirable behaviours, provide network support, and establish and reinforce our values, and b) identify and check undesirable behaviours?
• In what ways can we incentivise operations and use peer pressure to ensure collective action?

Strong communities have identity that separate a sense of sociological boundary that distinguishes members from non-members (Nahapiet and Ghoshal, 1993). The community navigator recognised the importance of identity when he facilitated the development of community values. CMF values and identity separate the community from the hostility associated with traditional contracting and are reinforced in several ways. For example, language terminology, symbolic posters, the Phil Stanton Award, and the opportunity to attend social events, seem to have influenced an ‘identity’ that separates the CMF from what the Community Manager calls the ‘real world’, and
which constitutes a significant enabler to information sharing, learning and knowledge exchange. Identification facilitated by network closure along with the ideological identity (for example JTR supporting UK PLC) associated with resilience is one pathway by which social capital may be exploited for building resilience.

Emergent questions for practitioners and policy makers:

- In what ways can our existing or potential cohesive networks be leveraged to create and maintain identification? What can be created or done differently, for example – values, language, posters, symbols, social events, artefacts and rituals, to create and maintain identification (relational social capital) as a resource for maintaining positive adjustment - resilience?
- What does our terminology suggest about our cognitions and culture? Could we adapt our terminology as part of cultural readjustment to gain access to people and their information; to create a greater degree of respectful interaction?

In some ways closure has helped the CMT in facilitating a ‘pleasant working environment’, a feature to which the community give high regard. Closure in terms of a local workforce in a geographically bounded Area contributed to creating a work-life balance for community members. It was argued that a pleasant working environment and a work-life balance were conducive to increasing productivity and a willingness by people to ‘go the extra mile’ which may be a valuable resource when faced with maintaining positive adjustment under challenging conditions. Creating a pleasant working environment seems to be as much about respect for others as anything else. Weick (1993) identifies ‘respectful interaction’ as a potential source of resilience.

Emergent questions for practitioners and policy makers:

Creating a pleasant working environment can involve identifying and understanding what motivates people to ‘go the extra mile’. The CMF seems to manage a healthy work-life balance for its people.

- Closure is conducive to the development of high levels of relational and cognitive social capital. In what ways can we lever trust, norms, expectations
and identification (relational) for creating and maintaining a pleasant working environment?

- In what ways can we exploit our social, technical, economic, and political boundaries for creating and maintaining a pleasant working environment?

Although many CMF benefits rely on a cohesive social structure, the Community Navigator stressed the need to explore and broker new relationships for the constant renewal of the community. A trade-off relationship between exploitation and exploration (resilience) and closure and brokerage (social capital) was presented which suggests one implication for managers is to seek the best balance for various activities and functions.

Social capital theory assumes the position of broker to be on one side of a structural hole. It was argued, the success of the community may, in part, be linked to the dedicated but relatively independent and supportive position of the CMT.

Emergent questions for practitioners and policy makers:

- Do we manage effectively our cohesive social structures to exploit potential benefits of cognitive (shard codes, language, and narratives) and relational (trust, the development of norms, expectations and obligations, and a sense of identity) social capital?

- What are the strengths and weaknesses in our organisation’s close or immediate network? Where and how might access to knowledge and resources be brokered beyond the existing network for sustainable advantage and resilience?

Table 9.1 summarises the application of some of the principles of complex adaptive systems to CMF closure and brokerage for a fuller appreciation of the adaptive capacity element of resilience. “Complexity is not a methodology or a set of tools... The theories of complexity provide a conceptual framework, a way of thinking, and a way of seeing the world” (Mitleton-Kelly, 2003, p.26). Rather than attempting to pose questions based on individual principles, a more meaningful proposition based on a CBT perspective may be for organisations to pursue “the identification,
development, and implementation of an *enabling infrastructure*, which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

The chapter has in part, responded to research objective one by identifying ways in which organisations can exploit their social capital for building resilience; objective two by exploring how Closure and Brokerage as ‘enabling conditions’ contribute to the exploitation of social capital for building resilience. The chapter in part, responds to objective three by identifying questions that will form part of a reflective framework to help organisations identify how they can build and exploit their own social capital for building resilience.

The next chapter brings together the emergent questions from the previous four chapters to construct a reflective framework to help organisations develop and exploit their social capital for building resilience.
Chapter Ten

Reflective Framework

This chapter brings together emergent questions from each of the previous four chapters to construct a reflective framework which may help organisations to explore how they can develop and exploit their social capital for building resilience. The questions are posited under the section headings from chapter’s six to nine as shown in Figure 10.1. Figure 10.2 depicts chapter ten’s ‘position’ within the thesis and contribution to knowledge.

Figure 10.1 Reflective questions are posited under section headings from chapters’ six to nine.
Chapter Ten - Questions from the four emergent ‘enablers’ are compiled into a reflective framework to help practitioners and policy makers consider how they might develop resilience through social capital.

Research contribution - adding new knowledge, transferring existing knowledge, and tackling problems that interest practitioners and policy makers

Figure 10.2 Chapter ten’s ‘position’ within the thesis and contribution to knowledge
Time, Continuity, and Network Maintenance Feedback

History and Investments in Social Relations

- Social capital and trust, can take time to develop. Do our network relationships have sufficient history and social capital to enable the resourcefulness that can help us build resilience?
- Are our business relationship expectations in terms of resourcefulness and resilience commensurate with the history and social capital within those relationships?
- In terms of trust – a willingness to be vulnerable to another party; a belief in their competence, capability, and reliability, are we investing sufficiently in relationships with the right people to build resilience?
- In what ways can we better manage our social capital investments (formal and informal) to develop and maintain new relationships, established relationships, and dormant relationships for building resilience?
- In what ways might our investments in network relationships be appropriable for other, related or unrelated purposes that might support sustainable competitive advantage and thus resilience?

Commitment to Stability and Continuity

- How can we encourage and enable our establishment and network partners to commit to the stability and continuity of the social structure?
- What can we do to nurture a ‘pleasant working environment’ which can influence a ‘willingness to go the extra mile’?
- In what areas could we:
  - Invite financial commitment to network initiatives?
  - Recognise and reward (formally or informally) innovation and excellent performance?
- What might we learn from evaluating our communication and feedback methods?
- What might we learn from evaluating the suitability and commitment of our people for our purpose?
• Are our expectations for commitment from our people and partners commensurate with the workload, benefits and rewards they receive?
• What else can we do to manage desirable commitment?

**Threats to Stability and Continuity**

• The CMF imposes peer pressure to check behaviour that threatens the stability and continuity of the community. In what ways can we use peer pressure to eradicate or reduce behaviours that threaten the stability and continuity of our organisation?
• In what ways might we leverage from peer pressure or any other community action to reinforce commitment to our values and purpose?
• Work discontinuity and thus network discontinuity may result in social capital erosion. Should work become discontinuous or infrequent, what can we do, formally or informally, to avoid erosion of our social capital?

**Interaction and Participation**

**Early Contractor Involvement**

In what areas might we engage early multidisciplinary interaction within our networks to help us to:-

• Build and maintain good working relationships?
• Identify and manage problems before they escalate into something more serious?
• Develop an appreciation of others’ roles (virtual role systems)?
• Invite improvisation and wisdom routinely and when problems emerge?
• Develop a broad repertoire of responses or a ‘complex varied action inventory’ that is associated with resilience?
• Facilitate access to expertise and other resources, for example via loose network ties?
• Provide a space for ‘continuous conversation’? Collaborative sense-making, constructive interdependence, self-organisation, and mutual adjustment all require continuous communication (Thompson, 1967; Weick, 1993).
• Invite respectful interaction and reinforce our values?
• ECI is one means of exploiting social interaction for resilience. Is our mindset and culture conducive to enabling social interaction through ECI?

Empowerment

• Is our organisational culture an empowering or disempowering culture?
• Respectful interaction is a potential source of resilience. Where in our business networks can we empower respectful interaction:
  o Innovation initiatives?
  o Performance monitoring and management?
  o Safety awareness and management?
  o Cultural awareness and management i.e. checking opportunism?
• In what ways can we empower people to explore tacit multidisciplinary knowledge, and more explicit knowledge? Combined, these contribute to the exploitation/exploration ‘trade-off’ for developing adaptive capacity element of resilience.
• In what areas might our business benefit from empowering ‘deference to expertise’?
• How can we evidence the benefits or advantage of empowering social interaction in our networks; and how can we exploit the evidence to reinforce our desired identity and culture? Communities with identity are conducive to information sharing, learning and knowledge exchange – qualities that may influence positive adjustment.

Extended Community or Network Interaction

• Do we have resources (individuals or teams) formally or informally ‘positioned’ to facilitate interaction and relationship building in our
networks? Can we identify areas where we could develop and exploit this role?

• Can we identify informal relationships (perhaps based on longevity or frequent interaction) in our extended network, well endowed with social capital that we can lever for mutual resourceful and reliable interaction?

• Can we identify informal relationships in our extended network that we can exploit for mutual benefit or advantage in terms of ‘change’ or embedding new ideas?

• The application of a predisposition participation → environmental sensitivity ‘loop’ (Ashmos et al., 2002) suggests how participation in various collective investment strategies achieved cultural readjustment. In what areas (processes and procedures) might we facilitate ‘participation’ to help us adjust our predisposition?

**Supportive Relationships**

• What elements of our business/networks might benefit from more supportive relationships? In what ways could we facilitate supportive relationships to help us to:-
  - Solve problems collectively
  - Assimilate information
  - Share expert knowledge (e.g. buddy forums)
  - Improve performance – supplier development

• What are the formal and informal possibilities for creating supportive relationships and where might peer pressure be levered as part of that process?

**Interdependence**

**Mutual Adjustment**

• In what ways can we exploit interdependence for:
  - Maintenance of positive adjustment under challenging conditions?
  - Weick’s four potential sources of resilience?
• Where and how might we leverage interdependence for cultural adjustment as part of building resilience, for example, in nurturing ‘learned resourcefulness’, or the ‘continuous conversation’ that can speed up processes, procedures, and project delivery?

• In what areas of our business networks could interdependence help us collaborate with competitors for sustainable competitive advantage, for example, in:
  o Creating shared targets?
  o Sharing physical resources – plant, processes, equipment, collective purchasing, and property?
  o Sharing information, developing ‘network’ knowledge and learning?
  o Supplier development initiatives that carry expectations for reciprocity?

**Values and Interdependence**

• When we assemble teams or groups, how might we go about identifying and embedding shared values that influence interdependence and patterns of social interaction that can be exploited for building resilience?

• In what areas might we build/demonstrate/evaluate trust (a willingness to be vulnerable to another party) in our networks?

• How might we exploit this in developing high performance knowledge sharing networks?

• How might we exploit this for sustainable competitive advantage?

**Interdependence versus Dependence**

• Are we fully aware of our network interdependencies and dependencies?

• In what areas do our network dependencies render us vulnerable, for example, restricting access to information, other resources, and broader network opportunities?
• In what areas might we seek higher levels of social capital through greater network interdependence, and where can we afford less interdependence in favour of a spread of dependencies?

• What can we do to convert dependency into interdependency or vice versa for mutual benefit, advantage, and resilience?

Closure and Brokerage

Benefits of Closure

• Formal organisations by definition imply a measure of closure through the creation of explicit legal, financial, and social boundaries (Kogut and Zander, 1996). Within these boundaries, what structures and processes can we develop for social capital, for example work force identification, that in turn can help us build resilience?

• In what ways can we mutually exploit our association with partners, clients, or networks, for example, for learning of better practices, innovations, or levering kudos in marketing for competitive advantage and resilience?

• In what ways can we exploit our existing or potential closure to impose expectations and obligations, or develop behavioural norms for reciprocity to benefit from sharing resources (technical, social, economic, and political), in order to maintain positive adjustment under challenging conditions?

• What can we do to ensure stories of success feedback to develop and reinforce a resource sharing culture?

The Power of Peer Pressure

• In what ways, formally or informally, can we create and exploit peer pressure to a) promote desirable behaviours, provide network support, and establish and reinforce our values, and b) identify and check undesirable behaviours?

• In what ways can we incentivise operations and use peer pressure to ensure collective action?
**The Influence of Identification**

- In what ways can our existing or potential cohesive networks be leveraged to create and maintain identification? What can be created or done differently, for example – values, language, posters, symbols, social events, artefacts and rituals, to create and maintain identification (relational social capital) as a resource for maintaining positive adjustment - resilience?
- What does our terminology suggest about our cognitions and culture? Could we adapt our terminology as part of cultural readjustment to gain access to people and their information; to create a greater degree of respectful interaction?

**A Pleasant Working Environment**

Creating a pleasant working environment involves identifying and understanding what motivates people to ‘go the extra mile’. The CMF seems to manage a healthy work-life balance for its people.

- Closure is conducive to the development of high levels of relational and cognitive social capital. In what ways can we lever trust, norms, expectations and identification (relational) for creating and maintaining a pleasant working environment?
- In what ways can we exploit our social, technical, economic, and political boundaries for creating and maintaining a pleasant working environment?

**Closure and Brokerage**

- Do we manage effectively our cohesive social structures to exploit potential benefits of cognitive (shard codes, language, and narratives) and relational (trust, the development of norms, expectations and obligations, and a sense of identity) social capital?
- What are the strengths and weaknesses in our organisation’s close or immediate network? Where and how might access to knowledge and
resources be brokered beyond the existing network for sustainable advantage and resilience?

Reflective Framework Summary

The reflective framework has been constructed by compiling questions identified in the previous four chapters. Each of the four chapters explores an emergent theme or ‘enabler’ which contributes to an ‘enabling infrastructure’ for the exploitation of social capital for building resilience. Although the questions derive from the CMF study, they have purposefully been posed loosely so that other organisations can adapt them to suit their own circumstances.

Although informed by a complexity based thinking perspective, the reflective framework avoids questions relating to specific principles of complex adaptive systems. To reiterate the position adopted at the end of chapter’s six to nine, “Complexity is not a methodology or a set of tools... The theories of complexity provide a conceptual framework, a way of thinking, and a way of seeing the world” (Mitleton-Kelly, 2003, p.26). Rather than attempting to pose questions based on individual principles, a more meaningful proposition based on a CBT perspective may be for organisations to pursue “the identification, development, and implementation of an enabling infrastructure, which includes the cultural, social, and technical conditions that facilitate the day-to-day running of an organisation or the creation of a new organisational form” (Mitleton-Kelly, 2003, p.46).

This chapter has responded to research objective three in constructing a reflective framework to help organisations consider how they might exploit their social capital for building resilience.
Chapter Eleven

Conclusion

The aim of this research has been to explore social capital and resilience in organisations. The research has been a parallel study to an investigation of better practices in Business Continuity Management (Elliott and Johnson, 2010). Drawing on knowledge from the disaster management field where social capital has been shown to influence the resilience of placed based communities exposed to natural and man-made hazards, it was argued that social capital might inform organisational resilience, in particular supply network resilience.

Research Questions

To meet the research aim, three objectives were identified:-

1) Identify ways in which organisations exploit their social capital for resilience
   - Identify ways social capital can facilitate positive adjustment under challenging conditions
   - Identify ways social capital can facilitate the trade-off between exploiting known certainties and exploring new possibilities implicit in building resilience
   - Identify ways social capital can facilitate Weick’s four potential sources of resilience
   - Identify ways in by which formal and informal relationships can compliment resilience building
   - Identify ways social capital can contribute to sustainable competitive advantage

2) Explore how four emergent ‘enabling conditions’ help organisations exploit social capital for building resilience
   - Time and Continuity,
   - Interaction and participation
Interdependence

Closure and Brokerage

3) Develop a reflective framework to help organisations identify how they can exploit social capital for building resilience.

A review of relevant literatures informed analytical frameworks for resilience and social capital. For resilience, a broad working definition of resilience – the maintenance of positive adjustment under challenging conditions (Weick et al., 1998); the trade-off between exploitation and exploration implicit in building resilience (March, 1991; Sheffi, 2005; Robb, 2000); and the application of Weick’s (1993) potential sources of team or small group resilience were used as an analytical framework. For social capital, Nahapiet and Ghoshal’s (1998) model comprising structural, cognitive, and relational dimensions was used. A convoluted route to a ‘complexity-based thinking’ perspective was particularly useful for a fuller appreciation of the adaptive capacity element of resilience.

There is evidence of social capital within the CMF contributing to the development of a more resilient contractor community.

Positive adjustment

One strong indicator is the focus community’s ability to maintain positive adjustment by willingness to share resources to overcome problems and to ensure a project is delivered on time and within budget. Resource exchanges occur routinely, often without payment or the necessary formalities (paperwork) required in traditional contracts, which can result in faster more competitive project delivery.

Another indicator for positive adjustment may be linked to the degree of community support that the CMF exhibits. Formally, the community funded CMT play a supportive role in managing the day-to-day running of the community. Informally, the story of the community self-organising to help a specialist contractor through a period of financial difficulty suggests high level community support and buy-in to the CMF concept. Obliged to reciprocate, the contractor ensured that when their
difficulties were resolved the community were repaid accordingly, which in turn helped them to retain confidence. This kind of behaviour can be influenced by at least three drivers. Formally, the CMF contract clearly creates an incentive to support others. Less formally, the community’s espoused values shape behaviour. But some of the relationships encountered were established long before the birth of the CMF. Long standing relationships, most likely already endowed with social capital also seemed to have influence. “You’d like to think that some of it was down to personalities; they thought we were ok people. We’ve known them since before the CMF started” (r6)

When emergency events unfold, the CMF community show the ability to respond quickly and resourcefully. With similarity to the preliminary Network Rail case study, a CMF emergency response capability is dependent on both contractual strong ties between the HA (and their representative MAC) and the specialist contractor, and the weaker or informal ties in the extended contractor network between the specialist contractors and their supply chain partners.

Stories of positive adjustment of one form or another can become ‘shared narratives’ creating, exchanging and preserving meaning. In other words, the narratives can reinforce cognitions that drive positive adjustment.

The resilience trade-off between exploitation and exploration

From a review of relevant literature, resilience building demands management ‘trade-offs’. These trade-offs (Robb, 2000; Sutcliffe and Vogus, 2003; Sheffi, 2005) are captured in March’s (1991) assertion that adaptive organisations focus on both exploitation of old certainties and exploration of new possibilities. Various CMF initiatives contribute to striking the trade-off. ECI enables contractors to assemble and share known better practices and at the same time creates opportunities to explore new possibilities for solving problems; possibilities that might not emerge without multidisciplinary and collaborative interaction. The innovation recording initiative gathers explicit knowledge; as contractors overcome problems, written accounts of their initiatives are evaluated for added value and may adopted as new better practices on future projects. Offline groups are more exploratory and have
been assembled to explore new ideas in areas such as processes, culture, and measurement, safety communication, innovation, supply chain integration, and the environment. The CMF community has learned to manage a trade-off between competition and collaboration. Where contractors once would not collaborate to maintain their own competitive edge, they now seek improved performance in part, through the sharing of information and resources. With these exchanges come expectations of reciprocity and mutual benefit – resources that can be exploited for competitive advantage and resilience.

*Potential sources of resilience*

The CMF exhibits elements of Weick’s (1993) four potential sources of team resilience. Improvisation and bricolage is evident in the community’s ability and willingness to engage in resource sharing to deal with unanticipated problems such as a machine breaking and improvising with competitor equipment. ECI, Off-line Groups, and ‘buddying’ are structures that contribute to an enabling environment for multidisciplinary ‘conversation’, creativity, and problem solving. The innovations recording initiative encourages creativity and helps to ensure learning is captured and passed on.

The CMF membership exercised ‘attitude of wisdom’ in their ability to challenge traditional forms of contracting and engage in a concept that is fundamentally different. From the conception of the CMF the membership’s buy-in and participation in establishing community values which have shaped new or different behaviours and relationships represents an acceptance of the limitations of traditional contracting methods.

Respectful interaction is evident in the conduct and feel at ‘setting the scene’ meetings, project progress meetings, interim and final project performance reviews. This is not to suggest that these settings are cosy; some of the meetings attended became ‘heated’, but all resulted in agreement upon which contractors respected and were willing to act. Acknowledging inherent dangers associated with highways maintenance, and underpinned by community values, CMF contractors strongly support openness and honesty and are encouraged to respect the concerns of others.
A degree of community closure and interdependence, combined with the multidisciplinary ECI process can support the development of virtual role systems. ECI provides an enabling environment not only for relationship building but has also helped contractors to develop an awareness of the issues and problems faced by other contractors of a different specialism which may be a potential source of community resilience when dealing with both routine and unexpected events. The case study responds to research objective one by identifying ways in which organisations exploit their social capital for resilience.

Four interrelated themes or ‘enabling conditions’ emerged during the case study: Time, Continuity, and Network Maintenance Feedback; Participation and Interaction; Interdependence; and Closure and Brokerage. Together these themes contributed to an enabling infrastructure in which the CMF contractor community appeared to exploit their social capital for adaptive capacity and resilience. Drawing on principles of complex adaptive or evolving systems, a ‘complexity-based thinking’ perspective provided useful insight into the adaptive capacity element of resilience building. The four chapters supporting emergent themes or enablers thus respond to research objective two.

Based on the conclusions of each chapter supporting an ‘enabling condition’, emergent questions were compiled to develop a reflective framework to help organisations think about how they might exploit their social capital for building resilience. The reflective framework thus responds to research objective three.

**Contribution to Knowledge**

Having identified an undeveloped ‘space’ between the social capital and resilience constructs in an organisational context, the CMF case study has made a contribution by adding new knowledge.

The research also makes a contribution in deepening the understanding of existing knowledge. In the broader field of disaster management, social capital has been shown to be a resource linked to the resilience of ‘place based’ communities when
faced with effects of natural and man-made hazards. This research thus transfers elements of existing knowledge from the disaster field to the organisational field.

The research makes a contribution towards tackling problems that interest practitioners and policy makers. For example, the BCM industry recognises a need for supply network resilience. Linked research (Elliott and Johnson, 2010), suggests currently used objective benchmarking methods are limited in helping practitioners and policy makers tackle supply network resilience. By adopting a subjective approach, and through the development of a reflective framework, the research will compliment the limitations of current objective methods and contribute to tackling problems – supply chain/network resilience.

Claim to an emergent contribution may be made in responding to Maguire and McKelvey (1999) when they suggest more case studies using complexity characteristics are needed to further the field.

Limitations

Although this research project is entitled exploring social capital and resilience in organisations, the CMF represents one type of organisation or network in one sector. Researching social capital, networks, and knowledge transfer, Inkpen and Tsang (2005) distinguish between three types of networks: intra-corporate networks, strategic alliances, and industrial districts and propose a set of conditions that promote knowledge transfer for the different network types. It may be that different network types demand different enabling conditions for the exploitation of social capital for building resilience. Different enabling conditions would almost certainly generate a different reflective framework. This observation invites future research in a range of networks for a fuller exploration of the relationships between social capital and resilience constructs.

Another limitation is that time and resources have not been sufficient to apply the reflective framework in other settings. It is likely that such an endeavour may lead to adjustments as part of an iterative process of honing the improvement of the framework. Again, this invites further research opportunities.
**Future Research**

As well as the future research opportunities linked to the limitations above, another possibility identified during the research related to the position of broker. In the social capital literature a broker of advantage can be assumed to be on one side of the structural hole. Actors with ability to bridge structural holes are well ‘positioned’ to exploit the advantage of new knowledge or resources. However, there may be social, economic, or political barriers that make the bridging of structural holes difficult or impossible when attempted by an actor on one side of the structural hole. There is little, if any attention given to the advantages that might be created through an independent broker. An independent broker may be a preferable approach when there is a need for negotiating agreeable terms of engagement across the structural hole. In the CMF, the CMT may be seen as independent brokers of community relationships. Given the adversarial, aggressive history of the highways industry described by the community, the success of the community may, in part, be linked to the dedicated but relatively independent and supportive position of the CMT. The CMT may be better described as a ‘boundary spanner’. Williams (2002) reviews the literature on boundary spanners which he describes as ‘by no means extensive or consolidated’. Webb (1991) refers to boundary spanners as individuals who are especially sensitive and skilled in bridging interests, professions and organisations. Trevillion (1991, p.50) views boundary spanners as ‘cultural brokers’ who need to understand anothers’ organisation and to ‘make a real effort to empathise with, and respect anothers’ values and perspectives’. A future research opportunity may be to explore the role of network boundary spanners in exploiting social capital for resilience.

Many of the stories offered by respondents illustrate change from ‘aggressive’ behaviours associated with traditional contracts towards collaborative behaviours encouraged within the CMF. Once the benefits of the latter had been experienced there was evidence of cultural re-adjustment (Turner, 1978) as actors spoke of the experience shaping behaviour elsewhere. In part, the cultural re-adjustment appears to have been influenced by the community interdependence. This presents another potential research opportunity – the relationship between interdependence and cultural re-adjustment, which may have powerful change management implications.
During the research respondents frequently referred to the CMF as a ‘pleasant working environment’. This seems to imply that if a better or pleasant working environment can be created, it could contribute to a ‘resourcefulness’ that can be associated with resilience. Motivation appears to be at the core of this issue. Potentially, this presents another opportunity for future research – the relationship between motivation and organisational resilience.
References


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Appendices

Appendix One

Email to research contact (18th November 2008)

Dear *****,

Thanks for your time and hospitality last week. I felt our meeting went very well, covered a lot of ground, and again I thank you for the interest you have shown towards my PhD research.

I have been thinking about possible ways forward. A good starting point would be for me to learn of the evolution and structure (network ties and configuration) of the contractor network. With an appreciation of the structure I can give thought to network access points to explore the inter-related relational and cognitive dimensions of social capital, and how these dimensions collectively might influence the resilience of the network.

How to go about this?

We discussed the possibility of a case study approach. I can envisage distinct but ultimately related approaches, but would further welcome your views in terms of practicality, access, and other party participation etc.

1) Case study – historical examples of routine and non-routine problem solving, or dealing with uncertainty (policy & procedures through to carrying out elements of complex construction projects). Exploring how network relationships may have influenced the capacity for the ‘maintenance of positive adjustment under challenging conditions’ (resilience).

2) Observing the influence of relationships (formal & informal) during the undertaking of a project (attending progress meetings/conversations with contract managers). In terms of methodology, this approach is potentially very rewarding as it can be real (or very near real) time observation avoiding any distortions of third party interpretation. Is there an issue, problem or complex project currently underway or scheduled for the near future that demands engagement from multiple parties from the contractor network?
3) Capacity to adapt to changing circumstances/events/environment. Through case study analysis, for example, a management process or procedure outcome, exploring cultural enablers and/or barriers within the network.

4) Supplier Development Study - Is there any ‘supplier development’ process undertaken in the extended contractor network? If supplier development is undertaken, how does this influence network relationships, and in what ways does this contribute or influence network resilience?

5) Team resilience analysis – you spoke much of teamwork. Can we further discuss? There may be an opportunity either separately or as part of one of the above to get into the organisational culture in terms of the way tasks/projects are undertaken (looking at where a team is now and where it wants to be in terms of resilience).

I am convinced that this sort of research needs some context – an interesting case study or event, a management process such as ‘supplier development’, or observing network behaviours through a project. *****, these would be starting points. Often it is the emergence of the unexpected (context) that can be of interest.

Central to this is seeking to understand how different aspects of social capital in organisational networks influence the balance or ‘trade off’ we discussed in managing resilience - the balance or ‘trade-off’ between the ‘performance system’ (process and target compliance) and the ‘adaptation system’ (e.g. ‘non-routine’ or a ‘window of opportunity’), the ‘trade-off’ between stability and search, exploitation and exploration.

Access and time

I do need to be able to gain access to contract network parties. The number is dependent of the quality of data collected or observed and the time period over which data is collected. As a ball park figure… ten to fifteen parties… or at least a couple from each tier of contractors. In terms of time, in my experience 60 to 90 minutes is usually ample for an interview. Observations would be dependent on context. It would be helpful for me to collect data over the following three months or so, but I understand people are busy… I am flexible and grateful for any time parties may be willing to offer. Perhaps we could discuss?
I re-emphasise, the underlying purpose of the research is to identify better practices within networks which may be shared to improve wider network resilience. I have attached two papers for your perusal: Krause et al., (2006) I referred to during our meeting which provides a good description of social capital relating to supplier networks - heavy in places!, and Robb (2000) who discusses the organisational resilience trade-off issue.

If you have any questions please do contact me. I will telephone you towards the end of the week to further discuss.
Appendix Two

Email to research contact (3rd December 2008)

Hi ****,

Attending the ‘setting the scene’ presentation last week was really useful for me in getting an appreciation of how the initial stages of a large project are undertaken at *****... so thanks for letting me know about that. I found the amount of time and emphasis given to a ‘common culture’ within the contractor community very interesting. The four areas that are championed seem like good areas to follow through the project for my research.

It was good to meet **** and ****, who I hope to be able to meet again shortly for their views on how I suggest going about the research. After ****’s question regarding contractor benefits for participating in the research, I have given a lot of thought to the benefits that all stakeholders might get from the research. The answer to such a fundamental question can be difficult to articulate when engaging in research exploring concepts such as network relationships, culture, and resilience, each of which is ‘not very tangible’. The attachment gives examples of potential benefits to stakeholders, but I emphasise the research is as much about understanding organisational culture, which I see as the driver for more tangible performance outputs. Again, comments, views welcomed.

I note from the ‘setting the scene’ meeting minutes, the programme and progress meetings begin in January 09. Will I need a site induction/passes etc to attend the onsite meetings?

Is there a good time to phone over the next few days to discuss?

Attachment from email above:

The Research

Having already learned a lot about the developing organisational culture at *****, the Leasowe Bidston Rail Bridge Project presents an opportunity to research more fully how various aspects of contractor relationships or ‘social capital’ (network
norms and trust that facilitate cooperation and coordination) can influence the resilience of the ***** contractor network.

What is resilience? Resilience has many definitions. A useful ‘all rounder’ is ‘the maintenance of positive adjustment under challenging conditions’. On one hand, resilience is about building competence for dealing with known or anticipated conditions – best practices etc. On the other hand, resilience is about growth and being able to adapt to change and uncertainty through improvisation, innovation, and creativity. In terms of management, this can often demand a ‘trade-off’ between the two to build and maintain resilience. Successfully managing the trade-off can manifest as ‘competitive advantage’. A resilient contractor network can both exploit what is known for today and also explore and seize opportunities for tomorrow.

Identifying tangible outputs can be difficult in this sort of research where the constructs i.e. social capital and resilience have (as yet) no unified definition and can be difficult to quantify. The research is about understanding the organisational culture that drives the more tangible performance outputs.

**Research Methods**

The research approach will be to gather information pertaining to three inter-related dimensions in the contractor network: The structural (impersonal) dimension, such as network ties and configuration; the relational (more personal) dimension, such as trust, expectations and obligations between contractors; and cognitions (systems of meaning) such as rules, codes of practice, or simply ‘the way things get done around here’, within the contractor network.

The four ‘championed’ areas highlighted in the ‘setting the scene’ presentation i.e. ‘culture’, ‘innovations’, ‘communications’, and ‘measurement’ offer a good starting point or focus to begin gathering data (stories, accounts, and observations that might influence network resilience).

During the project, I anticipate it would useful to:

- attend weekly and fortnightly programme and progress meetings;
• have regular liaison with culture, innovations, communications, and measurement ‘champions’;

• observe and talk with actors at various levels of the contractor community (HA, Main Contractors, Subcontract, Subcontract Specialist, Supply Chain, Site Lads, to research the social capital (structural, relational, and cognitive dimensions) in the contractor network, and how these might influence the trade-off implicit in managing network resilience.

Research Outcomes/Benefits

From information available on **** and the HA websites, the development and maintenance of ‘common culture’ and goals is a key part of both the **** and Highways Agency mindset. Part of that culture is the promotion of ‘feedback’ and ‘continuous learning’ to enable the network to be better equipped for future projects. The research may contribute to the continuous learning process and be of benefit to all of the network stakeholders.

The Highways Agency

During the ‘setting the scene’ meeting, much emphasis was given by the HA to their vision and goals, and also aspects of organisational behaviour they encourage:

• Better working relationships

• Best practice

• Innovation

Better working relationships are at the heart of the research. Managing best practice and innovation may be seen as the balance or ‘trade-off’ needed for managing resilience. The research is therefore supportive towards the HA philosophy.

**** (MAC)

In addition to being seen to be engaged in research supportive of the vision and goals of the HA, **** may also benefit from evidence based research that seeks to identify how the various components of social capital contribute (or otherwise) to the resilience of the wider contractor network. **** is in a very competitive space,
seeking to retain and win more areas from the HA and others. Resilience embodies competitive advantage. The research may therefore inform the development of competitive advantage in the **** network, and the retention and winning of more areas.

The Highways Agency has Business Continuity ‘duties’ under the Civil Contingencies Act (2004). A key component of Business Continuity is supply chain resilience. Any research findings may be beneficial in demonstrating ****’s commitment to assisting the HA in complying with these duties.

**Contractor Community/Network**

Contractor participation in the research may be recognised by **** as engaging in the development and maintenance of the desired ‘culture’, a culture that embraces ‘continuous learning’. Potentially, knowledge may emerge for enhancing ‘culture’, ‘innovations’, ‘communications’ and ‘measurement’, each of which may be contributory to the network resilience and competitive advantage.

Each contractor, as a stakeholder in the **** network community, should have an interest in the resilience of the network. The interest may be concerned with long-term commitment to the network or more short-term survival. The research seeks to identify conditions and practices within the network that can be shared to improve the resilience of the wider network.

Current institutional arrangements may be uncomfortable for expressing a view regarding certain aspects of working relationships. The research is strictly confidential. Any sensitive views or expressions will be anonymised but could form part of important feedback and learning improving the resilience of the network for future projects.

**Summary**

- Contribute to the competitive advantage of the wider network

- Engaging in continuous learning – the world is in constant flux

- Participant in the development of common culture

- Identify factors that enhance the wider **** network resilience
• Identify factors that enhance resilience outside of the **** network

• An opportunity to express anonymous views/opinions that you may feel uncomfortable in expressing through currently available channels

• Interest & Curiosity

The benefit for me is to be able to conduct an original and achievable piece of research in contribution to my PhD. As far as I am aware there has been little or no previous research that has focused on social capital in supply networks in an organisational resilience context.