



Resilient Organisations Research Report – 2009/01

REDUCING THE IMPACT OF ORGANISATIONAL SILOS ON RESILIENCE

*A Report on the impact of silos on resilience and
how the impacts might be reduced*

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RESILIENT ORGANISATIONS

The Resilient Organisations Research Programme (www.resorgs.org.nz) aims to improve the resilience of New Zealand organisations to major hazard events. Organisations manage, maintain and operate our infrastructure, create our economy and contribute to our society. The ability of organisations to respond effectively following a hazard event will have a large influence on the length of time that essential services are unavailable, and ultimately how well our communities cope with major disaster.

Particular aspects of organisational response and recovery focused on by the research team include: how organisations plan for hazard events, their ability to direct resources effectively during crises, and the challenges presented by a post-disaster reconstruction effort.

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ABSTRACT

Organisations need to perform effectively if they are to meet societal goals and expectations. This is especially important when adverse events arise, whatever the cause.

Silos are organisational units where there is a breakdown in communication, co-operation and co-ordination with external parties. Silos can arise within organisations, a result of silo mentality. Or organisations themselves can become siloed if they unduly limit their connections with other organisations. Silos are often detrimental to the resilience of organisations and communities.

Two definitions of resilience are suggested; one based on New Zealand research undertaken within the Resilient Organisations Research Programme (www.resorgs.org.nz) and another from the UK that addresses resilience at both organisational and national levels.

There is a need to improve the way that we manage silos in the interests of organisational and community resilience. How silos arise and what can be done about them to promote resilience is the topic of this report. Good internal management practices, together with bridge-building between organisations to improve collaboration, appear to be particular needs. Specific steps need to be taken where private incentives fall short of delivering all of the community's resilience requirements.

This report concludes by suggesting some points that need to be recognised to reduce the impact of silos on resilience.

INTRODUCTION - THE ESSENTIAL ROLE OF ORGANISATIONS

Communities consist of people and the organisations that they create to own and operate the assets and systems needed to keep society intact and healthy.

The ability of society to function during both normal ~~business as usual~~ times and in emergency conditions depends, among other things, on how well organisations perform. In particular, when crises occur, the business sector has key roles in maintaining the flow of essential goods and services, supporting household incomes through continued employment, and generally in promoting a sense of community confidence. Small to medium-size enterprises (SMEs) provide many services and much employment. The continued operation of SMEs in adverse events is a particular need (and a particular challenge).¹

Continuity is particularly important in the case of those businesses that provide emergency services and that own or operate infrastructure such as electricity and other energy forms, ICT², transport and water / waste. Issues relating to the need for reliable infrastructure have been the focus of much attention in New Zealand and elsewhere in recent years. Businesses and households have become increasingly reliant on infrastructure services for commercial and social activity. Interdependencies between infrastructure types feature strongly (communications need electricity to function, transport needs petroleum as an energy source, and most rely on telecommunications for daily monitoring and control). At the same time, the potential for infrastructure failure may have increased as assets age, systems become more complex, owners and managers seek cost-savings and climatic conditions become more challenging.

Looking more broadly, it can be said that a sustainable community will (among other things) manage its risks effectively over time. As noted by Sonia McManus *et al*

“There is an intrinsic relationship between organisational resilience and improving the resilience of communities. Enabling the continued operation of organisations, in and following crises, significantly impacts on the medium to long term recovery and health of the wider community. There is increasing demand for organisations to exhibit high reliability in the face of adversity; decision-makers must address not only the crises that they know will happen, but also those that they cannot foresee”
(McManus, Seville, Brunsdon, & Vargo, 2007, p ii).

Similarly, Seville *et al* note

“Organisations manage, maintain and operate our infrastructure, create our economy and contribute to our society. The ability of organisations to respond effectively following a hazard event has a large influence on the length of time that essential services are unavailable. Therefore, enhancing organisational resilience is a critical step towards creating more resilient communities” (Seville, Brunsdon, Dantas, Le Masurier, Wilkinson, & Vargo, 2006, p 5).

This report commences with a brief description of resilience and silos. Silos and the development of silo mentality within organisations are described, noting that these arise from cultural phenomena and that they can impede organisational resilience. This is followed by corresponding material on silos between organisations. The report also sets out some thoughts on what might be done to reduce the incidence of silos and silo mentality, and on how adverse impacts may be offset when they occur. Some unifying themes are offered in the conclusion.

WHAT IS RESILIENCE?

Organisational resilience is the subject of a six year research programme underway in New Zealand (the research programme is titled “*Resilient Organisations*”). The research explores how organisations prepare for adverse events, how well they adapt when crises occur, how effectively interdependencies between organisations function under duress and how well community interests are served in these conditions.³

Programme participants, noting that resilience arises from an organisation’s resilience ethos, have developed three defining dimensions

Resilience is a function of an organisation’s

- *Situation awareness*
- *Management of its keystone vulnerabilities*
- *Adaptive capacity*

in a complex, dynamic and interconnected environment.

Seen this way, organisational resilience is a goal . a state to be aimed for

“A resilient organisation is one that is still able to achieve its core objectives in the face of adversity. This means not only reducing the size and frequency of crises (vulnerability), but also improving the ability and speed of the organisation to manage crises effectively (adaptive capacity). To effectively manage crises, organisations also need to recognise and evolve in response to the complex system within which the organisation operates (situation awareness) and to seek out new opportunities even in times of crisis” (Seville, Brunsdon, Dantas, Le Masurier, Wilikinson, & Vargo, 2006, p 4).

The UK government’s definition of resilience covers organisations but extends to other levels, including the national as a whole.

Resilience is the ability at every relevant level, to anticipate, and if necessary, to handle and recover from disruptive challenges

The disruptive challenges in question can arise from natural hazards (geophysical and meteorological events, for example), acts of malevolence, sudden changes in the operating environment (e.g. the currently global financial crisis) or by internal failure of the organisation’s assets or systems themselves.

While these definitions address resilience at different levels, they have much in common. In particular, both are dynamic in the sense that resilience is seen as starting with pre-event awareness and anticipation and continuing through event management into a post-event recovery.

SILOS DEFINED

The term %silos+is quite commonly used in literature on organisational performance to describe inwardly focused organisational units where external relationships are given insufficient attention. Breakdowns in communication, co-operation and co-ordination between unit participants and other stakeholders, and the development of fragmented behaviour, are common features. The result is that the organisation falls short of making its best contribution to the needs of immediate and wider groups with an interest in the unit's continued good performance.

Silos can arise within organisations. In a paper quoting a 2003 Survey on Leadership Challenges by the American Management Association, Florence Stone notes that

"..... getting people who have different agendas to work together is amongst the biggest obstacles facing business today" (Stone, 2004, p 11).

Silos can also arise between organisations. In a recent paper Conrad Guelke notes that

".... organisational parochialism is characterised by a lack of co-operation between [and within] agencies. In a corporate environment where decision-making is being increasingly "unbundled", and business unit fiscal performance is the priority, the values of teamwork and co-operation are often neglected" (Guelke, 2005, p 749).

Silos can also arise between disciplines

Although not a major focus in this report, silo behaviour can also arise between disciplines and occupations.

- In an article on management cultures and learning, Edgar H. Schein notes that %occupational communities+(fishermen and miners are quoted) often develop similar attitudes within their occupations irrespective of national origin (Schein, 1996, p 12).
- The smooth running of complex organisations such as hospitals and universities, for example, demands very high levels of understanding and co-operation between professional groups with different expectations and training. The tensions that can arise between these groups can reduce organisational performance unless well-managed.

Silos, whether within or between organisations or between disciplines, have their origin in human behaviour. The term %silo mentality+is often used to describe individual and group mindsets which can be divisive within and between organisations and which are most often

manifested as communication barriers creating disjointed, disconnected and detrimental ways of working.

It is helpful to think of silos existing in degrees along a continuum, i.e. silo existence isn't a binary, black and white matter. Most organisations and organisational units will have some silo characteristics at any given time. But silos become problematic when they are developed to a point that good performance suffers. The challenge is to identify silos that are problematic or that threaten to become so, and to identify and take remedial steps.

SILOS WITHIN ORGANISATIONS

Silos are Cultural Phenomena

Intra-organisational silos and silo mentality can be seen as cultural phenomena. Specifically, silo mentality (or ~~tribalism~~) is a cultural or social phenomenon that can affect individuals, communities, business units, teams or functions within any organisation.

Edgar H. Schein notes that

“A culture is a set of basic tacit assumptions about how the world is and ought to be that a group of people share and that determines their perceptions, thoughts, feelings and, to some degree, their overt behaviour. Culture manifests itself at three levels: the level of deep tacit assumptions that are the essence of the culture, the level of espoused values that often reflect what a group wishes ideally to be and the way it wants to present itself publicly, and the day to day behaviour that represents a complex compromise among the espoused values, the deeper assumptions, and the immediate requirements of the situation” (Schein, 1996, p 11).

Put more simply, Steven Davis describes culture as *“the way we do things around here in our organisation”* (Davis, 2004, p 15).

Problems arise when cultures of organisational units are misaligned, i.e. when they fail to fully mesh to serve organisational goals. Silo mentality, for example, creates barriers within organisations, blocking opportunities including those that might be fostered by good communication e.g. relating to innovation, creativity and efficiency, and leading to duplication and other costs.

Intra-Organisational Silo Mentality is Quite Comprehensively Treated in Literature on Organisational Performance

Three examples

Florence Stone quotes Karl Albrecht who, in the course of an address to a Current Issues Forum sponsored by the American Management Association, suggested that *“silos are symptomatic of organisational dysfunction”*. Stone also notes that *“silos create an environment in which the personal and departmental interests of ambitious managers may take precedence over the well-being of the organisation”* (Stone, 2004, p 11).

John S. Carroll suggests that employees at different levels in a given hierarchy can have different understandings and may not communicate easily (Carroll, 1998, p 700).

Davis discusses how an organisation with silo mentality will *“look to their own interests rather than that of the (organisation) as a whole”* (Wisner, Blaikie, Cannon, & Davis, 2004, p 15).

Silo mentality is also addressed in applied research. McManus *et al* note that the concept of intra-organisational silo mentality is not new, and that it *“often represents a decentralised structure, an individualistic approach to achieving goals, and a limited understanding of the overall vision of the organisation”*. Problematic levels of silo mentality were common in the ten case study organisations that were the subject of their research. The authors go on to note that silo mentality

“..... is an intrinsic feature of the autonomous decision-making structures that feature in modern organisations, and is important for ensuring loyalty and pride, as well as competition, [in] an organisational framework. However, the negative aspects of silo mentality appear to be poorly identified and largely misunderstood These effects include..... destructive and detrimental relationships” (McManus, Seville, Brunsdon, & Vargo, 2007, p 30).

How are intra-organisational silos and silo mentality generated?

Silo mentality can occur when teams are spatially separate, but it can also occur between people or groups that share office space.

Conditions that may be conducive to the establishment of silo mentality are covered in a 2004 paper by Florence Stone (Stone, 2004, p 12). Summarising a survey on internal collaboration by the American Management Association, Stone notes that these conditions may include

- the attitude of unit managers
- indifference to other departments needs
- strong departmental priorities relative to corporate priorities
- poor project management
- geographic separation
- isolation mind-set
- financial rewards based on individual unit results
- policies / procedures that make co-operation difficult.

Stone goes on to note five organisational factors that can lead to conflict and turfism. These are presented as prompts that may alert managers to the existence of silos that are possibly problematic (Stone, 2004, p 15). The factors are

- *“Organisational structures that are rigidly designed around functional areas and that hinder efforts when there is a need to work interdepartmentally*
- *“Company culture that is competitive rather than team-oriented, and is going through profound change as a result of external trends such as poor economy or changes in the market*
- *“Unclear policies and procedures that can be interpreted differently by employees throughout the organisation*
- *“Inadequate training and development in interpersonal skills, resulting in poor communication styles and a lack of understanding as to how to build cooperative working relationships*
- *“Personality or management style of organisational leaders that either encourages conflicts or serves as a poor role model on terms of respecting or incorporating others’ ideas or needs. Just as important is the failure of senior management to take a strong stand against executives and managers who build turfs”*

Silo mentality may exist in parts of an organisation but not in others. Where it arises, the extent to which silo mentality prevails may differ from organisation to organisation, and within a single organisation over time.

Silos Within Government

It is often assumed that government agencies are well connected and operate from a common information base but silos can also arise within government. In her article on risk and security management, Louise Comfort cites

“..... the compelling evidence presented in the 9/11 Commission Report that documents startling gaps in performance of government agencies and in the communication and co-ordination among them. The primary problem appeared to be the asymmetry of information among relevant agencies with shared risks and responsibilities. Government agencies, based on incomplete or untimely information, did not recognise the risks presented by seemingly ordinary, but highly interconnected, actions the multi-jurisdictional administrative structure developed for responding to natural and technological disasters is largely inappropriate for networked threats that cross jurisdictional boundaries....” (Comfort, 2005, p 343).

Comfort notes that soon after 9/11 President Bush established the Office of Homeland Security. A first task was to identify the agencies that performed security tasks, and their roles.

“The product of this analysis was a densely overlapping chart that identified 22 federal agencies with distinct responsibilities related to homeland security” (Comfort, 2005, p 341).

Voters have legitimate expectations of high performance standards of government agencies, but the task of shaping and reshaping the many institutions that comprise government is often challenging.

The relationships between silo mentality and organisational resilience

Silo mentality has strong potential to interfere with organisational resilience. For example, discussing organisational silo mentality, Conrad Geulke notes that silo mentality is a *significant barrier to [disaster] preparedness* (Geulke 2005, p. 748). Similarly, reporting messages from the Resilient Organisations Research Programme, Seville *et al* note that

“... underlying resilience issues often relate more to the softer, less tangible aspects ... such as ... culture, leadership and vision. For example, qualities such as good communication and relationships across the organisation and with key customers and stakeholders, trust, and a shared vision and priorities are all fundamental to enabling different parts of the organisation to work together to achieve a common objective. This is particularly true at times of crisis when it is often the informal networks and relationships that count. Building resilience is therefore also about reviewing the culture of the organisation and recognising the strengths and weaknesses that culture brings to the organisation at times of crisis” (Seville, Brunsdon, Dantas, Le Masurier, Wilkinson, & Vargo, 2006, p 13).

But what exactly are the linkages between silos and resilience?

As mentioned, McManus *et al* have noted that problematic levels of silo mentality were common in the ten diverse New Zealand case study organisations that were the subject of their investigation. *“Silo mentality was observed in all of the case studies irrespective of their size”* (McManus, Seville, Brunsdon, & Vargo, 2007, p 30). Individual case summaries noted include ⁴

“One organisation had employees in different departments that had excellent communications and relationships internally. But communication across departments was fraught with difficulty. This was partially because there were no common or reciprocal strategies linking departments and employees were not confident that their communications needs would be met by [the available] systems. This further isolated staff in department groups, perpetuating silo mentality.

“In another organisation, strategies for emergency management were well established in one department (information technology) but were not communicated throughout the organisation. Therefore, valuable management strategies were not being utilised as effectively as possible. Staff outside this department had almost no knowledge of these strategies.”

Taking the matter to the practical level, McManus *et al* assembled case material from these organisations to distil common features that foster or create barriers to organisational resilience and to develop tools that will assess and improve resilience. They have suggested a diagnostic tool comprising 15 indicators designed to measure resilience against the three dimensions mentioned above (situation awareness, management of keystone vulnerabilities and adaptive capacity) and to enable organisations to identify their strengths and weaknesses. One of the indicators is *silo mentality*; it falls within the *adaptive capacity* dimension (McManus, Seville, Brunsdon, & Vargo, 2007, p 20).

Seville *et al* note that difficulties may be exacerbated when the need arises to respond to a crisis.

“During simulated crises exercises with individual organisations, we have seen organisations that even in the day-to-day struggle with reconciling disparate and sometimes even competing strands of the business, were observed to have these internal silos emphasised, significantly hampering the organisation’s ability to pull together “ (Seville, Brunson, Dantas, Le Masurier, Wilkinson, & Vargo, 2006, p 11).

Silos Within Banking

In its *Final Report of the IIF Committee on Market Best Practices: Principles of Conduct and Best Practice Recommendations* (a response to the international financial market turmoil beginning in 2007), the Institute of International Finance notes that

“..... separation between risk areas is not only physical but also is reflected in procedures, techniques and IT systems. The result is the formation of “silo” approaches to risk, in which credit, market, liquidity and operational risk are independently managed without sufficient consideration of risk correlations and concentrations. This “silo” approach to risk may prevent firms from adequately identifying sources of risk or systematically undermine appreciation of the true size of aggregate risk positions. Therefore, an integrated approach to risk is fundamental” (Institute of International Finance, 2008, p 49).

The report recommends amongst other matters that banks should

“..... eschew the “silo” approach toward risk management and take a comprehensive approach to risk, integrating strands such as credit, market, operational, liquidity, and reputational risk” (Institute of International Finance, 2008, p 10).

The matter has also been recognised in publications contributing to the Australian Attorney-General Department’s programme under the banner of *Trusted Information Sharing Network+* (TISN). An executive guide to resilience on the TISN website notes that

“Resilient’ organisations are able to continue meeting key objectives when faced with significantly challenging circumstances in the operating context/environment. Resilience synergises silos of risk, security, management and business continuity management through a holistic approach to help organisations survive turbulent times.”

Later, the guide adds *“... early actions an executive can take include remov[ing] silos” (TISN Resilience Community of Interest, 2008).*

How can a sound resilience-related culture be created?

If better internal silo management will assist organisational performance, particularly in emergencies, how can a sound resilience-related culture be created?

Plain *good management* is a good start. Approaches commonly recommended at this level helpfully and typically focus on aligning strategy, culture and values and are generally

designed to meet expectations of the various stakeholders. The emphasis is on getting things done through staff, with managers' role being an enabling one.

Getting things done through staff places an emphasis on staff learning and initiative-taking. Ideally, staff / management relationships involve a covenant in which each acts to develop to their potential to the benefit of both the organisation and the individuals employed within it. One acknowledged writer in the area, Dr Peter Senge, describes 'learning organisations' as places

"... where people continually expand their capacity where new and expansive patterns of thinking are nurtured and where people are continually learning to see the whole [reality] together."

Senge also notes that

"... through learning we become able to do something we never thought we were able to do [and are able to] re-perceive the world and our relationship to it" (Senge, 1990).

Looking at these issues over time (say the last 2 or 3 decades), the expected staff contribution has progressed from simply 'knowing what and how', to a higher-level 'knowing why', and ultimately to 'caring why'. Once staff 'cares' enough to share knowledge with those that can best use it, silos cease to exist and a more much more fertile environment is created for resilience.

The challenge 'managing for resilience' can be rephrased as 'managing for uncertainty'. Quite apart from the silo-breaking features, a business that has invested in staff who 'care why' is likely to have more in-built resilience than one with a staff that simply 'knows what', simply because its staff will be better equipped to make good on-the-ground decisions in times of stress.

Others have suggested targeted approaches to building intra-organisational resilience. McManus *et al* developed two 'strategies' to aid organisational resilience improvements: a Resilient Communications Strategy and an Emergency Planning Strategy. Used together, these target all of the 15 resilience indicators identified in their work. McManus *et al* note that these tools are scalable and that they need to be applied over time as part of a continuous improvement endeavour (see McManus, Seville, Brunson, & Vargo, 2007, p vi).

Similarly, in a 2005 paper, Louise Comfort asks

"If standard administrative structures prove too rigid, what forms and conceptual frameworks could serve as constructive models?" (Comfort, 2005, p 344).

Four approaches are outlined in Comfort's paper. None of them are new; all aim to reduce risk and all are familiar to decision makers working under uncertainty.

"The four approaches all acknowledge that dynamic environments require learning processes that enable flexible adaptation and collective action rather than attempts to exert control through an administrative hierarchy of rules and constraint" (emphasis added) (Comfort, 2005, p 344).

The four approaches are:

- After Action Reviews - learning by immediate lesson capturing
- Recognition-Primed Decision Making - being sufficiently knowledgeable to spot the anomalies and sufficiently quick to take offsetting action
- The Edge of Chaos - managing in that part of the order . chaos+continuum in which there is both sufficient structure to manage information effectively and sufficient flexibility to adapt quickly to new pressures
- The Bowtie Model . %anning in+information from diverse sources to a central processing unit or %not+followed by %anning out+to relevant actors. Emergency operation centres are an example.

Comfort adds that

“The objective [of each of the four models] is to critique actual performance against a prior model of organisational structure in order to improve performance in a continuous process of collective learning” (emphasis added) (Comfort, 2005, p 346).

Issues relating to reducing or eliminating silo mentality are also covered in Florence Stone's 2004 paper. Stone quotes five questions suggested by Angela Drummond (a practitioner in the area of silo breaking and organisational change) to help executives identify and overcome silos (Stone, 2004, p 16)⁵

- *“does your organisation structure promote collaboration, or do silos exist?”*
- *“do you have collaboration in your culture and as part of your value system?”*
- *“do you have the IT infrastructure for effective collaboration?”*
- *“do you believe in collaboration? Do you model that belief?”*
- *“do you have a reward system for collaboration?”*

Drawing on the American Management Association's and her own work, Stone prescribes the following to minimise or eliminate silos (Stone, 2004, p 17)

- reward cooperative behaviour
- encourage innovation (i.e. encourage staff to improve processes)
- create a culture of collaboration (this starts with communication)
- clarify responsibilities

There are of course also cases where the risks that arise from silos have been well managed in challenging circumstances. McManus *et al* note that

“Some of the case study organisations were working towards addressing [the silo mentality] problem. One strategy being used to minimise the negative effects of silo mentality on communications and information flow was to encourage a more personal approach to communications; one organisation is actually quite dismissive of email communications. These case study organisations generally have a wide distribution of offices and sites throughout New Zealand, and their senior staff members travel extensively to ensure that personal contact and communication are made” (McManus, Seville, Brunson, & Vargo, 2007, p 32).

And Kurtz and Snowden remind us that, while

“..... the problem can be realthe solution is often worse than the problem: a "change initiative" to remove barriers and force people to share all knowledge equally, in effect forcing multiple sub- identities to merge into one grand identity rarely works, mainly because organisational silos do provide useful advantages: rapid communication through shared language and social context, consistency, and coherent response. In fact, one could say that simultaneous prescriptions for "removing silo mentalities" and "supporting team-based organisations" are at odds. A well-functioning team within an organisation is actually much like a well-designed silo: it concentrates its energy and expertise (and identity) into the tasks it is best suited for, yet maintains context-appropriate connections and flows that maintain its relationship with the entire farm complex” (Kurtz & Snowden, 2006).

Does Planning Help?

Planning can have an important role in reducing the risk of emergence of silos and other impediments to good performance in adverse conditions. But planning is not always essential - silo and other risks may be overcome if there is a very good leadership and a supportive culture

Bankstown City Council had no plans in place when the council offices burnt down in the early hours of 1 July 2007. The response was well organised, staff highly motivated and services quickly restored. This demonstrates that having a plan is not the sole key to surviving severe business disruptions. In the case of Bankstown Council the immediate effective leadership, devolved decision making, supportive external agencies created through years of partnering, and a highly motivated workforce created through a good human resource recognition program resulted in a strong recovery from the event. The recovery operation was called “Operation Phoenix” and inspired staff to win against all odds” (TISN Resilience Community of Interest, 2007, p 5).

The experience of Loyola University’s School of Law following Hurricane Katrina offers a similar example. The entire operation was relocated to the University of Houston Law Centre without prior planning. In his description of the transition, Brian Huddleston notes many silo-breaking behaviours, largely a determination by Loyola personnel to make it happen, and an open attitude by the Houston Centre. Huddleston notes that detailed plans often quickly become irrelevant in an actual event, and concludes that a better course is to

“..... work to make your institution more flexible and responsive to a wide variety of potential operational challenges. Practical documentation like lists, contact information, resources decision trees, and the like are important but to be effective, a disaster or business continuity plan must be accompanied by the right institutional mindset, one that is able to adjust to not only the incremental change that happens to any institution, but to the rapid, chaotic change that occurs during a disaster” (Huddleston, 2007, p 343).

We conclude that silo mentality has the potential to seriously interfere with intra-organisational resilience, and that good management supplemented by some specific initiatives have the potential to reduce or eliminate difficulties that may arise.

What then can be said about silo mentality and silos *between* organisations?

SILOS BETWEEN ORGANISATIONS

What is the nature of organisational boundaries?

Discussion of silos between organisations immediately raises the questions 'what is the nature of organisations?' and 'how are their boundaries established?'

These questions are not firmly answered in the relevant literature which often simply assumes the existence of organisations without further enquiry on their external boundaries. Some ideas are however available from the economic literature on 'the theory of the firm'. Essentially, the literature in this area addresses the question 'why isn't commercial activity organised purely in markets on the basis of day to day contracts?', or, put another way, 'why does it make sense for human and other resources to combine into organisations / firms in enduring ways through longer-term employment contracts and resource ownership?'

The theory suggests that organisations / firms are created to overcome inefficiencies that can and do arise from daily market transactions. It is very often efficient to spread transaction costs over time, giving rise to a need for an organisational entity to manage long-term contracts.⁶

These issues have been addressed in numerous studies and papers in the period since the early 1900s. Ronald Coase, perhaps the most widely recognised writer in the field, explored the role of transaction costs in defining internal versus external resource acquisition (i.e. the boundaries of the firm), noting amongst other things the importance of 'uncertainty' and certain types of government interventions such as sales taxes in determining firm size. i.e. uncertainty adds to transaction costs, and taxes may be payable on external transactions, both of which set up an environment conducive to internalising business relationships, i.e. the establishment / enlargement of firms (see e.g. Coase, 1937).

Creating organisations / firms is not without difficulties. As a practical matter, commercial firms are largely controlled by managers rather than owners (i.e. shareholders). Researchers such as Berle and Means have drawn attention to the differing incentives and behaviours between owners and managers (Berle & Means, 1933). Issues relating to the alignment of the interests of these two groups were addressed in the 1960s by further writers including Baumol and Williamson. They noted that managers have more information than shareholders (the term 'information asymmetry' is used to describe this). Further, incentives may not be congruent. managers may adopt the practice of meeting their own objectives subject to meeting sub-maximum shareholder goals, i.e. profits. 'Principle-agent theory' addresses these relationships, and 'satisficing' describes seeking only to meeting sub-maximum shareholder goals (Baumol, 1959, Williamson, 1975).

A conclusion from this branch of economic theory is then that firm size is determined by the value that can be added within a corporate structure (taking costs, defined widely, into account) relative to the value available from other organisational forms such as daily contracting. A second conclusion is that alignment between owners' and managers' interests cannot be taken for granted, suggesting that attention needs to be paid to the principles of good corporate governance. Indeed, the mechanisms available to shareholders of many firms to express their views on corporate goals are under-developed. managers

may assume a primary profit motive but often have no information on the extent to which profit is to be balanced against other goals.

Taking this further, the management style of an optimally-sized firm where managers assume profit-related shareholder goals might feature a tight focus on value added by internal teams, perhaps benchmarking performance against external market comparators. Once it makes commercial sense to think of teams as modules that might be either internally or externally contracted, the distinction between a firm's external boundaries and its internal structure begins to break down. Internal teams can be disestablished and their contribution secured by outsourcing. Similarly, established firm boundaries may be challenged by the development of new types of corporate relationships (including active supply chain management) and revised structures (including mergers and de-mergers), often suggested by value and cost opportunities that arise e.g. as new technologies become commercially viable. (We return briefly to these three matters – outsourcing, supply chain management and restructuring – in the next section of this report.)

For these and many other reasons, the commercial scene is not a stable one. Firms expand, contract and take different forms over time-spans that are sometimes short. This makes for a challenging and dynamic inter-organisational resilience environment.

How are inter-organisational silos generated and how is inter-organisational resilience impacted?

Recalling Guelke's observation that inter-organisational silos reflect "*parochialism characterised by a lack of co-operation between agencies*" it is relevant to ask how inter-organisational silos become established taking into account the evolving commercial scene.

A natural tension between competition and co-operation lies at the heart of inter-organisation silos.

Broadly, the commercial model within which most businesses operate aims to generate wealth through the efficiencies that arise from market-based competition.⁷

Many types of co-operation arise naturally in this environment. Licensing and joint venture arrangements are common, even between organisations that also compete (research and development activities benefitting competing firms are often organised as joint ventures, for example) and firms enter into supply chain contracts for goods and services to which they can add value. Spekman *et al* point out the value that can be added by active and seamless supply chain management, noting (for example) that

"More and more, we are witnessing a transformation in which suppliers and customers are inextricably linked throughout the entire sequence of events that bring raw material from its source of supply, through different value-adding activities to the ultimate customer" (Spekman, Kamauff, & Myhr, 1998, p 630).

However, the incentives for many types of co-operation are weaker, e.g. where private wealth-creating benefits are less clear.

Co-operation between firms is often central to an emergency response when adverse events occur. For example, Seville *et al* note

“Above a certain scale crisis events differ from day-to-day management, in that organisations have to operate out of their comfort zone, interact with organisations they do not normally work alongside, and have to make and share strategic decisions quickly and effectively” (Seville, Brunsdon, Dantas, Le Masurier, Wilikinson, & Vargo, 2006, p 3).

The needed emergency cooperation might take the forms of information sharing, mutual on-the-ground support (e.g. sharing spare parts or making service personnel available for repair work on other companies equipment). Information sharing and coordinated communications with civil defence and relief agencies is also sometimes required. All of these require planning (collaborative arrangements that might promote preparation are suggested later in this report).

But co-operation to meet wider community needs including resilience is often given less attention that the community may desire in the pressure to meet more immediate and measureable corporate goals; in other words, parochialism takes hold and silos become established.

How Well Might New Zealand’s Construction Sector Cope with Post-Disaster Reconstruction?

Questions have arisen about the ability of New Zealand’s construction sector to meet post-disaster reconstruction demands.

The NZ Construction Industry Council cites the organisation of the industry as presenting particular challenges to achieving a coordinated response. The Council adds that the industry works in an environment of conflict and is structured such that the traditional divide of design and construction, together with the hierarchy of sub-contractors and suppliers, means that knowledge is often buried in the supply chain rather than being widely available (New Zealand Construction Industry Council, 2006, pp 3, 10).

Similarly, Seville *et al* note that *“there is a common perception that the construction sector views post-disaster reconstruction as a building boom to be responded to after a disaster occurs, rather than to be planned for in advance..... but there could be a need for all nationally available resources to be mobilized for post-disaster reconstruction and this would require significant prior planning to be effective”* (Seville, Brunsdon, Dantas, Le Masurier, Wilikinson, & Vargo, 2006, p 12).

These views suggest that inter-organisational silos in New Zealand’s construction industry might significantly impede resilience.

Business conditions create a challenging environment for resilience in a number of ways. The preceding quote from Seville *et al* draws attention to one of these, i.e. the complexities that arise from interdependencies between organisations. Interdependencies can take at least two forms

- *Outsourcing* to sub-contractors has become increasingly common in most sectors (including infrastructure). Reliance on out-sourcing may make commercial sense in

business as usual conditions but the availability of sub-contracted resources in emergencies also needs to be addressed and solid understandings reached on continued support in adverse conditions. Sub-contractors, particularly those with relationships with more than one principal company, can be overwhelmed by emergency demands and the risks of over-commitment may not be visible either to them or to those reliant on their services.

- The benefits from closely linking organisations through *active supply chain management* and the like also need to be balanced against the resilience risks. In particular, just-in-time supply arrangements need to be managed well if the community's increasing expectations of continuous availability of goods and services are to be met during and following emergencies.

At a minimum, resilience-related enquiry from potential sub-contractors and suppliers as part of procurement programmes seems essential for companies that supply goods and services on which the community relies.

Corporate restructuring often leads to a need to establish or re-establish a wide range of relationships to meet immediate commercial requirements. Similarly, inter-organisational relationships to support resilience will need renewed attention as corporate forms change.

Corporate forms are often impacted or defined by government regulation. For example, restricting mergers and requiring de-mergers results in smaller firms than may arise under unregulated commercial arrangements (there are several examples in New Zealand's electricity sector and, more recently, in telecommunications). While having more than one supplier can promote resilience-enhancing diversity especially if the firms compete on the basis of reliability or if customers can switch (or be switched) easily when supplies fail, small disconnected units may lack the resources (critical mass) to deal effectively with emergencies through co-operation and other initiatives.

The Impact of Regulation on Corporate Form and Resilience in New Zealand's Electricity Sector

Inter-organisational silos may result following restructuring unless adequate new cooperative arrangements quickly emerge.

It has been necessary for New Zealand's electricity industry to find new ways to work together under the government's regulatory regime, which features splitting generators and retailers into competing companies and carving off transmission (a natural monopoly) into a separate enterprise. New formal arrangements were needed with the Electricity Commission and the Commerce Commission. Less formal arrangements have also been developed to coordinate industry responses to security concerns in winters when low hydro lake levels threaten supply (e.g. the Chief Executive's Forum in generation). These initiatives have reduced but not eliminated silo impacts.

On the other hand, mergers between many of the very small local line (distribution) businesses were anticipated following the reforms. While many medium to small line businesses remain, informal mutual support arrangements between distributors have assisted response to major events such as snow storms.

Other difficulties have also emerged following electricity restructuring. It can be difficult to build a business case for new investments (including some resilience-enhancing ones) in a way that produces a good overall outcome when the benefits are spread between separate entities.

However, it should not be assumed that single large companies necessarily deliver superior resilience. Electricity security was closely threatened in 1992. This preceded the reforms . at that time, all generation and transmission was owned by one company, the state-owned Electricity Corporation of New Zealand (ECNZ). Unified ownership did not ensure electricity security in that year . the Electricity Shortage Review Committee made several recommendations to ECNZ covering improved security management (Electricity Shortage Review Committee, 1992).

The picture that emerges is a mixed one. It illustrates the helpful role that tailored arrangements can play in promoting resilience when co-operation is needed across organisational boundaries (a matter addressed later in this report). It also suggests that large single companies with many interests in delivering essential services do not necessarily perform better than smaller separated ones.

Cost-cutting may also impact more immediately on resilience by reducing resources available for cooperative effort. Kurtz and Snowden, for example, have noted that

“In organizations, the focus on efficiency that has dominated management theory for some decades and creates such practices as stripping away “surplus” functionality may pose dangers to survival. The most effective systems leave a sufficient level of inefficiency in order that they can be resilient in changing contexts” (Kurtz & Snowden, 2006)

Rapid staff turnover, often a feature of rapidly changing business environments especially when costs need to be reduced, can also lead to resilience-reducing expertise losses and disturb inter-organisational cooperative relationships that might serve the community well in emergencies. Training may need ongoing attention.

The International Energy Agency comments on “Investing in People”

In their book *Learning from the Blackouts – Transmission System Security in Competitive Electricity Markets*, the International Energy Agency comments on training needs in electricity, a key industry that has undergone much reform in many countries

“Highly trained and experienced personnel are required to manage transmission system security in the more dynamic real-time operating environment created by electricity reform. More attention has focused in emergency training in the wake of [recent] blackouts..... However, new training programmes may be needed..... Competencies need to be identified and training programmes reviewed Joint training programmes should be developed to facilitate more effective coordination among system operators managing an integrated transmission system” (International Energy Agency, 2005, p 18).

How can sound resilience-related arrangements be created?

The challenges that communities face in preparing for adverse events and responding to them when they arise call for high levels of inter-organisational co-operation, as noted earlier in this report.

In general, the greater the number of organisational units, the greater the level of co-ordination required to prepare for and respond to adverse events within and across sectors. The inherent vulnerability in siloed organisations needs to be offset by a conscious effort to actively link individual elements.

Seville *et al* note

“In New Zealand, the good fortune that has seen a lack of significant events affecting widespread communities has also acted as a significant disincentive to engage in resilience planning. The connection with an enhanced “business as usual” function that comprehensive resilience planning can bring about is also often not made” (Seville, Brunsdon, Dantas, Le Masurier, Wilkinson, & Vargo, 2006, p 13).

Questions relating to improving inter-organisational co-operation have been discussed by many writers. Addressing supply chain management in a “business as usual” context, Spekman *et al* note that

“Co-operation emphasises the need to integrate functional silos and views these units [i.e. silos] as interdependent parts charged with meeting the end-user customer’s needs” (Spekman, Kamauff, & Myhr, 1998, p 633).

These ideas take on additional meaning in the context of emergency management. Brunsdon and Dalziel put the matter like this

“Today’s environment features larger numbers of functionally independent organisations than in the past Efficient and effective response and recovery processes require integration across organisational units and between agencies. This integration is achievable, but requires an increase in the level of organisational effort in terms of specific planning and resource commitment” (Brunsdon & Dalziel, 2005, p 33).

In a different context (reviewing the functionality of US protection arrangements relating to 9/11) Louise Comfort notes that it is clear that policy had failed but much less clear what changes were required. Summarising her work, Comfort notes that

“Although each condition presents particular challenges to public agencies and the communities they serve, all represent varying states of uncertainty Building networks of organisations committed to a process of continual enquiry, informed action, and adaptive learning is a more flexible, robust strategy than the standard practice of establishing greater control over possible threats through administrative structures” (Comfort, 2005, p 335).

The common ingredients in these extracts are the needs for commitment to integration of siloed organisations through networking and information sharing.

Brunsdon and Dalziell go on to argue that

“..... the first step, that of commitment, is proving elusive. In many sectors, the levels of awareness, planning and investment for events outside of the ‘normal envelope’ do not appear to have increased to offset these fundamental changes The real issue for many organisations seems to be a lack of understanding of the full scope of response, including the expectations of other agencies, and extending right out to [the] community level. Once the scope and scale of a potential response is mapped out, the necessary extent of readiness activities and hence the level of commitment required becomes reasonably apparent.

“Work in these areas will require some quite fundamental shifts in organisational commitment, both within and across organisation (and in many cases, contract) boundaries – and in both the public and private sectors” (Brunsdon & Dalziel, 2005, p 33).

Spekman *et al* have identified progressive styles of inter-organisational involvement in the transition from independence to full collaboration

- *Open market negotiations*, featuring price-based discussions and adversarial relationships between companies and their suppliers
- *Co-operation*, involving longer term contracts
- *Co-ordination*, where information linkages are forged, work in progress is more tightly managed and data is exchanged electronically
- *Collaboration*, where supply chains are more fully integrated, joint planning occurs and technology is shared.

Spekman *et al* go on to note that moving up these levels *“require[s] changes in mind set and strategic orientation”* and add that *“collaboration requires high levels of trust, commitment and information sharing”* (Spekman, Kamauff, & Myhr, 1998, pp 634, 635).

How much resilience-related co-operation can the community expect of commercial and other organisations? Most organisations are owned and operated under commercial disciplines and drivers broadly aimed at increasing ownersqwealth. Commercial organisations therefore face incentives to promote revenue, directly through short-term cash flows and less directly through building reputation as a good corporate citizen. Reputation might therefore be a significant commercial driver for resilience-enhancing measures. There are signs of increased commercial interest in reputation-enhancing steps over recent years across a number of fronts (sustainability and climate change offer many obvious opportunities). And the possibility that managers might misinterpret ownersqgoals (and thereby down-rate goals other than profit) has been mentioned earlier in this report. But taking these points together, reputation seems unlikely to deliver all of the communityq resilience needs.

All in a Day's Work: Business and Australian Disaster Management

The Australian Strategic Policy Institute's recent report under this title notes that, while Australian business makes a significant contribution to disaster management, many improvements are desirable. The executive summary notes that

"..... the relationship business and disaster management organisations is best characterised as ad-hoc and exists only for the period of the disaster this is not acceptable a partnership between business and other emergency stakeholders is required."

The report's five recommendations include

- *"Partnerships between business and disaster management organisation should be established to enhance disaster management"*
- *"Business should increase the quality and uptake of business resilience practices and become more involved in disaster management"*

(Australian Strategic Policy Institute, 2008, p 2)

Given the importance of co-operation in emergency mitigation and management, further bridge-building steps are required where commercially-driven cooperative initiatives fall short of community needs. These collaborative arrangements may be voluntary ones. In New Zealand, regionally-based Lifeline groups of infrastructure providers in the energy, information and communications technology, transport and water sectors have been active for many years. These groups have typically focussed on identification of vulnerabilities to regional emergencies, including risk identification, planning and attention to interdependencies and related resilience-enhancing activities. Group members are also often involved in civil defence emergency management and other similar disaster simulation exercises where cooperative behaviour is practiced.

Looking at the issues from a public policy viewpoint, to the extent that commercial and voluntary arrangements fall short of delivering community resilience needs, resilience has public good characteristics. Some form of government action may then be indicated where the benefits outweigh costs.⁸ In Australia for example, the Trusted Information Sharing Network+(TISN) features engagement with infrastructure businesses to promote supply continuity.⁹ These arrangements have a sector focus (energy, banking, etc) rather than being regionally-based. Information sharing in an environment of trust is a key to the success of the sector groups. Government involvement extends beyond instigation to facilitation of the sector groups. An overall governance forum involving government and private representatives oversees the arrangements.

Sector Supply Security Arrangements in Other Countries

The United Kingdom's UK Resilience programme is hosted by the Cabinet Office.¹⁰ Canada has equivalent programmes and has recently issued a discussion paper that addresses the same concerns.¹¹ Arrangements in the USA focus on the National Infrastructure Protection Plan issued by the Department of Homeland Security.¹²

Terrorism is a concern in many of these countries but we have a greater exposure to natural hazards in New Zealand suggesting that similar, but natural hazard-focussed, arrangements might be considered.

Similar sector-based collaborative bodies might work well in New Zealand. The terms of reference for these bodies might usefully cover preparation, response and mitigation of adverse events, including matters such as sector resilience analysis (e.g. addressing supply chain vulnerabilities), understanding interdependencies, promoting customer resilience, post-event reviews and co-ordination of response activity during an emergency.

Two Overseas Examples of Willingness to Collaborate in Banking

Banking is an industry that relies on very high levels of collaboration.

Morgan Stanley: *Despite the competitive advantage offered to firms which have leading practice in BCP, Deighton says that collaboration among firms takes precedence there is more of a drive to share knowledge and experience recognising the mutual dependency of the [banking] sector.* + Richard Deighton, Business Continuity Manager Europe, Middle East & Africa, Morgan Stanley.

Financial Services Authority (UK financial regulatory body): *Our programme of annual market-wide [resilience benchmarking] exercises highlights that interdependency is the key aspect to business continuity. In Financial Services, more than any other sector, your own business continuity is only as good as that of your counter-parties.* + John Milne, Head of Business Continuity Management, Financial Services Authority.

These quotes are from the KPMG Advisory *Living on the Frontline: The Resilient Organisation* (KPMG, 2007, pages 25 and 27 respectively).

Sharing Sensitive Information – Project Aurora

The US Department of Energy discovered, in 2006, that it was possible to destroy certain types of electricity generation plant by remotely accessing their control systems and changing certain settings. This had the potential to create severe electricity outages. Improved cyber security was needed by some generation companies.

The question was how to advise these companies (numbering around 1,000) and the equipment manufacturers, without the information falling into the hands of any who might misuse it.

An initial step was to brief members of the North American Electric Reliability Corporation Critical Infrastructure Protection Committee. Subsequently, an advice notice was sent more widely. The notice was carefully drafted to minimise content that might increase the risk while containing information needed for mitigation.

While this is an extreme example in a number of respects (e.g. the number of companies that needed to be informed), it does illustrate the need for trusted relationships.

(Brindley, 2008, p 17)

Other forms of government action are also possible. Section 60 of New Zealand's Civil Defence Emergency Management Act 2002 obliges public organisations and organisations in the energy, information and communication technology, transport and water sectors to *ensure that [they are] able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency*". This obligation is accompanied in the Act by powers under which the Director of Civil Defence Emergency Management can call for plans and advice from lifeline organisations. A range of practical matters arise. For example the meaning of *function[ing] to the fullest possible extent*" is not clear, and the powers have seldom if ever been activated. Nevertheless, the Act sets out a basic mandatory framework to promote resilience by infrastructure providers.¹³ Of course, government is also able to take stronger regulatory action and public funding is also possible where justified.

We conclude this section on inter-organisational silos on the summary note that inter-organisational silos, whatever their cause, can significantly interfere with community resilience. Organisational commitment to bridge-building, supported by appropriate government initiatives, has the potential to reduce the difficulties.

CONCLUSION

Crises are inevitable. Customers and communities expect them to be well managed. The business sector has key roles in maintaining essential outputs and employment when crises occur. Resilient organisations and well-functioning inter-organisation arrangements are needed to meet these expectations.

This is particularly important in infrastructure where the community needs high levels of reliability and where assets are aging and systems are becoming both more complex and vulnerable to natural and other hazards. It is also important in the emergency service sectors on which the community relies when emergencies occur.

This report focuses on silos and silo mentality as an impediment to resilience. It has addressed the issues in two sections. At the intra-organisational level, we conclude that silo mentality has the potential to seriously interfere with intra-organisational resilience, and that good management supplemented by some specific initiatives has the potential to reduce or eliminate difficulties that may arise. Looking at the issues from a wider perspective, inter-

organisational silos can significantly interfere with community resilience. A commitment to bridge-building, supported by appropriate government initiatives has the potential to reduce the difficulties at this level.

Some themes common to both intra- organisational and inter- organisational silos can be distilled. Resilience cannot be achieved in isolation of other units and organisations. In summary, there is a need to recognise

- the characteristics of silo formation, particularly in the creation of new organisational structures or as part of change management processes
- a convergence of interests, taking account of the fact that ~~we~~ we are all in this together+ Efforts are needed to achieve seamless internal relationships at the intra-organisational level and a commitment to work with others to advance community resilience (perhaps with a judicious contribution from government) at the broader societal level
- the case for collaboration. Gains are often possible by pooling ideas and resources (the total is greater than the sum of the parts)
- the value of harnessing grass-root capability including through continuous knowledge-building and sharing learnings in a trusted environment
- that cost-effectiveness calculations don't easily take account of broad organisational or social needs and that the analysis may need supplementation if wide objectives are to be met.

Leadership is the key to bringing these elements together. Leadership is needed to reduce and mitigate risks before crises occur. It is doubly important during a crisis response phase when an ability to motivate staff to meet unexpected challenges arises. This requires the deliberate establishment of appropriate levels of co-ordination and co-operation in preparation for adverse events, especially where defined commercial boundaries are involved.

Role clarity and accountability are also important. Risks are best managed where the incentives are sharpest and where they are best able to be addressed. This is often at the operational or local level. Steps may be needed (e.g. training) to ensure that organisational boundaries, which may be created to manage risk, do not lead to new risks by impeding cooperation and collaboration when it is most needed. Exercises have an important role in bringing issues to the surface and overcoming silo-forming tendencies.

The Resilient Organisations Research Programme seeks to develop approaches for improving organisational resilience. Irrespective of the cause, and whether the focus is on intra-organisational or inter-organisational performance, silos reduce organisational and sector resilience. There is therefore a case for action to reduce the likelihood of silo creation, to watch for any that does arise, and to take offsetting action where they might become problematic.

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ENDNOTES

¹ About 95 per cent of New Zealand's 330,000 enterprises employ 19 or fewer people, and about 85 per cent employ 5 or fewer. SMEs account for about 30 per cent of all employment.

² Information and communication technologies.

³ The research programme is funded by the Foundation for Research, Science and Technology. See www.resorgs.org.nz.

⁴ Organisation names are withheld for confidentiality reasons.

⁵ These questions are phrased in a way that enable them to be answered %yes+or %no+. It might be more helpful to rephrase them as open questions along the lines %to what extent does your organisation?+

⁶ Transaction costs include search and price discovery, contract negotiation and documentation and other costs in setting up relationships for labour and other resources.

⁷ Many of the organisations on which society depends are owned and operated under arrangements where commercial incentives are weak or non-existent (these include many Crown entities such as regulatory bodies, NGOs and a wide range of community groups, all with valuable roles during adverse events). The drivers for resilience in these organisations are likely to reflect a complex combination of commercial and reputational imperatives. They may also reflect specific stakeholder expectations in their charters and other governance documents.

⁸ Public goods are those where there is a case for public provision beyond the amount that commercial providers will willingly supply. In the language of public policy, this is a type of %market failure+. Where benefits of action outweigh the costs, government action may involve low-cost steps such as provision of information, persuasion, and alignment of procurement standards and promotion of research. More costly or intrusive actions might involve funding and regulation.

⁹ See http://www.tisn.gov.au/www/tisn/tisn.nsf/Page/AbouttheTISN_AbouttheTISN. TISN leaders have displayed considerable interest in New Zealand's work on resilience at the organisational level (Erica Seville, who leads the Resilient Organisations research programme referenced in this report, was invited to discuss the issues with the overall TISN government-industry council in 2007).

¹⁰ See <http://www.ukresilience.gov.uk/>.

¹¹ Canada's main relevant website is <http://www.publicsafety.gc.ca/prg/em/nciap/about-en.asp>. See especially the recent Canadian discussion paper %Working Towards a National Strategy and Action Plan for Critical Infrastructure+, Public Safety Canada, 2008 (available at <http://www.publicsafety.gc.ca/prg/em/cip/strat-part1-eng.aspx>)

¹² See http://www.dhs.gov/xprevprot/programs/editorial_0827.shtm.

¹³ An interesting discussion of recent New Zealand resilience-related developments, with emphasis on infrastructure, is available in Brunsdon & Dalziel, 2005, p 27.