"All that man is; all mere complexities": managing disruption-related risks

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Summary

The first section of this paper briefly reviews some recent disruptive events in New Zealand and elsewhere and some disruption-related risks.

Some research into disruptions and management responses is then reviewed, showing many organisations consider themselves to be ill-prepared for disruptive events and that, in a world increasingly networked, they may have overlooked loss of key components of their networks. Further, highly threatening disruptions can arise from new business models implemented by competitors or as a result of a disruptive technology. It is argued these factors demonstrate the need for management of disruption-related risks and that this should be part of the overall business strategy of an organisation.

The paper then explores how organisations can more effectively assess and treat potential disruptive events, including changes in particular circumstances. Assessing disruption-related risks requires techniques that seem rarely to be applied at a strategic level. Examples of some appropriate techniques and a brief discussion of business impact analysis are given.

It is argued that, in contrast with traditional emergency and business continuity management, the management of disruption-related risks should extend to include potential changes in the organisational context.

It is concluded that resilience is an ephemeral condition: as soon as the context changes, resilience must change to match the new conditions. Plans alone are insufficient for resilience.

The paper draws information from New Zealand and elsewhere and advocates adoption of the AS/NZS 5050: 2010 *Business continuity: management of disruption-related risk* framework and process, as this facilitates an integrated, management-led approach to continuity, discontinuity and context-sensitive resilience, competitive advantage and stakeholder value.

Please cite this paper as: Peace, C. (2011). *"All that man is; all mere complexities": managing disruption-related risks*. Paper presented at the 6th Emergency Management and Business Continuity conference, Wellington, NZ, Conferenz

Published: 23 August 2011

Managing disruption-related risks

Managing disruption-related risks seems, initially, fairly straightforward. Identify possible events that could cause disruptions; analyse their consequences and write a plan for management of consequences considered unacceptably disruptive or damaging. This misses many of the subtleties and complexities in and surrounding organisations. Too often, the context of an organisation is missed in business continuity planning and opportunities to modify risks or introduce disruptive business models are missed.

Examples of disruption-related risks

This section provides a general review of a number of events (and data about events) and then considers some specific case studies. It helps set the scene and show why executive managers should be concerned about disruption-related risks.

Major events

The number of technological and natural disasters and the people affected increased internationally from 1900 to about 2005 with a small reduction in numbers of events and people

affected from 2005 to 2010. However, the numbers killed by disasters has been reducing, perhaps due to better control of technological systems (CRED, 2011).

Dilley et al (2005) analysed international natural disaster hotspots and found many countries were exposed to three or more natural hazards with New Zealand ranking 57th out of 62 based on land area and 22.4% of the population at relatively high risk from multiple natural hazards. On this basis, the implications for fatalities and economic damage due to natural hazards are significant. However, methodologies for the analysis of natural disasters are variable in their and there is no consensus about how their analyses should be conducted (Hallegatte & Przyluski, 2010). For New Zealand, a relatively narrow view of the insurable (and insured) costs of floods, earthquakes and other natural events is given on the Insurance Council website www.icnz.org.nz.

In Europe, in the period 1998-2009, some 352 major technological disasters killed 169 people; in the same period worldwide, 576 natural disasters killed 98,803 people, affecting 11.112 million people and causing €148.8 billion damage (European Environment Agency, 2010).

In the period 1998-2009, one technological disaster occurred in New Zealand at an insured cost of NZ$12.6 million (no deaths were reported); in that period, 62 natural disasters cost the New Zealand insurance industry some NZ$673 million at current values (ICNZ, 2010). No information was quickly available about deaths in those events or costs to the Earthquake Commission [1]. A number of major technological events damaged or disrupted New Zealand organisations in the period 1998-2009 but only anecdotal information about these was available.

The magnitude 6.8 Gisborne, New Zealand earthquake of 20 December 2007 was 40 km deep and cost insurers NZ$30.5 million (source: www.geonet.org.nz/earthquake/historic-earthquakes/top-nz/quake-13.html). Damage was typically to older buildings that had not been strengthened, with retail losses slightly amplified by closure of the central business district (CBD) until 22 December 2007 for damage inspections (Powell, 2010).

The magnitude 7.1 Darfield, New Zealand earthquake of 4 September 2010 was 40 km south-west of Christchurch (Gledhill, Ristau, Reyners, Fry, & Holden, 2010). The main earthquake severely damaged water and wastewater pipelines, houses and other structures in parts of the city and surrounding areas. No lives were lost and damage has been estimated to be at least NZ$6 billion. Anecdotal information suggests storage racking systems and storage tanks were more severely damaged than had been expected; they certainly suffered some serious damage (Crosier, Hannah, & Mukai, 2010). Closure of roads blocked either by debris or to enable inspection of damaged buildings was relatively brief and may have little effect on long-term business recovery.

The subsequent magnitude 6.3 aftershocks (22 February 2011 and 13 June 2011) caused further and more extensive damage to the CBD of Christchurch and the nearby Port of Lyttelton (Stevenson et al., 2011). As a consequence, hundreds of commercial and industrial buildings were destroyed or damaged and, in many cases, subsequently demolished. One estimate by the New Zealand Historic Places Trust noted (NZHPT, 2011):

> *Of the 13,058 small businesses (those with staff numbering one to 19) operating in Christchurch, some 6000 are located within the four central avenues – a massive proportion considering the relatively small size of the CBD. Yet of the estimated 30 percent of Christchurch businesses expected to be closed for up to six months, a large number lie in the outlying suburbs …*

Such a potential loss of so many small- and medium-sized businesses is a major threat to the long-term recovery of businesses of all sizes that suffered little or no damage in the earthquakes (Powell, 2008). A further threat may be the loss of skilled residents who left following loss of their homes or stress due to the more than 7,900 aftershocks (source: www.christchurchquakemap.co.nz/). However, the greatest impediment to repairs or restoration of normal activities may prove to be, at a national level, the relatively limited numbers of available competent building contractors.

Hypothetical events

Clarke (1998) carried out an analysis of likely damage to Wellington due to a hypothesised magnitude 7.5 earthquake and calculated 657 people might die, with damage to the physical

[1] The New Zealand Earthquake Commission levies residential insurance policies and covers the first $100,000 loss following earthquake and some other natural disasters.

environment valued at NZ$9-10 billion (1998 values). Continuing costs of the event were difficult to calculate.

More recent work considered the impact of a range of major economic shocks on New Zealand (Fookes, 2011). Fookes modelled the consequences of a magnitude 7.8 earthquake near Wellington and suggested it could result in an increase of about NZ$15 billion in government debt.

Powell (2008) found in a survey of Wellington businesses that 53% derived more than three-quarters of the value of their sales from within the region, an aspect of the context of organisations that might be overlooked when assessing, or planning for, disruption-related risks. As noted above, social and business networks may be a significant part of the continued viability of small- and medium-size businesses after a major event.

Sudden shifts in company value

Knight & Pretty (2002) analysed the impact on 15 large businesses of high-profile, man-made catastrophes [2] on shareholder value. For those that failed to recover, they concluded that, typically:

- there was an initial loss of over 10% of market capitalisation
- in the first two to three months after the event, the estimated financial loss was significant
- there was a large number of fatalities
- the shareholder value response was strongly influenced by management acceptance of responsibility for safety lapses.

The combination of impacts on future cash flows plus (in some cases) the large number of fatalities accentuated the perceived lack of competent recovery management to reduce shareholder value [3]. These findings give strong messages for the management of disruptive events. The adequacy of insurance in replacing revenues was often of no relevance to long-term recovery or survival.

Pretty, Bussa, & Knight (2002) researched sudden shifts in the value of major companies and found "the vast majority of value shifts – both positive and negative – originate in strategic issues, rather than those operational or directly financial". They found strategic risk and how it is managed and communicated are key determinants of future value. Specifically, 59% of positive events and 72% of negative events were strategic in nature and very likely to be derived from the business environment.

"The single biggest source of sudden value destruction was the failure to anticipate changing patterns of supply and demand" (Pretty et al., p. 27), surely a failure of leadership. In only two cases were planned events disrupted by external events. Ashby & Diacon (2000) supported the Pretty et al finding that the ability of firms to cope effectively with such extreme situations could result in increases in both market share and profits, perhaps due to consumer sympathy.

Pretty, Bussa, & Knight suggested market research and scenario planning were key risk assessment tools for disruptive competition-related risks, a possibly novel approach for many business continuity and risk managers.

Context changes

Events popularly associated with business continuity planning are but some of the many disruption-related risks that might affect an organisation. As noted above, for many organisations, other external or internal events or changes in circumstances may be more likely to occur and could result in greater consequences. For example, Markides & Oyon (2010) researched responses by 65 large companies (mostly in the USA) to their competitors' disruptive business models. Failure to respond might have resulted in loss of market share and shareholder value. Their research showed responses might include development of a new business model, disruptive to the competitors' models, but managed separately from the established business model. In some cases, this drove innovation and avoided cannibalisation of the existing market.

[2] The businesses identified were Johnson & Johnson (Tylenol, 1982); Union Carbide (Bhopal); Johnson & Johnson (Tylenol, 1986); Sandoz (Rhine pollution, 1986); P&O (Zeebrugge, 1987); Shell Oil (Norco, 1988); Occidental (Piper Alpha, 1988); Pan Am (Lockerbie, 1988); Exxon (Valdez, 1989); Upjohn (Halcion, 1989); Phillips Petroleum (Pasadena, 1989); Source Perrier (Benzene, 1990); Eli Lilly (Prozac, 1990); Commercial Union (Baltic Exchange, 1992); Heineken (Glass, 1993).

[3] On this basis, the Pike River Coal Ltd explosion of 19 November 2010 that killed 29 men failed three and perhaps four of the indicators and so the company was highly likely to fail.

Four case studies

At the beginning of the global financial crisis, Air New Zealand recognised its vulnerability in the highly competitive aviation sector. It needed to develop a competitive edge that would attract international passengers to long-haul flights to New Zealand (in the order of 11 hours) and so feed passengers through to domestic flights. This was done by designing and building innovative seats that are comfortable to both sit and sleep in (Oram, 2010). It is claimed this has redefined the experience of long-haul flying and will protect market share and earn royalties from competitors for use of the seat design.

In risk management terms, Air New Zealand recognised the *change in circumstances* caused by a recession and strong competition and found a treatment option that is a disruptive business model for its competitors. This case study also fits with the Pretty, Bussa, & Knight (ibid) analysis of strategic risk management driving future value.

In 1991, a major fire in a distribution centre owned by Kwiksave, a UK supermarket company, was substantially destroyed by fire in less than two hours. Strong leadership and management resulted in the building being rebuilt and normal operations resuming in six months with little disruption of normal trading. The financial cost in is estimated to have been about US$80 million at current exchange rates. However, the fire disrupted expansion plans, perhaps contributing to the subsequent sale of the business by the majority shareholder in 1996 (Peace, 1995 with subsequent unpublished re-analysis). This case study fits with the Pretty, Bussa, & Knight (2002) analysis of strategic risk management driving future value.

The consequences of distant events can result in major impacts felt elsewhere in the world. The 2000 fire at a Philips microchip plant resulted in a major loss of micro chip production capacity and led to the ejection of Ericsson from the mobile phone market and dominance of that market by Nokia for much of the next decade.

The region of Japan affected by the Great East Japan [Tohoku-Kanto] Earthquake and tsunami of 11 March 2011 is the base for major automotive, electronics and other manufacturers (EIU, 2011). Many were directly damaged or had normal working disrupted by unexpected power failures. Some high-tech industries (eg, semi-conductor manufacturing) use equipment that will be damaged by such disruptions; others may be affected by water shortages. This is significant for some supply chains as about 20% of global production of semi-conductors, 60% of silicon wafers (used to manufacture computer chips), and 90% of BT resin (an essential component of electronic circuit boards) come from Japan. The knock-on effects have included disrupted motor vehicle production in Japan and the USA and a shortage of new and second-hand cars for export to New Zealand. The wider consequences for the Japanese economy have resulted in negative impacts on airline bookings and, thus, a drop in share values for Air New Zealand (and, probably, other airlines).

Risk and business continuity management research

Benyoucef & Forzley (2007) found that many organisations regard data backup as their business continuity plan, giving little or no thought to supply chain disruptions. They argued the supply chain in large organisations is so complex that any business continuity activity requires good information technology.

Research by Powell (2010) after the Gisborne earthquake found many businesses relied on insurance and first aid kits as their business continuity plan with little or no thought given to alternative measures. Such over-reliance on insurance can now be seen as very short-sighted, as some Christchurch organisations have been unable to renew their earthquake-related material damage or business interruption insurance. In some cases, the New Zealand Government has had to underwrite community-owned assets.

Research in the USA quoted by Starr, Newfrock, & Delurey (2003) showed:

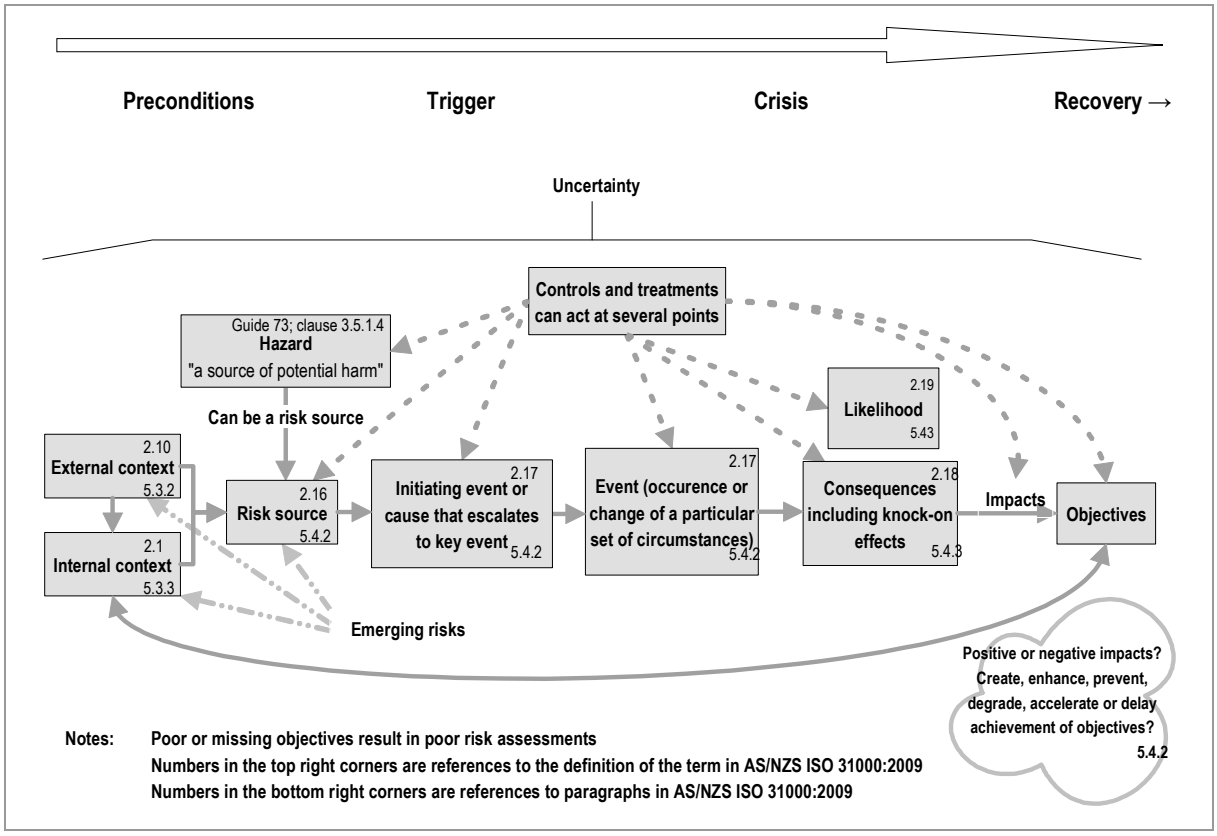
- fewer than 25% of respondents believed their current risk management sufficiently addressed key areas of contingency planning
- more than 33% of respondents thought their senior managers did not understand the impact a major disruption would have on the organisation and the organisation's level of preparedness for such an event.

Stead & Smallman (1999) analysed three case studies from the finance sector (Johnson Matthey Bank, Bank of Credit and Commerce International and Barings Bank) to identify if the failures (due

to internal events) could have been avoided through organisational learning from similar, prior events. They also tried to identify barriers to such learning and tested the applicability of crisis management theory derived from studies of industrial disasters to business failures.

Stead & Smallman analysed some of the then principal research into the structure of crises and tabulated the results to show preconditions, trigger, crisis, recovery and learning stages. These bear a strong resemblance to the model below, developed from definitions and descriptions in AS/NZS ISO 31000:2009 *Risk management – Principles and guidelines* and AS/NZS 5050. The crisis stages suggested by Stead & Smallman have been mapped onto this model. The model closely resembles models used to aid management of risks on major accident hazard sites in the UK and Australia.

Figure 1. Risk and crisis model



Sources: definitions and text in AS/NZS ISO 31000 and ISO Guide73; Stead & Smallman (1999)

Preconditions are in the external and internal context of organisations and give rise to sources of risks, including hazards. The trigger for an event may initially seem trivial but can rapidly give rise to a major event or crisis. However, the time between trigger and event can be many years and may involve a “resident pathogen” (Reason, 1990).

Stead & Smallman also found management responses to events ranged from revenge to blame; “dress the wounds”; compensate; investigate and correct at an operational (but not organisational) level; investigate and adjust culturally (including “un-learning”).

From their work and work by others (eg, Smith, 2005), cultural adjustment, including “un-learning”, is important for avoidance of future crisis events and long-term survival of the organisation. This strongly suggests managers should learn from disruptive events affecting competitors, other sectors and disciplines and that risk management and business continuity management should converge. However, it is still comparatively rare for such cross-discipline and cross-sector learning to happen and seems even rarer for such learning to be accepted by managers.

Vaid (2008) discussed the convergence of operational risk and business continuity in the banking and finance sector. He noted that ”no discussion on [business continuity planning] can be complete

without reference to operational risk" [4]. Vaid argued that operational risk management and BCP are very closely linked but then distinguished them as follows.

Operational risk management	Business continuity planning
Operational risks can, to some extent, be controlled by the business	Risks that are less controllable by the business (eg, hurricanes, floods, earthquakes)
Internal practices and policies (internal or external fraud, system failures, workplace safety, etc	Business continuity risks cannot be avoided, disasters will happen
Operational risks can be informed by past events	Extreme scenarios are unpredictable and are more an art than a science
Operational risk management depends on reviewing existing processes and fixing gaps	BCP works on possible internal and external threats (both man-made and natural) and being adequately prepared when the disaster strikes

The problem with such distinctions is they take no account of many real-world issues. While the timing and severity of risks due to earthquakes, hurricanes, floods, and other natural hazards cannot easily be predicted, their consequences can be modified by the location, design and operation of critical infrastructure. On a regional basis, natural hazards are likely to be more disruptive than man-made events, but organisation-specific man-made events can cause disruption of the type noted by Knight & Pretty (ibid). The distinction between internal and external causes of risk eventuation is also false; for example:

- the global financial crisis arose from a mixture of poor management decisions within organisations (internal weaknesses) and the weak regulatory environment they were operating in (external weaknesses) with both acting synergistically to worsen the consequences
- in February 2011 the self-immolation of one fruit and vegetable vendor in Tunisia (an external trigger event) resulted in the demise of governments in Tunisia and Egypt and civil wars in Libya and Yemen (internal events at a country level) and threatened political stability in other Arab states; it may yet come to threaten crude oil supplies from the Middle East and north Africa [5] (an external event possibly resulting in internal and external consequences).

More generally, a study of recent major disasters (such as those outlined earlier) typically will show failure to adequately:

- understand a change in the context of the organisation
- identify or analyse or evaluate disruption-related risks.

This compounds failure to develop and implement risk treatments (possibly including business continuity plans). At a societal level, "complex societies are highly susceptible to interferences and accidents, [and] offer ideal opportunities for a prompt disruption of normal activities" (Habermas, n.d.) while at an organisation level "[the] chapter of knowledge is very short, but the chapter of accidents is a very long one" (Lord Chesterfield, 1753).

In summary, the research reviewed above suggests the following.

Before the event

Enable learning by executive managers from the disasters that have afflicted others (Stead & Smallman and Starr, Newfrock, & Delurey).

Broaden the scope of response plans from simply arranging backup of computer data to cost-effectively control disruption-related risks and include risk indicators for context changes (Benyoucef & Forzley, Pretty, Bussa, & Knight and Vaid).

Do not place great reliance on insurance as a recovery mechanism (recent experiences with renewal of insurances in Christchurch specifically and New Zealand generally; Knight & Pretty, Powell).

[4] "The risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events", Basel Committee on Banking Supervision 2001 definition.
[5] The price of Brent crude oil exceeded US$119 in June 2011

During the event

Communicate authoritatively and proactively with key stakeholders and the media (Knight & Pretty).

Restore revenue streams as quickly as possible (Knight & Pretty).

After the event

Investigate to identify the root causes and take action to "un-learn" negative conditions and achieve a true cultural adjustment (Stead & Smallman).

The above research and the events and disruptive risks discussed earlier strongly suggest that business continuity management focused on the "traditional" risks (eg, fire, flood, earthquake) is missing the point – it is the business model of an organisation that matters along with the resources needed to implement it while adapting to changes in context. The worst disruptions may be due to the new and disruptive business model of a competitor, societal upheavel following a natural disaster or due to some other geographically remote event.

The key finding from much of this research is that organisational culture was the main contributing factor in these failures and this arose due to "ambiguous situations" (leading to cognitive dissonance), "resident pathogens" and "latent errors" (Perrow, 1999, p. 318; Reason, 1990, p. 197; Toft & Reynolds, 1997, pp. 79-80). These concepts, familiar to process managers and occupational health and safety practitioners, can lead to the failure of foresight and a "crisis of management". Organisational culture has often been described as the "tone from the top" and reflects the leadership provided by executive management.

Managing disruption-related risk – a management function

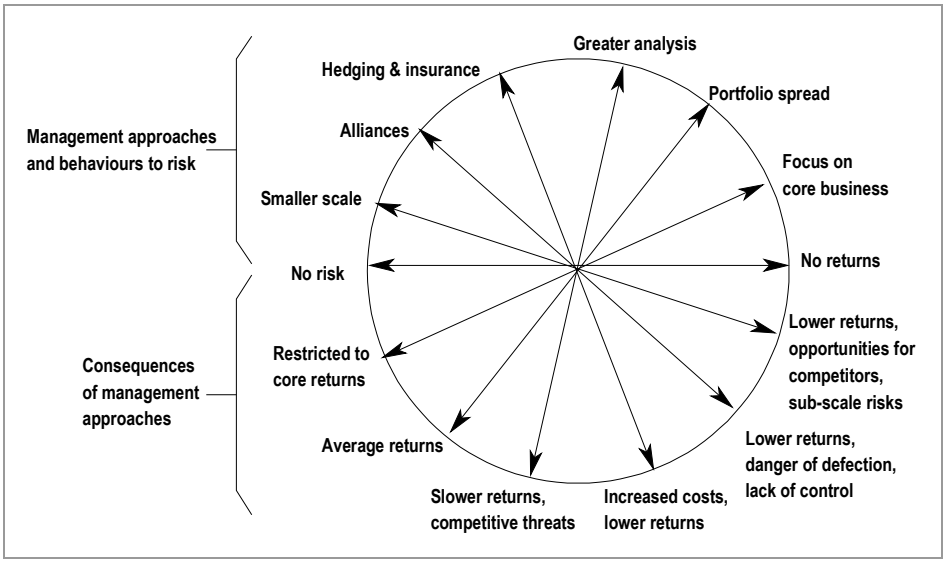
Risk and business continuity management have been seen by some practitioners as separate organisational functions and activities. Indeed, between different employment groups and professions, different names have been given to similar and sometimes identical activities. Equally, some researchers and practitioners are aware of cross-sector similarities between disruptive events, their causes and consequences and raise questions about the overlaps and differences between crisis, business continuity and disaster recovery plans. Should there be any differences? What exactly is an organisation trying to achieve with such plans?

What if risk and business continuity management were to be seen as strategic activities, as advocated by Pretty, Bussa, & Knight (2002)?

If the consequences of a risk event, including a change in circumstances, could impact on organisational objectives the risk should be a strategic issue. However, risk management is often treated tactically, with management focusing only on the negative impacts and not the opportunities (Clarke & Varma, 1999). Typically, various internal controls are allocated to different people in an organisation, often with little oversight or coordination at the governance level. Examples of such controls include corporate communications, insurance, compliance programmes, occupational health and safety management (a specialist area of compliance), building and security management and business continuity management.

Clarke & Varma suggest (p. 416) a model for strategic risk management that initiates with the external environment and sources of risk and concludes with opportunity-taking outputs. The model includes a feedback loop similar to the monitor and review feedback loop in the ISO 31000 risk management process model. The loop is identified as "learning", and they point out that "risk cannot be destroyed" and can only be changed from one form to another.

Selected risk treatment options



Adapted from figure 3 in Clarke & Varma (1999)

Application of AS/NZS 5050

AS/NZS 5050: 2010 *Business continuity: management of disruption-related risk* is based on ISO 31000:2009 *Risk management – Principles and guidelines*. AS/NZS 5050 explains how to apply risk management to disruption-related risks that could impact on an organisation. It gives detailed guidance on the features of such risks and the risk management framework through which they are managed. In contrast to traditional emergency and business continuity management, management of disruption-related risks extends to include uncertainty and change in the context of organisations.

In the standard, the definition of disruption-related risk is "risk arising from the possibility of disruptive events". Substituting the definition of risk in ISO 31000 into the definition of disruption-related risk gives:

> *the effect of uncertainty on objectives, arising from the possibility of disruptive events*

Both ISO 31000 and AS/NZS 5050 define event as an:

> *occurrence or change of a particular set of circumstances.*
>
> > *Note 1 An event can be one or more occurrences, and can have several causes.*
> >
> > *Note 2 An event can consist of something not happening.*
> >
> > *Note 3 An event can sometimes be referred to as an "incident" or "accident".*
> >
> > *Note 4 An event without consequences can also be referred to as a 'near miss', 'incident', 'near hit' or 'close call'*

The combination of these definitions should raise many questions (to be answered by effective risk assessments) including those offered here.

- Crucially, what are the objectives of the organisation?
- In relation to those objectives, how much uncertainty is acceptable?
- What disruptive events might occur?
- Which particular set of circumstances might change?
- What effects might be felt?
- How tolerable will those effects be?
- What is the likelihood of each identified consequence?
- What combination of occurrences could occur, acting to magnify the effects?

Some of these are governance-related questions (Dahms, 2009) that must be answered as part of any risk assessment. When answered, they show (for the private sector) effective management of

disruption-related risks is critical for long-term survival. Indeed, it becomes part of the competitive edge of organisations. For the public sector, effective management of disruption-related risks is also a survival requirement – stakeholders are unlikely to tolerate repeated adverse outcomes from disruptive events.

The disruption-related risk management framework

Section 3 of the standard addresses such governance issues with requirements for management mandate and commitment as part of the framework.

Risk management framework is defined in AS/NZS 5050 as a "set of components that provide the foundations and organisational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management throughout the organisation". The foundations can include the policy, objectives, mandate and commitment to manage risk. Organisational arrangements may include plans, relationships, accountabilities, resources, processes and activities. The risk management framework is embedded within the organisation's overall strategic and operational policies and practices.

As described by the standard, management of disruption-related risks is not an activity separate from strategic or line management activities. It may, however, require some additional skills or knowledge.

If disruption-related risks are to be effectively managed they must be subject to a risk assessment that is, in turn, founded on a good understanding of the external, internal and risk management contexts the organisation is operating in.

Context

Experience shows development of a context statement frequently reveals information previously overlooked or inadequately interpreted. Paragraph 4.2 of AS/NZS 5050 describes the types of context-related information to be gathered and analysed.

Risk assessment in a AS/NZS 5050 framework

The need for specialist skills and knowledge most clearly arises in the assessment of disruption-related risks and the proposal and development of strategies for the management of risks found to be unacceptable. Risk assessment is defined in AS/NZS 5050 as "the overall process of risk identification, risk analysis and risk evaluation". In practice and in the standard, each of these three stages has feed back and feed forward loops. Each identified risk may require application of a specific risk analysis technique and will lead to preparation of a risk evaluation report; preparation of such a report may disclose risks not previously identified or analyses that were inadequate.

In the standard, the final sentence of the third paragraph in 4.3.2 (risk identification) states "all significant causes and consequences should be considered". In this paper it is assumed this has been done and the following focuses on the risk analysis stage.

Paragraph 4.3.3.2 of AS/NZS 5050 tells us the initial risk analysis "should include building a clear understanding of:

> (a) the business functions and processes;
>
> (b) the magnitude of the contribution of each of these functions and processes to the organization's objectives;
>
> (c) the location and distribution of infrastructure and resources;
>
> (d) the vulnerabilities of the systems, physical structures and locations in which business activity occurs (having regard to the likely effect of any existing controls);
>
> (e) the principal types of internal and external dependency including (but not limited to) infrastructure, utilities, human expertise, knowledge and experience, suppliers and customers; and
>
> (f) other factors critical to the organization's business activity".

The following techniques contribute to such an understanding with business impact analysis building on their outputs.

Flowcharting

Flowcharting is a graphical technique that can be applied by an individual or group. It is especially useful for mapping supply chains or networks. When applied to process mapping in an organisation it can show flows of money, data and goods into, through, and out of an organisation and enables "what if" questions. It is usual to develop a set of flowcharts showing supply chain dependencies, suppliers and customers.

SWIFT

The "Structured What If Technique" (SWIFT) was developed as a simpler and more efficient version of HAZOP (**Haz**ard and **Op**erability studies) and has been used in the petrochemical industries for some years (Maguire, 2006). It is a team-based method for analysing systems or procedures and may be linked with a simple consequence/likelihood matrix to enable ranking of risks. Instead of considering a system or process on an item-by-item basis, SWIFT considers the whole system or subsystem following a brainstorming approach supported by questions from a checklist. Outputs can be used in a range of additional techniques including bowtie analysis.

SWIFT can help open up a rich vein of risks for further analysis and its simplicity and relative low cost has led to its use in diverse sectors

Scenario analysis

Scenario analysis is best applied to long timescales, typically 15 years, to help challenge test strategic plans and assumptions (Davies, 2002). For example, Schwartz (1996) used the technique to test a major investment decision for Shell and a Fookes (2011) used a scenario analysis with a 13-year horizon to analyse the effects of a major earthquake near Wellington

Fitzpatrick (2007) suggested consideration be given to a range of scenarios such as: the effects of a pandemic on employees, contractors and their families; a credit downgrade; a customer boycott (perhaps through Facebook or a similar medium); supply chain disruption; and loss of a key facility for an extended period. These can then feed into a subsequent business impact analysis. Fookes (ibid) considered pandemics, natural disasters, agricultural disease and economic rebalancing as events or changes in specific circumstances in his economic scenario analysis.

One scenario used to aid consultancy work and teaching hypothesises "when oil reaches US$500 per barrel in the next five years". Consequences, uncertainties and vulnerabilities of such an event or change in circumstances are identified and analysed and likely responses of stakeholders considered. As a major external event or change in circumstances it challenges existing business models and plans. While participants initially see such a change as impossible, their analyses show it is plausible, with both negative and positive impacts. Should such a risk eventuate it would be highly disruptive for many organisations.

Lempert, Hallsworth, Hoorens, & Ling (2009) provide a useful and accessible review of scenario planning methodologies.

Note: scenario analyses are not forecasts or projections. Scenarios should encompass the foreseeable (ie, the next 2-3 years) but be based on events or changes in circumstances that can be conjectured. They should be plausible but tease out uncertainties in strategic plans and incorporate disruption-related risks.

Business impact analysis

A business impact analysis builds on information from earlier risk analyses. Rather than attempt to focus on causative events or changes in circumstances, the business impact analysis should consider how quickly and how severely loss of identified equipment, facilities, services, people, and so on would disrupt key activities. Key information will include restoration times for those activities.

The forthcoming joint standards handbook, HB 31010 *Risk assessment techniques* will provide an overview of business impact analysis and the Standards New Zealand *Handbook of Business Continuity Management* (SNZ, 2003) provides more details about the technique [6].

[6] This handbook is likely to be replaced in 2011/2012 by an updated version supporting AS/NZS 5050.

Effective management of disruption-related risks

In this section it is argued that effective risk management, founded on effective risk assessments, leads to effective business continuity management, including crisis communications and disaster planning.

An effective risk assessment will include analysis of the risk controls in place. Control is defined in AS/NZS 5050:2010 as a "measure that is modifying risk" and can include any process, policy, device, practice, or other actions which modify risk. However, controls may not always exert the intended or assumed modifying effect.

Use of the word "modifying" in the standard is deliberate. The risk model (shown earlier) demonstrates that controls can act on many components of a risk. Some controls may act to increase desirable impacts on objectives, some may be intended to reduce negative impacts and others may modify characteristics of the risk.

The process for managing disruption-related risk set out in AS/NZS 5050 shows risk treatment is required for risks evaluated as currently unacceptable. Risk treatment is defined in the standard as the "process of developing, selecting and implementing controls". Use of the risk model again shows where treatment might be applied.

Treatment may involve risk avoidance (eg, by deciding not to start or continue with the activity that gives rise to the risk); seeking an opportunity (eg, by deciding to start or continue with an activity likely to create or enhance the risk); removing the source of the risk; changing the nature and magnitude of likelihood; changing the consequences (eg, by redundancy, moving equipment, or business continuity plans); sharing the risk with another party or parties (eg, through insurance); or retaining the risk by choice. These are management options that must be weighed against other management options; see the diagram on page 8 for examples. Note that business continuity plans are but one option in a range of management actions to treat unacceptable disruption-related risks.

Methodically working through these generic descriptions may result in identification of options previously overlooked. From an internal control and audit perspective, implementation of options other than business continuity plans should be welcomed as it may reduce dependence on plans that may go out of date or gather dust on shelves, untested. It may also draw out risks and opportunities not previously identified.

Assuming some form of business continuity plan has been identified as necessary, it must aid achievement of organisational objectives in ways that are acceptable to the organisation and its stakeholders. It must address wider issues than restoration of computers, electricity or other infrastructure. Crucially, it must aid a strong management response to stakeholder concerns and (for the private sector) restoration of revenue flows. For the private sector it should address maintenance of confidence of business partners and consumers and (for major external events) consider likely responses of business partners and consumers: will they still be there after the event?

Symbolic –v– functional plans

Why take a new route to the management of disruption-related risks when business continuity planning and management have been used for so long? Such plans and management strategies often fail to take account of the complexities in external and internal contexts of organisations and so can miss crucial information for effective management of risks and alternatives to plans. Worse, such plans for responses to disruption-related risks can range from functional to symbolic (Clarke, 1999).

In relatively low uncertainty (perhaps as a result of an effective risk assessment), functional plans can be expected to work broadly as intended. However, if there is high uncertainty (eg, risks and related controls have not been identified and appropriately analysed or evaluated by decision-makers) it is likely any plans will be symbolic. Clarke described such plans as "fantasy documents". They are prepared to satisfy the expectations of some stakeholders but will never work in practice.

Drucker (1973) wrote:

> *The main goal of a management science must be to enable business to take the right risk. Indeed, it must be to enable business to take greater risks – by providing knowledge and understanding of alternative risks and alternative expectations; by identifying the resources and efforts needed for desired results; by mobilizing energies for contribution; and by*

> *results against expectations, thereby providing means for early correction of wrong or inadequate decisions.*

His words can justly be applied to why and how any business continuity plan should be developed.

Resilience

In section 2 of AS/NZS 5050:2010, the second of the 11 principles for effective risk management states:

> *(b) Risk management enhances an organisation's resilience and creates strategic and tactical advantage.*

Adoption of the AS/NZS 5050 framework and process facilitates a management-led approach to continuity, discontinuity and resilience in a complex environment. Resilience here is the "adaptive capacity of an organisation in a complex and changing environment" (ISO, 2009) rather than the traditional sense (ie, returning to the state before the disruption). This definition suggests resilience is actually an ephemeral condition: as soon as the context changes, risk assessments, their controls and treatments must be reviewed and the nature of perceived resilience must change. Such context changes can originate from changes in stakeholder expectations, disruptive strategies adopted by competitors, disruptive technology, new legislation, and so on.

Discussion and conclusions

Major disruptive events, possibly far from an organisation, seem to be increasing. In parallel, the complexity of supply chains and interdependency of local infrastructures is increasing. It has been argued that disruption-related risk is:

> *the effect of uncertainty on objectives, arising from the possibility of disruptive events*

Objectives are set at the governance level of organisations and implemented through management systems. It is therefore argued that:

- effective governance is dependent on the best available information being used to inform decision-making under uncertainty
- day-to-day management of risks should include controls focused on increasing the certainty those objectives will be achieved.

Conclusions

Organisations and the societies they exist in have become more complex. Disruption-related risk events, including changes in circumstances, threaten individuals, organisations and whole communities.

Business continuity management narrowly based on risks of fire, flood, earthquake, electrical failure, etc or plans that are complex will surely fail, while disruption-related risks assessed and managed through the AS/NZS 5050 model are more likely to work in the face of organisational and societal complexity.

Business models need to be "adaptive … in a complex and changing environment" and incorporate management plans for disruptions. In our human societies, nothing is simple.

> *All that man is; all mere complexities.* (Yeats, 1933)

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File name: RML 2011 WP0103 DRR.doc