A 'conceptual models' approach to organisational resilience

Gibson and Tarrant discuss the range of inter-dependant factors needed to manage organisational resilience.

ABSTRACT

Over the last few years there has been considerable interest in the idea of resilience across all areas of society. Like any new area or field this has produced a vast array of definitions, processes, management systems and measurement tools which together have clouded the concept of resilience. Many of us have forgotten that ultimately resilience is not just about 'bouncing back from adversity' but is more broadly concerned with adaptive capacity and how we better understand and address uncertainty in our internal and external environments. The basis of organisational resilience is a fundamental understanding and treatment of risk, particularly non-routine or disruption-related risk.

This paper presents a number of conceptual models of organisational resilience that we have developed to demonstrate the range of inter-dependant factors that need to be considered in the management of such risk. These conceptual models illustrate that effective resilience is built upon a range of different strategies that enhance both 'hard' and 'soft' organisational capabilities . They emphasise the concept that there is no quick fix, no single process, management system or software application that will create resilience.

Introduction

Today the majority of organisations have either been deliberately designed for, or have evolved to operate efficiently and effectively in routine environments characterised by stability and predictability. However, in many organisations, this has increased their vulnerability to the highly volatile and uncertain conditions that appear to becoming the norm (Stern, 2001; Kates and Parris, 2003; Sornette, 2003; U.S.-Canada Power System Outage Task Force, 2004; United States General Accounting Office, 2004, McDonald and Robinson, 2009). Over the last decade, volatility in our natural, economic and social systems appears to be increasing at rates faster than many organisations can cope. Whilst such fast moving events overwhelm many organisations a proportion demonstrate an ability to either manage or bounce back from the adverse effects of system volatility.

In recent years the term resilience has been applied at individual, community, organisational, and societal scales to describe an ability to cope with often sudden and dramatic change (World Economic Forum, 2008; The Reform Institute, 2008). Accordingly, there have been a wide variety of resilience definitions, many reflecting the origins of the term from social, ecological, computing and engineering sciences (Holling, 2001; Paton and Johnson, 2001; Rose, 2004; Gaillard, 2007; Sapountzaki, 2007; Bosher et al, 2009, DeBardeleben, et al, 2009).
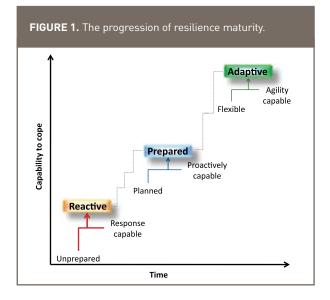
The term resilience has become widely used by many including consultants, managers, bureaucrats and politicians. With this increasing use of the term we have seen a catch-all terminology develop and some subsequent mismatches to our specific interest. Some of this has arisen from attempts to encapsulate a complex multidimensional, multifactorial concept under a single banner. Some blame must also lay with people jumping onto the bandwagon and trying re-badge old ideas. This has seen claims of processes, management systems, computer software and measurement tools that will all create resilience.

This paper aims to provide insight into the complexity and multidimensional nature of organisational resilience by examining several different conceptual models that demonstrate different and interrelated aspects of resilience. It is useful to remember the old saying "all models are wrong but some illustrate useful points." The authors have selected those models that we believe illustrate useful aspects of thinking about resilience. It is our hope that by considering resilience in its complexity, that we start to discard much of the simplistic and mechanistic approaches that are being promoted in recent years.

The 'principles model of resilience'

The authors propose a 'principles model of resilience' that can provide a simple guiding foundation for investigating resilience. The principles model is derived from common themes that emerge from comparisons of resilience in different disciplines and is based upon six key principles:

- *Resilience is an outcome.* Resilience is not a process, management system, strategy or predictive measurement. It is most certainly not a synonym for business continuity or emergency management (although both of these can be important contributors to resilience). Rather resilience is a trait that can be observed following, and in response to a substantial change in circumstances.

- *Resilience is not a static trait.* There is no metric or score that will describe resilience as a fixed feature. An organisation's resilience will not be constant, but will change in response to volatility in the external environment and as organisational capabilities change over time. Resilience is dynamic, it will increase or decrease as the context changes.

- *Resilience is not a single trait.* Resilience arises from a complex interplay of many factors. As circumstances change, the presence, importance and contribution of each of these factors to resilience will change in turn.
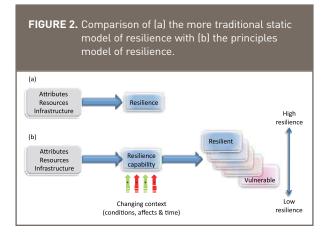

FIGURE 1. The progression of resilience maturity.

- *Resilience is multidimensional.* There is currently no single model that describes resilience, all existing models have limitations, some more than others. The better models each describe aspects of resilience from complementary viewpoints.

- *Resilience exists over a range of conditions.* Resilience can exist over a range of conditions from low resilience (vulnerable) to high resilience (resilient). Such a spectrum of resilience can be observed amongst different organisations facing the same event; within a single organisation experiencing different types of events, or over different periods of time; or internally amongst the different functions within an organisation. As an organisation focuses on and invests in enhancing its resilience, it should see an increasing maturity in its resilience capabilities, from a low end highly

reactive state (such as a simple emergency response such as an evacuation), improving capabilities through proactive preparedness (for example having in place incident response and business continuity capabilities) eventually achieving a state where it is adaptive to conditions of high uncertainty (Figure 1).

- *Resilience is founded upon good risk management.* Rarely will organisations demonstrate resilience by accident. Their approach to developing resilience will be based upon the sound assessment, treatment and monitoring of, and communication about risk.

These principles establish a foundation upon which other conceptual resilience frameworks or models can be developed and evaluated. An immediate outcome of applying these principles demonstrates where many current resilience frameworks are flawed; in particular those static frameworks that also claim the ability to provide a measure of resilience.
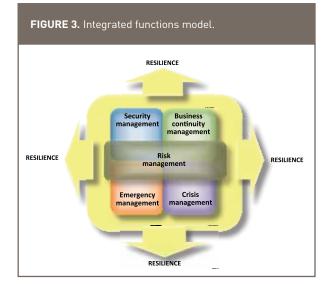
Many existing approaches to measuring organisational resilience assume that measuring a range of organisational attributes in a routine environment, will translate directly to giving a measure of resilience (Figure 2a). However, in reality each attribute will potentially function differently and will have a different level of contribution to resilience, depending upon the conditions facing the organisation. Since resilience arises from an entity interacting with its environment, at best these models are measuring the organisation's resilience capabilities. It is the manner in which this range of resilience capabilities interact with a changing context that will determine an organisation's resilience (Figure 2b). An organisation's context may have both enhancing and degrading affects on these resilience capabilities resulting in a possible spectrum of outcomes – generating possibilities from high to low resilience. How the organisation deals with such variability in its context over time will depend upon how it monitors, understands and addresses the risks it faces.

FIGURE 2. Comparison of (a) the more traditional static model of resilience with (b) the principles model of resilience.

Therefore, in the absence of a robust approach for modelling a dynamic range of different contexts, the best indication of resilience that we can hope for from models at this time will be an appreciation of the organisation's resilience capabilities.

The 'integrated functions model' of resilience

Early concepts of organisational resilience, particularly from the UK and USA were based around re-badging various approaches to business continuity management (BCM) and relabelling them as resilience. This often presented us with what was labelled as a 'resilience process', or 'resilience system'. More recently there has been emergence of resilience management system cycles, apparently claiming to do for resilience what ISO9001 has done to quality assurance. Accordingly, we believe there is a danger that such highly prescriptive approaches not only fall short of what resilience is about, but that the prescriptive nature may even reduce resilience, particularly when faced with 'black swan' events (completely unanticipated, extreme consequence events). Over the last few years this has been demonstrated time and time again, when strongly prescriptive processes failed to adapt when the environment changed suddenly (Taleb, 2007) for example as occurred in the Enron Collapse (Committee on Energy and Natural Resources, United States Senate, 2002; Millon, 2003), Katrina (Walker, 2006) and the global financial crisis. This does not mean that all such approaches should be avoided.

FIGURE 3. Integrated functions model.

An evolution of this process/management system thinking has seen a number of integrated models proposed, with some implemented successfully into a range of different organisations (including in the organisation of one of the authors). We believe that those integrated models that are based around a robust risk management program can be major contributors to organisational resilience. In such models, risk management provides the foundation that links different organisational capabilities such as emergency, business continuity, security and crisis management (Figure 3). Risk management provides a common understanding of how uncertainty arising from highly volatile environments can affect the organisation's objectives and provides the means by which these specialised capabilities can then address that uncertainty. However

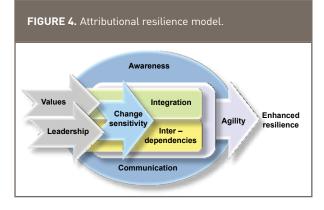while this may be a significant contributor to resilience it is not a complete picture.

The current work undertaken by the joint Australia and New Zealand Standards working group has taken this concept to a whole new level into the development of the draft standard on *business continuity – managing disruption-related risk* (Standards Australia, 2009a), using the new risk management standard (Standards Australia, 2009b) as the driving concept.

Attributional resilience model

Recent approaches have sought to explain resilience from the perspective of the features of highly resilient organisations. Such models demonstrate what organisational attributes can help an organisation deal with uncertainty and adversity. Accordingly, these models can provide an insight into the types of change that an organisation needs to consider making as it strives towards improving its resilience.

The 'attributional model' of resilience (Figure 4) was developed in a series of workshops by the Resilience Community of Interest (Resilience COI, 2009) is a good example of this approach. . In this 'attributional model' the key drivers for creating resilience are:
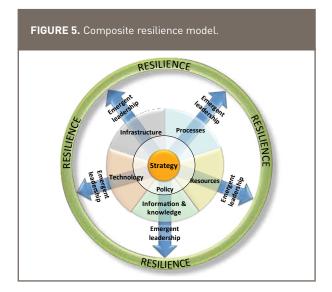
- The organisational *values* - establishing commitment, trust and strong internal alignment and creating a common purpose.
- *Leadership* - establishing a clear strategic direction based upon an understanding of risk, empowering others to implement the strategic vision, and engendering trust.

FIGURE 4. Attributional resilience model.

The 'values' and 'leadership' attributes in turn create an organisational culture and capability that is aware of, understands and is sensitive to internal and external change. This high level of *change sensitivity* or acuity (understanding the past, monitoring the present and foreshadowing the future) allows indicators to be identified in the lead-up to dramatic change. This in turn facilitates closer *integration* of the disparate parts of the organisation and through-chain *interdependencies*, enabling them to better work cooperatively together to a common set of goals a disruptive event unfolds.

The operation of these various elements is enabled through open, adequate and honest *communications* that both provides an understanding and creates an *awareness* of how risks to the organisation are emerging or changing. This awareness and communication enhances the organisation's ability to learn from previous disruptions and better understand and adapt to new emerging disruptions (Peche and Oakley, 2005). It is the manner in which these various elements interoperate that creates the *agility* that the organisation requires to respond and adapt to a volatile environment. Attributional models of this nature can be incredibly useful in focusing attention on these often poorly understood 'soft' elements of resilience.

Composite resilience model

A drawback of the attributional models is the lack of attention paid to the 'harder' elements that contribute to resilience. The composite resilience model provides a different viewpoint that considers both soft and hard elements' operation: processes, infrastructure, technology, resources, information and knowledge. Key to the model is the central importance of strategy and policy in establishing an operational duality, the capability to operate in both routine and non-routine environments. However, one of the key differentiators of the composite model is the role of emergent leadership (Norhouse: 2000) (Mintzburg: 1985) in driving the adaptation of each of the other organisational elements to meet the changing non-routine environment.

FIGURE 5. Composite resilience model.

We envisage that emergent leadership is able to create an improved understanding of the volatile environment and any resulting changed organisational properties. Emergent leadership is therefore more rapid in translating this information into decisions and actions. It thus provides direction, in times of high uncertainty and ambiguity for applying capabilities and unifying the operation of the processes, resources, infrastructure, technology, information and knowledge. It also needs to be recognised that emergent leadership does not necessarily arise from top management, but often comes from talented middle managers that rise to the

occasion. This again emphasises the importance of strategy and policy in establishing the conditions that allow such leadership to emerge.
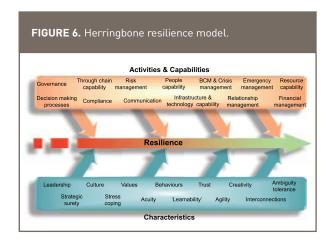
Herringbone model of resilience

So with three different resilience models and three different viewpoints on resilience, which is the most appropriate? That really depends on how each model relates to an individual organisation's level of maturity and the context it operates within. To try and provide more of a one-stop shop model, the herringbone model was developed (Figure 6) to encapsulate the concepts of the other three models and fill in some of the gaps.

The 'herringbone' recognises that an organisation possesses a substantial range of *capabilities* and undertakes a range of *activities* (collectively what the organisation '*does*') that will contribute towards improved resilience. Furthermore, the organisation also exhibits a number of *characteristics* ('*how*' the organisation operates), that will affect the effectiveness of the capabilities and activities and help to enhance the organisation's resilience.

Whilst most of the capabilities, activities and characteristics are critical to functioning in the routine environment, it is the manner in which they can adapt to the non-routine environment that will create resilience. A few capabilities and activities are specific for operations in the non-routine environment, such as business continuity, crisis and emergency management. However, there some characteristics that really come into their own in helping to create a resilient state by helping all aspects of the organisation to better operate in a non-routine environment. Some of these critically important factors include:

- *Acuity* - the ability to recognise precedence - what has occurred in the past; situational awareness - what is happening now and foresight - understand what could happen in the future. Acuity provides the ability to take this information and identify early warning indicators of dramatic change and provides an understanding of possible options for dealing with it.
- *Ambiguity tolerance* – the ability to continue making decisions and taking action at times of high uncertainty.
- *Creativity* and *agility* -operating in novel ways to work around problems at a speed that matches volatility.
- *Stress coping* - that people, processes and infrastructure continue to operate under increasing demands and uncertainty.
- *Learnability* - the ability of the organisation to use the lessons of their own and others' experiences to better manage the prevailing circumstances, including using lessons in real time as they emerge.

The relative contribution and importance to resilience of each of the capabilities, activities and characteristics will depend upon the nature of the changing circumstances being faced by the organisation.

FIGURE 6. Herringbone resilience model.

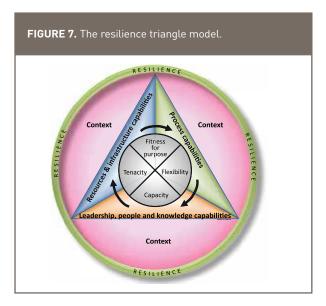FIGURE 7. The resilience triangle model.

The resilience triangle model

Collectively, the previous models demonstrate that resilience arises out of a complex interplay of organisational elements or capabilities that contribute to resilience when they adapt to a significant change. The challenge now is to encapsulate this complexity in a simple model construct.

The inspiration for us is the old fire triangle model (heat + fuel + oxygen = fire), take away any side of the triangle and the fire goes out. Hence the resilience triangle (Figure 7), take away any one side of the triangle and resilience 'goes out'. More accurately, what the model attempts to show is that all three types of capabilities: process capabilities; resources and infrastructure capabilities; and leadership, people and knowledge capabilities, are essential for organisational resilience.

The triangle model also emphasis the fluid nature of each of the three areas of capability. This fluidity arises from organisational processes that continually review, assess and adapt capabilities on each side of the triangle to ensure that they:

- Are *fit for purpose* – their design parameters meet the job that needs to be done – requires monitoring of capability and volatility.
- Retain sufficient *capacity* to ensure that required organisational objectives will be achieved – this often requires that the design of the capability has some level of redundancy.
- Have *tenacity* in that the capabilities continue to perform even in the face of severe disruptive consequence – requires that the design of these capabilities is either resistant or stress tolerant.
- Exhibit *flexibility* to go beyond original design parameters in response to changing circumstances.

Thus any loss of effectiveness of these capabilities (collectively or singly) will potentially degrade resilience. The actual extent of any degradation, or enhancement depends upon the nature of the interaction of the capabilities with each specific context (changing internal and external environment) being faced.
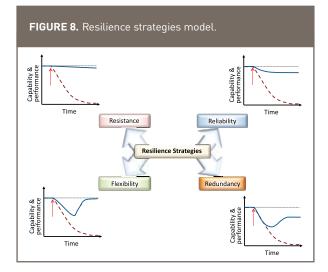
Resilience strategies

The range models in this paper illustrates a range of ideas about the nature of resilience. It has to be remembered that none of these models actually describe resilience itself. Rather they each describe some of those aspects of an organisation that can contribute to resilience. The question remains, however, of how these models can be implemented within an organisation. For any of the models there are four broad strategic approaches that can be taken to start building improved resilience: resistance, reliability, redundancy and flexibility.

It should be recognised that potentially any one of these four strategic approaches may provide for organisational resilience under specific set of circumstances. However, with a modern context that presents such high levels of uncertainty, it would be foolhardy to try to predict what is likely to happen and then be able to select a single strategic approach to manage those specific circumstances. It therefore seems more eminently sensible for an organisation to select a suite from all four types of strategies that will provide for a wide range of possible disruptions.

Each of the four types of strategies would be expected to influence the performance of organisational capability (and affect resilience) in a different manner (Figure 8). In the absence of any 'resilience strategies', organisational capability and performance (red dotted line, Figure 8) would be expected to show a sudden and catastrophic collapse soon after a disruptive event commenced (red arrow, Figure 8). However, the presence of one or more resilience strategies would be expected to moderate this deterioration in capability and performance (blue line, Figure 8) depending upon

the nature of the strategies in relation to the nature of the event. For example, generally we would expect to see the following:

Resistance strategies are aimed at improving robustness and hardening the organisation to withstand the immediate affects that volatility may impose. There is usually no agility or adaptation with such approaches, resistance tries to match the organisation's strength against the event's power. Following such an event, an effective resistance strategy would be expected to maintain capability and performance at close to routine operating levels. However, resistance strategies can present significant drawbacks as they are generally developed to meet predicted events, defined within expected parameters. Should the actual event exceed those parameters, then capability and performance would be expected to catastrophically collapse in the absence of other types of strategy. Examples of resistance strategies include: land use planning and construction standards in bushfire or flood prone areas; use of firewalls against cyber-attacks, etc. Also many organisational emergency response strategies can be regarded as resistance strategies.

FIGURE 8. Resilience strategies model.

Reliability strategies aim to ensure that key functions, resources, information and infrastructure continue to be available, accessible and fit for purpose following an event. Whilst capability and performance may show some deterioration, it is expected to remain at an acceptable level, until recovery is completed. Again, reliability strategies are usually designed to only operate within expected parameters, and should those parameters be exceeded then resilience can collapse suddenly and catastrophically. Outputs of reliability strategies would include arrangements such as business continuity plans, multiple supplier contracts, multimode systems, etc.

Redundancy strategies provide for one or more alternatives to day to day operational approaches. With redundancy strategies in place the organisation may have some initial degradation of capability and

performance before alternative arrangements begin to operate and re-establish performance back to acceptable levels. Redundancy strategies cater for arrangements such as disaster recovery plans, process work-arounds, back-up systems, etc. Such strategies are usually designed to manage foreseeable volatility and can be fragile in circumstances where their design parameters are exceeded.

Resistance, reliability and redundancy strategies generally provide for the process and 'hard factors' described by the various models.

Flexibility strategies enable the organisation to adapt to extreme circumstances and sudden shocks that often exceed the design parameters for the other strategies. Flexibility strategies usually provide for some of the 'soft' factors, particularly those in the 'composite', 'attributional', 'herringbone' and 'triangle' models. Such strategies, either directly or through their influence on resistance, reliability and redundancy provide the organisation with the adaptive capacity to respond to a wide range of unforseen circumstances up to and including black swan events. Examples of such strategies include: training and exercising for extreme events, practising 'decision making in a vacuum[1]', creating an environment for emergent leadership to flourish in, enhancing cultural aspects such as trust, loyalty and unified purpose.

Conclusion

The models described in this paper describe both different and interrelated viewpoints of resilience. One other concept ties all resilience models together, the way in which the organisation approaches the management of disruption-related risk. Organisations that are striving for resilience have demonstrated their ability to better understand these risks as well as their own vulnerabilities. They have also shown their willingness to invest in risk treatments that have created adaptive capabilities to prevent, reduce, respond to and recover from the extremes of today's uncertainty. The application of tools such as the new risk management standard AS/NZS ISO31000 (Standards Australia 2009b) and the soon to be published AS/NZ 5050 will provide the foundation upon which better resilience can be built.

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[1] Decision-making in a vacuum, a key leadership skill in extreme events – being able to make rapid decisions and provide direction under conditions of high volatility and high ambiguity.

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