EXTREME WEATHER EVENTS AND BUSINESS CONTINUITY PLANNING

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ABSTRACT

There is now a broad scientific consensus that the global climate is changing in ways that are likely to have a profound impact on human society and the natural environment over the coming decades. The challenge for Facilities Mangers is to ensure that business continuity plans acknowledge the potential for such events and have contingencies in place to ensure that their organisation can recover from an extreme weather event in a timely fashion. This paper will review current literature/theories pertinent to extreme weather events and business continuity planning; will consider issues of risk; identify the key drivers that need to be considered by Facilities Managers in preparing contingency/disaster recover plans; and identify gaps in knowledge (understanding and toolkits) that need to be addressed. The paper will also briefly outline a 3 year research project underway in the UK to address the issues.

KEYWORDS: climate change; extreme weather events; business continuity planning; disaster recovery planning.

INTRODUCTION

A changing climate is one business driver that organisations have to consider as part of their strategic business planning. In developing business plans that address the market barriers; competitive advantage; and business opportunities that climate change may bring, they have to examine the impact that future weather events may have on their ability to deliver business outputs to key customers. Disruption to production (both physical and knowledge based) and distribution networks (physical infrastructure and communication networks), and the ability of organisations to cope with them has forced Facilities Managers (FMs) to examine their current approaches to business continuity planning (contingency planning and disaster recovery) in the light of the challenges that a changing climate may present. This paper will review these challenges and consider whether current approaches to contingency/disaster recovery planning provide a sound base for strategic facilities management decision making.

CLIMATE CHANGE - EXTREME WEATHER EVENTS

There is now a broad scientific consensus that the global climate is changing in ways that over the coming decades are likely to have a profound impact on human society and the natural environment. In the UK there is evidence that extreme weather events (EWEs) are increasing in frequency and severity (Ekstrom et al, 2005) with, over the last decade, the UK seeing significant increases in heavy rainfall (Fowler, 2003) resulting in both localised urban flooding and more widespread fluvial flooding. Indeed, in 2000 flood events resulted in £500M worth of insurance claims in the UK (RMS, 2000), and in 2004 managing flooding cost the UK £2.2 billion (OST, 2004). In addition to flooding the incidence of heat waves

(Good et al, 2006) and water resource drought (Blenkinsop & Fowler, 2008) are also projected to increase, particularly in the south of the UK, as climate models predict wetter winters and drier summers (Hulme et al, 2002) together with increases in temperature and thus evaporative losses throughout the year. Finally, strong storms in Europe have induced, during the last decades, severe human losses and extensive damage to properties. The great storm of October 15, 1987 caused €5M damage and killed 34 people in the UK and France. The Lothar and Martin storms in December 1999 caused €13.5M damage in Europe, killing 125 people (wikipedia, 2008). All of these provide challenges to FMs as they seek to quantify the risks and develop contingency/disaster recover plans to prepare for them.

VULNERABILITY, RESILIENCE AND ADAPTIVE CAPACITY

Vulnerability, resilience and adaptive capacity are concepts from the biophysical and social realms that are increasingly being applied to the understanding of the complex relationships between community's, the built environment, and the drivers that may affect change. Whilst there is considerable debate over the precise definitions of the terminology (Gallopin, 2006), in the context of this paper: vulnerability will be considered as the risk of a system to perturbations by external forces or hazards (EWEs) that are beyond the normal range of variability under which the system operates; resilience, as the ability of the system to cope with such forces or hazards and return to its normal operating status once the perturbations have been removed; and adaptive capacity, as the ability for a system to change to meet the new conditions bought about by perturbations that fundamentally change the system. This paper will consider these drivers in the context of business contingency/disaster recover planning.

EWEs - VULNERABILITY, RESILIENCE AND ADAPTIVE CAPACITY

Assessing the impact of EWEs on vulnerability, resilience and adaptive capacity at the national, regional and sectoral level has identified a range of contextual (e.g. physical, economic, climate scenarios etc) environments that are likely to exist in the future and has highlighted the weaknesses in existing knowledge sets and the decision-making processes required to ensure 'operation as normal'. Whilst a community's resilience to EWEs, is known to be largely determined by the strategic decisions taken before, during and after an event, many of the policies, guidance, codes and regulations, currently in place in the UK tend to be complex and difficult to apply consistently (Spence, 2004) and as such many individuals and businesses are unsure of where responsibilities lie (following an EWE) and where assistance (to recover) can be obtained (Crichton, 2006).

Assessing the impacts of EWEs at a local level is less well developed. Whilst it is generally accepted that a community's resilience and adaptive capacity is a complex association of behavioural characteristics between: households; businesses (particularly small and medium sized enterprises - SMEs); and local decision makers (politicians), the precise nature of these relationships is less well understood (Smit & Wandel, 2006). What is generally agreed is the need for each community to identify its own determinants of vulnerability and adaptive capacity rather than rely on generic assessments and 'preferred solutions' and to understand the sensitivities of these determinants to the wider political, social, economic and technological forces (Smit & Wandel, 2006).

The specific dynamics underpinning the ability of business organisations to adapt to climate change have been studied by Berkhout et al (2004). In essence Berkhout et al argued that organisations respond to signals about the impacts (actual or perceived) that an activity (EWEs) may have on their operations in the context of their own, and their competitors performance (vulnerability). If a threat/opportunity is perceived they apply existing solutions to address any impacts and, if successful, they continue as normal (resilience). Only if their interventions are unsuccessful do they invest effort to find 'new' solutions to the problems and seek evidence to measure their success (through feedback) (adaptive capacity). Based on this theory Berkhout et al developed a 4 stage decision-making framework based around:

- risk and opportunity analysis;
- strategy setting;
- implementation; and
- integration.

However, when evaluating the model against climate change scenarios Berkhout et al found that:

- organisation's found it difficult to recognise and interpret climate change stimuli;
- because of the weaknesses and ambiguities in climate change stimuli trial and error experimentation with existing operating procedures were unlikely to yield satisfactory results;
- organisation's found it difficult to assess the advantages and disadvantages of alternate adaptation strategies; and
- organisation's found it difficult to directly measure feedback on the impact that the adaptation has had on organisational value.

Similar findings to the above have been identified by other authors who found that: a lack of forward planning; lack of capital for recovery; ineffectual interactions with national agencies; infra-structure problems (Runyan, 2006); individual attitudes and organisational culture (Petts, 1998); access to expertise; and perceived exposure to risk (Yoshida & Deyle (2005) all contribute to a general inertia amongst organisations to consider continuity planning for EWEs and this must raise questions as to whether current approaches to business contingency/disaster recovery planning can really deliver increased resilience and enhanced adaptive capacity in response to vulnerabilities induced by climate change.

CONTINGENCY PLANNING FOR EXTREME EVENTS - SMEs

Probably the most significant study of SMEs reactions to EWEs was presented by Crichton (2006). Crichton found that whilst SMEs are considered the backbone of the UK economy, in terms of diversity, innovation and social cohesion, they are also the most vulnerable section of the UK economy to climate change impacts. Drawing on evidence from insurance claims, backed up by telephone interviews, Crichton found that (as a consequence of EWEs):

- the average cost of business disruption had risen by 60% between 2001 and 2005 to an average of £35,000 per claim and was set to rise at an even steeper rate in the years to come;
- the average interruption period had risen from 8 months in 1996 to 14 months in 2005;
- 70% of those SMEs currently in high flood risk areas were unconcerned of the potential impacts on there business, with 69% of SMEs having no form of business continuity plan in place;

- 90% of SMEs were under insured (when measured against insurance industry expectations) with less than 33% having business interruption cover to pay wages whilst the business is out of operation.

Conversely Crichton found that, whilst 75% of SMEs did not connect climate change with a threat to their business, many were beginning to take actions to address specific threats posed by EWEs. Fifty one percent were reviewing their insurance cover; 50% were encouraging home or flexible working; 43% were reviewing weather related risks; 32% were seeking advice from government bodies; and 25% were considering relocation. However, what was unclear from Crichton's work was whether these actions were ad-hoc responses to single stimuli (e.g. reactions to situations that had occurred, or had occurred to close competitors) or a general reaction to the wider climate change debate. Given the small number of SMEs with formal business continuity plans, the former is probably more likely than the latter, and indicative of a reactive rather than proactive approach to the issues. Whilst such a position might be understandable, it is unlikely that it will provide the basis for improved resilience or the enhancement of adaptive capacity in the short to medium term.

COPING WITH EWEs – THE CHALLENGE TO ORGANISATIONS

Business continuity planning in the face of extreme events is not a new phenomenon. Indeed business contingency planning and the development of specific disaster recovery plans forms part of the day to day work of those with strategic responsibility for an organisation's support facilities. The process of developing a plan normally involves (Savage, 2002):

- the development of business risk and impact models;
- documenting activities prior to an event;
- identifying activities for the disaster recovery phase;
- identifying activities for the business recovery phase;
- testing and auditing the business recovery phase;
- training of staff;
- updating the plan.

However, whilst most of the above address disruptions caused to an organisation or its physical assets by a single focussed event (e.g. power loss, fire etc), they do not generally consider the implications of wide scale disruption to service. Such a situation not only causes problems for individual organisations but also for the supply chain on which they may rely on for their day-to-day operations and/or recovery following an event. Indeed it is these types of events (e.g. fluvial and localised flooding; prolonged periods of extremely hot weather; severe storms and tornadoes etc) that EWEs are likely to produce (in the UK). This must raise the question as to whether plans developed to cope with localised disruption to business can prepare an organisation for the more wide scale disruption associated with EWEs.

Assessing Organisational Vulnerabilities To EWEs

In essence an organisation's vulnerability to EWEs is the risk that it will fail to recover from the event. However, very little information exists to support the risk assessment process. Measuring the exposure of an organisation to an EWE requires not only an idea of what type of events may occur in the future (which we have got in part through the work of the IPCC and UKCIP) but the likely severity of the event(s) and the probability that it/they will occur.

At present this information is unavailable in the UK (although it should form part of the UKCIP 2008 Climate Change Scenarios).

Given that an assessment of the likelihood of an EWE can be made, an organisation then has to assess the potential impact of an event on their market. In making this assessment an organisation will need to consider the extent to which:

- regular customers may be affected by the same EWE;
    - will they be affected for longer or less time than your organisation?
    - is your organisation part of their recovery process?
    - if they loose their market how will it affect your organisation?
- those not affected by the EWE will switch to alternative suppliers
    - how long does your organisation have before a customer switches?
    - if customers do switch how easy will it be to win them back?
- an EWE that does not have a direct physical effect on your organisation (e.g. major flooding has occurred but your organisations premises are not directly affected) may cause disruption to your supply/distribution chains.
    - do your critical suppliers have robust plans in place for their recovery?
    - does your organisations have alternate suppliers?
    - how robust is your distribution network (physical and digital)?

In addition to the general market drivers outlined above, an organisation will also need to assess the potential vulnerability of its physical and humans assets. Whilst many of the physical issues are well known (e.g. structural damage to buildings; operational damage to building sub-systems; damage to fixtures and fittings etc) from other disruptive events (e.g. fire) others are less clear. Again, the problem is one of scope. An EWE is likely to affect a large geographical area and as such many organisations will be in a similar position (i.e. seeking to get back to full operation as quickly as possible) and the supply chain on which everyone relies may well be over stretched (or indeed trying to recover from the event itself). As such, even when the immediate problems associated with the EWE have passed, an organisation may find itself waiting in line for the services it requires to get back to full operation. With regards to an organisation's human assets: disruption to local infra-structure, both physical (e.g. transport) and social (e.g. schools) may pose problems for employees attending their place of work; whilst exposure to prolonged heat stress (in particular lack of sleep) may have a general impact on employee productivity and cause unacceptable levels of mistakes amongst knowledge workers.

Assessing/Enhancing Organisational Resilience

An organisation's resilience is its ability to continue working during, and recover following, an EWE. As discussed earlier resilience is very specific to the particular circumstances (both physical and business) that an organisation faces and as such making generalisations about the factors that affect it is difficult. However, in assessing resilience an organisation may need to consider: the strength of relationships with key customers and suppliers, and particularly the procedures in place to manage expectations during the period of disruption; alternative working practices and the infra-structure that may be needed to support them; critical points in the supply and distribution chains and the extent to which these can be mitigated by redundancy (in suppliers and systems); the contingency plans of key suppliers and distribution systems, particularly digital networks outside the organisation's direct control; and the timescale for recover, including quick access to those organisation's critical to this process.

Building Adaptive Capacity (Climate Proofing)

In its broadest sense adaptive capacity is the ability of a system to respond to changed circumstances: in the context of an organisation it is the ability to change its existing practices to meet the challenges/opportunities posed by climate change. In assessing adaptive capacity (in the context of EWEs) an organisation needs to consider what actions it can take prior to an event (in addition to assessing vulnerability and resilience) to ensure that it can continue to operate through the event and take advantage of market opportunities following the event. In particular organisations need to examine the trade-offs between: protection of their physical assets against increased construction/maintenance costs; redundancy in systems (e.g. off-site storage of data, multiple office locations etc) against increased operating costs; the purchase of mitigation measures (e.g. sand bags, portable air conditioning units etc) against the storage costs; the relocation of key building systems and services in existing buildings (e.g. power distribution moved above flood level) and refurbishment with resilient fixtures and fittings against relocation out of an affected area; and devolved rather than centralised working spaces. These pose new challenges to FMs.

THE CHALLENGE TO FACILITIES MANAGERS

Integrating climate change scenarios, and particularly EWEs, into contingency/disaster recovery planning is a new challenge facing many FMs. Whilst some larger organisations have begun to develop integrated business continuity plans many SMEs fail to see the importance of these to their organisation. They are generally unconvinced about the whole area of business continuity planning; see no compelling reason, or return on investment incentives, to engage in business continuity planning; believe that 'an event won't happen to them'; and are unprepared to admit vulnerabilities that a competitor may seize on (Wilson, 2007). However, against this background the UK Government (BCI, 2007) and insurance industry are trying to raise awareness of EWEs and have developed a range of toolkits and business guides (AXA, 2007a; AXA 2007b) to help SMEs develop business continuity plans. However, whilst these guides provide general advice on what is needed, they do not explain how to assess the specific risks to an organisation of climate change and EWEs. This is left ostensibly to the senior management within the SME organisation. In general such people are too busy dealing with the day-to-day problems associated with running the business to find the time to seriously engage in meaningful continuity planning for events that may never happen. This I believe is where FM consultants could play an important role.

The biggest challenge to those trying to develop business continuity plans for EWEs is quantifying the risks of an event occurring and the potential impact that such an event may have on the support services an organisation requires in order to perform their primary function. In 2008 the UK climate Impact Programme will release a new set of climate change scenarios that will provide a probabilistic estimate of the likelihood of an EWE occurring anywhere within the UK (based on a 25km square grid) along with a weather generator that will provide future daily and hourly weather predictions for any 5km square grid (UKCIP, 2008). This should allow FMs to develop specific climate change and EWE scenarios for organisations which coupled an assessment of how such events may affect the physical and business infra-structure will allow them to assess their risk exposure and plan mitigation and intervention strategies. The development of the scenarios; the impacts that they may have on the physical and business infra-structure; and the integration of these in business continuity

planning forms one part of a major new study into community resilience underway in the UK. The study uses an action research approach to develop a range of toolkits which will be evaluated in the field and modified in the light of feedback from the SME community. The study should produce a greater understanding of business resilience and a range of business toolkits that allow FMs to assess the potential impacts of EWEs on their, or their clients, business.

CONCLUSIONS

Whilst contingency and disaster recovery planning are not new to FMs, the author would argue that current approaches are too narrow in scope to be effective in the light of EWEs. What is needed is a broader view of EWEs and of the types of contingency that are effective in ensuring 'business as usual' both during and following an event. Robust mechanisms for the quantifiable assessment of the likelihood of an event; business focussed toolkits that assess the potential impact of such an event on an organisation and its supply/distribution chains; contingency plans that consider the soft human resources response to EWEs as well as the hard physical infra-structure; continuity plans that support temporary working solutions, either through re-location or mitigation measures; and climate proofing that takes a holistic view of the EWE and market position are all required if SMEs are to improved their resilience and adaptive capacity. The author would ague that the majority of the above are currently missing from the contingency/disaster recovery plans of most SMEs in the UK. As such they will become increasing vulnerable to EWEs with many failing to recover following an event. This in turn will have a major impact on community resilience.

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