PRELIMINARY OBSERVATIONS OF THE IMPACTS THE 22 FEBRUARY CHRISTCHURCH EARTHQUAKE HAD ON ORGANISATIONS AND THE ECONOMY: A REPORT FROM THE FIELD (22 FEBRUARY – 22 MARCH 2011)

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SUMMARY

On 22 February 2011, Canterbury and its largest city Christchurch experienced its second major earthquake within six months. The region is facing major economic and organisational challenges in the aftermath of these events. Approximately 25% of all buildings in the Christchurch CBD have been "red tagged" or deemed unsafe to enter. The New Zealand Treasury estimates that the combined cost of the February earthquake and the September earthquake is approximately NZ$15 billion [2]. This paper examines the national and regional economic climate prior to the event, discusses the immediate economic implications of this event, and the challenges and opportunities faced by organisations affected by this event. In order to facilitate recovery of the Christchurch area, organisations must adjust to a new norm; finding ways not only to continue functioning, but to grow in the months and years following these earthquakes. Some organisations relocated within days to areas that have been less affected by the earthquakes. Others are taking advantage of government subsidised aid packages to help retain their employees until they can make long-term decisions about the future of their organisation. This paper is framed as a "report from the field" in order to provide insight into the early recovery scenario as it applies to organisations affected by the February 2011 earthquake. It is intended both to inform and facilitate discussion about how organisations can and should pursue recovery in Canterbury, and how organisations can become more resilient in the face of the next crisis.

INTRODUCTION

Canterbury businesses are facing a very challenging post-earthquake recovery climate. At 12:51pm on 22 February, Christchurch was shaken by a shallow M_w 6.3 earthquake centred approximately 10 km south-east of the Christchurch Central Business District (CBD) resulting in significant impacts on people, buildings, and infrastructure. This event came at a time when the region's businesses were still struggling to recover from the M_w 7.1 earthquake which hit on 4 September, 2010 (shown in Figure 1) [3]. Prior to these earthquakes, Christchurch had experienced relatively low seismicity during the previous 100 years.

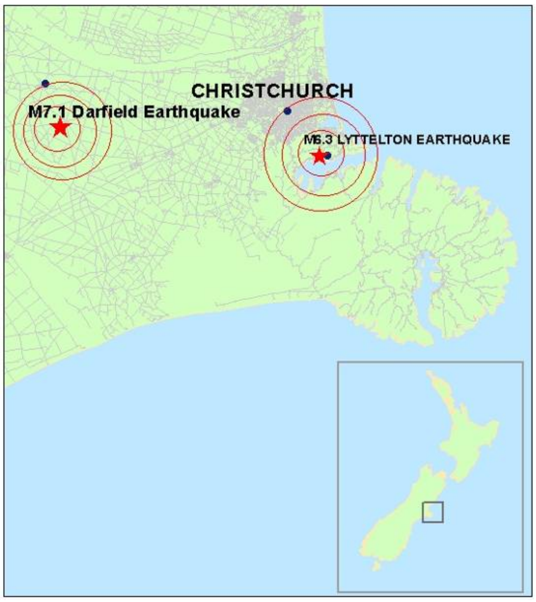

Figure 1: Earthquake epicentres.

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The 22 February event had a vastly different character to that of the 4 September earthquake. The 4 September earthquake epicentre was located 40 km west of Christchurch, at a depth of 11 km, whereas the 22 February earthquake epicentre was much closer to central Christchurch and at a depth of only 5 km. The energy release from the 22 February fault rupture was also highly directional; the horizontal East-West shaking effectively "pointed" at Christchurch. The M_w 6.3 earthquake produced peak ground accelerations in the Christchurch CBD that were 2.5 times greater than the accelerations felt during the M_w 7.1 September earthquake [4]. Peak ground accelerations experienced within the Christchurch CBD were 50% greater than the design loadings for new buildings in Christchurch and the shaking exceeded the 500 year design displacement spectra [5].

In the September earthquake there was shaking damage and serious but localised liquefaction damage. Many buildings that received "green tags" (deemed safe to enter) after the 4 September earthquake, exhibited complete or partial structural failure during the 22 February event causing a major loss of life (over 180 people were killed) [6]. Liquefaction caused by the February event was also three to five times worse [7]. Utility outages and road and property damage caused by liquefaction throughout the Christchurch area caused the voluntary evacuation of tens of thousands of people from the city in the weeks following the earthquake on a scale that was not seen following the September earthquake.

Organisations in the region had been pursuing their recovery from the 4 September event for nearly five months, despite ongoing aftershocks and a challenging economic climate. For many organisations, the 22 February earthquake has effectively reset the clock on the recovery timeline; in many cases causing damage and disruption far beyond what was seen following the M_w 7.1 earthquake. Many organisations have applied lessons learned from the 4 September event and are proactively finding avenues for business continuity immediately following the February earthquake. Others are questioning the long-term viability of their organisation in this new post-earthquake landscape. This paper presents a preliminary analysis impacts on organisations and the local and national economy, as well as a discussion of how organisations are finding ways to continue operating and prosper in a post-disaster environment. The paper will focus specifically on the impacts that manifested in the month (22 February to 22 March, 2011) following the earthquake, in order to provide a detailed short term snap-shot of the economic impacts.

LITERATURE REVIEW

In order for a community to recover following a disaster event, households, infrastructure, and businesses need to rebuild simultaneously [8, 9]. Without a healthy recovering economy there is less incentive for residents to return or new businesses to invest in a disaster affected area [10-12]. As stated by Alesch and Holly [13] in their summary of business survival and recovery following extreme events, "The best advice for recovery is not to need it." In other words, resilient organisations and communities are able to resist the impacts of a disaster and adapt to new circumstances that unfold as a result of the event. However, in order to improve the resilience of organisations it is necessary to understand how organisations and the economy are affected by and respond to disasters.

Although it is generally agreed that disaster may have devastating impacts on individual organisations, there is an ongoing debate over whether disasters can have a positive influence on the wider economy of an affected region. Case studies and post-disaster economic models have indicated that often regions or sectors of the economy experience long-term macro- and regional benefits following a disaster. Cohen [14] found that the overall economic benefits to natural resource based communities caused by the Exxon Valdez Oil Spill to South-central Alaska was enough to compensate for the seriously negatively impacted fishing industry at a regional economic level of analysis. In the years following 1989 Hurricane Hugo, the state of South Carolina experienced increased activity in the retail and construction sectors, essentially offsetting much of the wealth lost due the hurricane [15].

For some disasters however, regional and sectoral economic impacts are often shown to have an overall negative effect. Chang's [16] analysis of the Port of Kobe's long-term traffic loss following the Great Hanshin earthquake in 1995, demonstrated that long-term decline can be experienced by particular sectors and particular organisations as a result of a major crisis. Similarly, Johnston *et al.* [17] report major regional losses (approximately NZ$100 million) in the alpine tourism sector as a direct result of the forced closure of ski fields caused by the 1995-96 eruption of Mt. Ruapehu in the central North Island of New Zealand.

Studies that have examined the implications of disasters for individual organisations, find that organisations prepare for and respond to crises with varying degrees of success. Tierney [12] concludes that in the long-term businesses tend to return to pre-disaster levels of financial performance. Tierney [12] also notes that more than a year after the Midwest floods, the Northridge earthquake, and Hurricane Andrew comparable numbers of businesses reported being better off to those reporting being worse off.

In the literature predictors of poor organisational recovery post-disaster include: smaller businesses; businesses that rely on discretionary spend; businesses that own rather than rent; and businesses that sustain more structural damage [18-21]. In their study of business recovery following the 2007 Gisborne earthquake, Powell and Harding [21], found that in this event there was no evidence to suggest that smaller organisations were at a disadvantage during recovery. Powell and Harding [21] also found that often a business's own "poor managerial decisions", such as underinsuring the business or delaying strengthening the property to the current building code, were the greatest barriers to their resilience. It is important to note that businesses should not equate recovery with returning to pre-disaster conditions. Alesch, Holly *et al.* [10] discuss that businesses must consciously adjust to new post-disaster circumstances and that it is important for organisations to objectively assess whether operations can or should continue in their current form. It may be advisable for organisations to temporarily or permanently cease operation or enter a new line of business [10]. Some changes that are forced by post-disaster circumstances, such as relocations, are often perceived as very disruptive to an organisation's ability to succeed post-disaster. For example, Wasileski, Rodríguez et al. [22] found that of the businesses in Santa Cruz County, California that relocated following the Loma Prieta earthquake, 50% felt that relocation was 'bad' or 'very bad' for business. Research shows, however, that organisations who anticipate and prepare for possible disruption and find ways to adapt to the dynamic environment around them will be more successful in post-disaster environments [23]. More research needs to be done to understand how disasters affect the economy and organisations following a disaster, and how this manifests in a specifically New Zealand context, as well as what can make organisations of any size and across sectors more resilient to crises in the future.

PHYSICAL IMPACTS OF 22 FEB. EARTHQUAKE

Christchurch City and CBD

The Christchurch CBD suffered extensive structural and infrastructural damage as a result of the February earthquake. As during the September event, unreinforced masonry (URM) buildings performed poorly throughout the city, with about 62% of all URM buildings in the Christchurch CBD receiving red-tags as part of the initial assessment [24]. As of 22 March 2011, level 1 "tri-colour placard tagging" [5 p.3] was completed for the entirety of the CBD, excluding three restricted areas around buildings that were deemed too dangerous to continue working around. The results of the tagging process are as seen in Table 1.

Table 1: Level 1 tagging assessment outcomes for Christchurch CBD.

Level 1 Assessment (Tagging)	Number	Percentage
Red	826	23%
Yellow	862	24 %
Green	1933	53 %

As the tagging process only gives a preliminary assessment of building safety, more in-depth structural assessments of CBD buildings were underway at the end of March [5].

Heavily guarded cordons were placed around the central city the day of the 22 February earthquake. Approximately two weeks after the event, residents and businesses owners were gradually being allowed back into the city, but many cordons remain in place as buildings wait to be assessed or demolished. The majority of buildings within this cordon are non-residential businesses, including the retail and tourism heart of the city.

Businesses may also have restricted access caused by damage to neighbouring buildings, even if their premises are structurally sound. This was a prominent issue following the 4 September earthquake as well. A survey of over 300 businesses conducted by Kachali *et al.* [25] following the 4 September earthquake, found that "damage to or closure of nearby or adjacent" buildings to be one of the most commonly cited disruptions to an organisation's ability to do business. Due to the danger presented by unstable buildings and damaged infrastructure it is estimated that it will take over six months for the central city to be fully "opened" to the public [26].

Pervasive infrastructure damage was also an ongoing challenge for the city. Critical services were restored gradually to the wider Christchurch area, as seen in Table **2**, but the much of the service within the cordon remained off for the entire month following the earthquake [27].

Table 2: Percent of occupied households with service in Christchurch area.

	1 day after event	1 week after event	1 month after event
Electricity	60%	80%	99%
Water	50%	66%	95%
Wastewater	40-50%	50-60%	80%

Approximately, 50% of the city was without water for the first days following the earthquake; more than a third of households were without water for over a week [28]. A month on from 22 February, over 95% of occupied units (outside of the cordoned Christchurch CBD) had water, however a boil order was still in-place for most of the city due to potential contamination caused by severe damage to the wastewater system. The city relied heavily on a "temporary sewage service" facilitated by chemical and portable toilets to supplement the fractured and fragile wastewater system [27]. Electricity was restored to approximately 75% of their households by 24 February; 80% by 26 February [29].

Lyttelton

The port town of Lyttelton, located approximately 10 km southeast of central Christchurch, was effectively the epicentre of the 22 February earthquake. Approximately 60% of buildings on the main street of Lyttelton experienced some level of structural damage [30]. The Lyttelton Tunnel, the primary link between Christchurch and Lyttelton, was closed for several days when rock falls caused significant damage to the tunnel canopy and control building. Both lanes of the tunnel were reopened for residents of Lyttelton six days after the quake. The navy frigate Canterbury had been docked at Lyttelton when the earthquake struck and in the aftermath acted as a main hub of distribution for food and supplies in the initial days following the earthquake and helped keep Lyttelton operational [31].

The Lyttelton Port of Christchurch (LPC), one of the major economic drivers of the Lyttelton economy and the main port for the Canterbury region, had already sustained approximately NZ$50 million of damage and business interruption from the September earthquake. This figure is expected to increase significantly due to temporary forced closure and pending a full assessment of port infrastructure [32]. The LPC was able to ensure that preliminary assessments were completed quickly with core services at the Port, including receiving cargo ships, functioning within 96 hours of the February earthquake [33]. However, LPC did issue Solid Energy Ltd, the state-owned coal mining company, with a force majeure notice, a statement that demonstrates that forces beyond the company's control may render the company to be unable of performing contracted services. The ability to quickly resume operations at the LPC despite damage, however, has helped prevent supply shortages or delays of any goods throughout the affected areas [34].

Eastern Suburbs

The eastern suburbs of Sumner, New Brighton, Mt. Pleasant, Bexley, Avonside and Dallington, shown in Figure 2 experienced some of the worst damage from the 22 February event, including severe liquefaction, landslips, and rock falls.

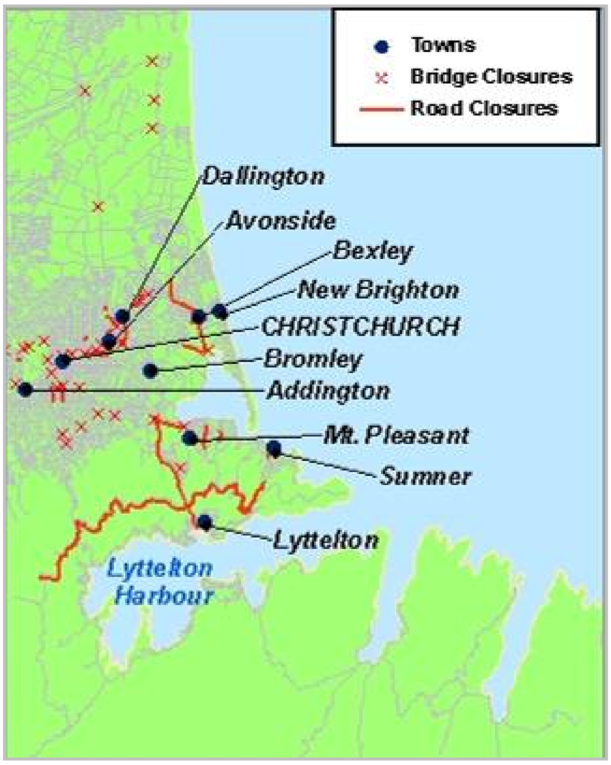

Figure 2: Some of the towns and suburbs affected by the 22 February earthquake.

Every café and restaurant in Sumner, a coastal town approximately 12 km southeast of central Christchurch, was forced to close while water utilities in some areas of Sumner were disrupted for a more than two weeks [35]. Access to Sumner has been limited due to the unstable hillsides alongside roadways and the closure and subsequent weight restrictions on the Ferrymead Bridge. The beaches in Sumner were contaminated by releases of sewerage near swimming areas, removing the major attraction for residents from other suburbs in Christchurch to visit during the summer months.

On 26 February, 23 properties in the suburb of Mt. Pleasant, located in the Port Hills that separate Lyttelton from Christchurch, were evacuated due to dangers from rock falls and landslips [36]. Evacuations also took place on the Sumner hills on 26 February.

Areas in the riverside suburbs of Avonside and Dallington were badly damaged in both the 4 September and the 22 February events. There are ongoing debates over whether will it will be necessary to reconstruct, abandon, or re-plan severely damaged areas [37].

Pre-event Economic Climate

The February earthquake occurred against a backdrop of high commodity prices, weak consumer spending, and ongoing contraction of the economy, in part, fuelled by the effects of the September 2010 earthquake [38]. The economic boost predicted to accompany the reconstruction around Christchurch from the September earthquake was slow to take effect as reconstruction had not started by February. The Treasury estimated that the economy did not grow at all in the last quarter of 2010, and by the end of last year the economy had grown just 0.5% [38].

The retail environment in late 2010 and early 2011 was weaker than previous years. Households and organisations were purchasing less and those customers that were shopping were spending less than previous years [39, 40]. This is due to a number of reasons that include increased household saving, the 4 September earthquake and ongoing droughts in both the North and South Island. This was felt most acutely at Christmas time, which usually provides a needed boost to the economy. Retail spending, however, was 1.2% less in December than the previous month [41]. Post-Christmas sales were also curtailed by an M_w 4.9 aftershock on Boxing Day. This aftershock caused temporary utility outages and seriously damaged at least 20 buildings and the temporary evacuation of key shopping areas within the CBD [42].

As of early February 2011, national unemployment was sitting at 6.8% with little indication of change expected in the first half of 2011. However, recovery work may begin to have a positive influence on employment in 2012 [38]. From 2012, the combined recovery from the September and February earthquakes is expected to produce a sizeable increase in residential, commercial and infrastructure investment, which is likely to raise property prices and rent. This regional and national improvement will be assisted by an improving yet risky global economic climate [43]. For example, there are fears that New Zealand's fourth largest trading partner, Japan, will enter a major recession following the 11 March M_w 9.0 earthquake, tsunami, and resultant nuclear crisis. This will have widespread negative effects on New Zealand exports to and imports from Japan and Japanese tourism in New Zealand [44]. Similarly, instability in the Middle East may have implications for already rising global oil prices.

NATIONAL AND REGIONAL ECONOMIC IMPACTS

There have been immediate financial repercussions of the 22 February event both regionally and nationally. The Treasury estimates that the February earthquake will at least triple the estimated NZ$5 billion bill for the September earthquake [45]. The direct cost to the New Zealand Government is estimated to be at least NZ$3 billion and this number will likely grow as the extent of the damage becomes apparent [46]. The Canterbury region accounts for approximately 15% of the New Zealand economy and the interrupted economic activity and reduced capacity due to the February earthquake will decrease New Zealand GDP in 2011 [43]. The New Zealand Finance Minister warned that the forecasted NZ$11 billion budget deficit for 2011 will rise as the Government absorbs the cost of earthquake recovery [45].

The New Zealand Institute of Economic Research (NZIER) had previously been cautiously predicting an economic recovery from the 2009-2010 recession and impact of the September earthquake. Following the 22 February event, NZIER revised down their 2011 national economic growth forecast from 2.3 % to 0.3% [47]. A predicted decreased productive capacity in Canterbury as a result of the damage to and interruption of businesses means a daily lost production, "equivalent to 0.1 per cent of national quarterly GDP" [47].

Regionally, retail sales also took an initial hit. A press release delivered by Paymark, New Zealand's largest electronic payment provider, reported an almost 50% spending drop in the Christchurch during the five days following the 22 February earthquake [47]. These numbers rapidly recovered in areas where businesses were able to reopen.

Lost productivity, reduced retail spending and potential decreased business presence in Canterbury will also result in lower tax revenues over several years for the National Government [48]. The Government will pursue partial asset sales, increased national borrowing and spending cuts to help pay for rebuilding Christchurch [49]. Accounting for these actions, the Government projects that Canterbury's recovery is manageable in the context of the Government's 5 year revenue base [50].

Despite the impact on the national economy, NZIER asserted that it is in the Government's best interest to invest in Canterbury's recovery by offering welfare assistance to households and businesses while also considering a "one-off levy" paid by all New Zealanders in order to ensure a rapid recovery of Canterbury's economy [47]. This short-term investment in Christchurch's reconstruction, will decrease the potential long-term costs of business failures and permanent residential and business locations [51].

Acknowledging the length of the recovery process and the need to improve coordination of the recovery effort, the Government created a stand-alone department, known as the Canterbury Earthquake Authority (CERA) following the 22 February earthquake, which is intended to operate for five years. CERA is designed to coordinate the recovery and rebuilding process and will also have the authority to "relax, suspend or extend law and regulations to allow faster decision making on key aspects of the rebuild," [52].

CHALLENGES FOR BUSINESSES

Some organisations that were already struggling to recover from the recession and the aftermath of the September 2010 earthquake may not survive the 22 February earthquake, while others may find opportunities in the post-disaster environment that help them prosper in the years to come. In this post-disaster environment, businesses need to find ways to overcome a range of obstacles including: business interruption, restricted access to their sites, changes in customer flow and behaviour, and helping staff cope and retain productivity.

Forward planning and forecasting future demand for some goods and services is particularly challenging in an unpredictable post-disaster economic environment. This was seen in the building sector following the September earthquake. The massive building boom that was predicted following the September event unfolded more slowly than originally predicted, leaving some companies over staffed and over supplied with nothing to do [25].

Following the February event, some organisations have been forced to close their premises due to damage and make redundancies. For example, Canterbury Spinners yarn manufacturing operation in the hard-hit area of Bromley have been forced to make approximately 195 staff redundant due to severe facility damage while they rebuild [53]. New Zealand Manufacturers and Exporters Association (NZMEA) Survey of Business Conditions completed during March 2011 reported total sales in the manufacturing and exporting sectors in February 2011 were down 13% (export sales decreased by 26% with domestic sales decreasing 5%) on February 2010, however market confidence has remained strong in these sectors and most organisations were projected to compensate for production delays by April 2011 [54].

Lessons can be drawn from the September earthquake, which had similar (though smaller scale) initial financial impacts such as decreased retail spending and some decreased productivity. A survey of 376 businesses around Canterbury following the 4 September earthquake (November 2010 – February 2011) conducted by researchers from the University of Canterbury and Resilient Organisations, found that, at the time of surveying a large majority of respondents (91%) had not made any staff redundant and approximately 27% of organisations had hired additional staff [25, 55].

Whitman *et al.* [55] found that a majority (62%) of organisations experienced "no change" to their revenue following the 4 September earthquake. However, of those that did report a revenue change a majority experienced revenue decreases (77%). Organisations were split on how long they expected these revenue changes (positive or negative) to last for their organisation, 55% thought the effects would end before 30 September 2011, with 38% of organisations reporting that the effect on their revenue had ended within a month of the earthquake [55].

Business Access

Building and infrastructure damage have made parts of Christchurch completely inaccessible following the 22 February earthquake. Approximately 75 square blocks of the Christchurch CBD were cordoned off for the month following the earthquake, and there is little indication as to how long some of the cordons will remain in place. As of 1 March, 2011 about 50,000 people were unable to go to work in the CBD [51]. The cordons, which consist of high fences and barriers guarded by military and security personnel, were erected immediately following the 22 February earthquake to protect the safety of the public and to facilitate the rescue and response operations within the city. The original cordon was bound by the four avenues: Deans Ave., Moorehouse Ave., Fitzgerald Ave., and Bealey Ave., indicated by the larger (dark-green) boundary indicated on the map in Figure 3.

Business inside the cordon is on hiatus until access is granted to both business owners and the general populace. As organisations look for options to continue operation, many that evacuated the cordoned area on 22 February found it difficult to relocate and continue businesses without first retrieving computers, servers, files, and stock from their buildings. On 6 March, approximately two weeks after the earthquake, businesses located in Zones 1-4 indicated in Figure 3 were progressively and temporarily given access to their buildings [1]. Business owners in Christchurch wanting access to the badly-damaged red zone, however, were required to register at the Recover Canterbury website (www.recovercanterbury.co.nz). Progressive access to buildings deemed safe to enter in the red zone began 14 March [56].

In badly damaged buildings, there is concern about retrieving critical supplies before buildings are demolished. Frustrations over a lack of access and a perceived lack of communication about when access would be granted, and buildings being demolished without owner consent sparked a protest led by business owners in the CBD, on 21 March. This protest led to a temporary moratorium on building demolitions while these issues were worked through [57]. Officials are finding it difficult to balance issues of safety, comprehensive planning, and the need to engage stakeholders in the recovery of the CBD with the imperative demand to move quickly to retain viable businesses and reduce the direct and indirect costs of a prolonged closure.

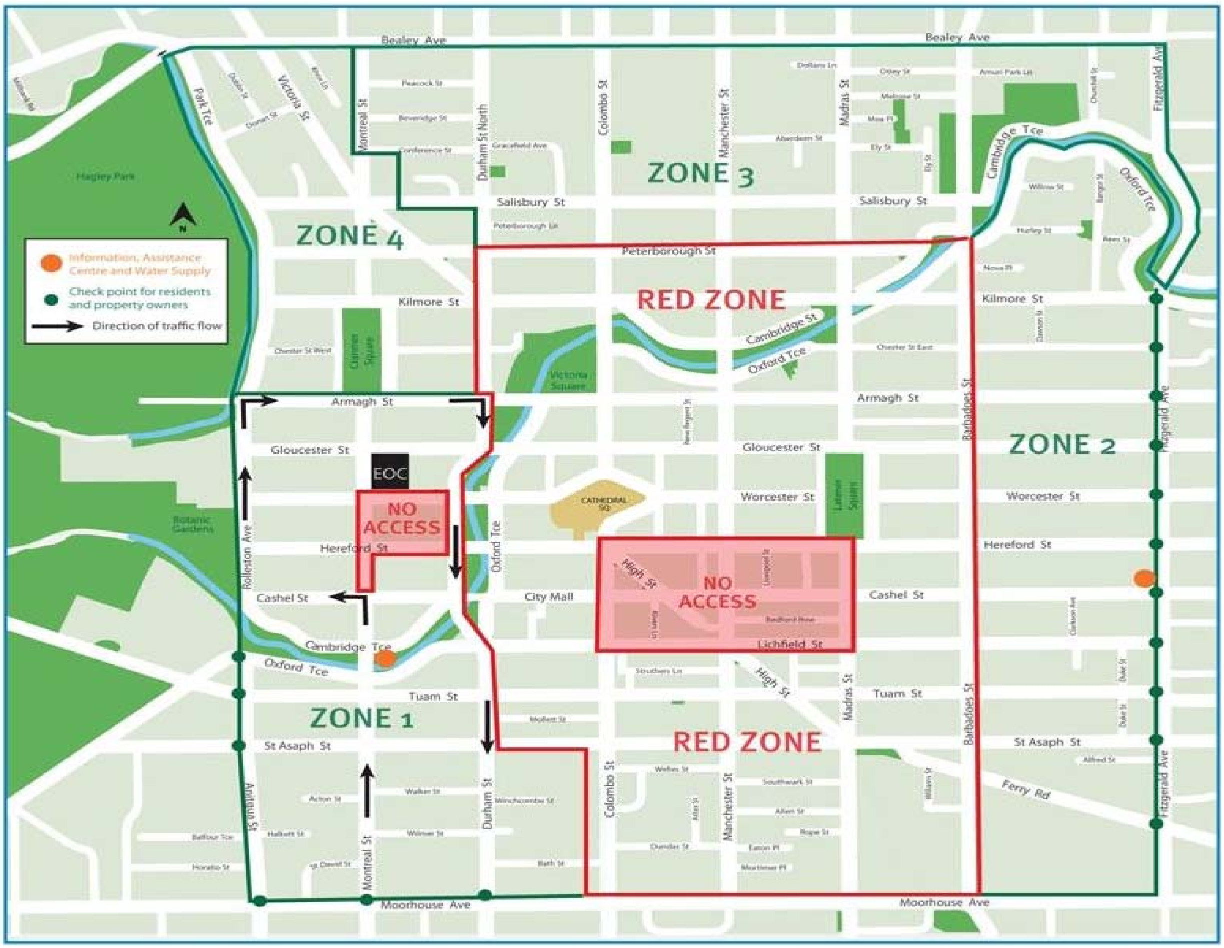

Figure 3: Christchurch Central Business District Cordon, map from Canterbury Business Recovery (CBR) report [1] by the 22 February earthquake.

Businesses outside of the cordons have also been affected by restricted access. Over 40 roads, road sections, and bridges, indicated in Figure 3 were shut for more than two weeks following the earthquake. Main routes into badly affected coastal suburbs New Brighton and Sumner were restricted throughout March to residents and authorized personnel, making it impossible for many customers to reach businesses that were attempting to remain open in these areas.

Issues caused by restricted facility access have extended beyond the CBD. For example, food and fuel supply deliveries were slowed following the 22 February 'quake, due to lack of access at the Port of Lyttelton. They were able to temporarily redirect shipments through PrimePort Timaru, approximately 160 km south of Christchurch, while the Port of Lyttelton was assessed [58].

Waiting for structural assessment following an earthquake was another factor that delayed reopening for some businesses. For example, the University of Canterbury was closed for three weeks following the February event, and used temporary facilities to conduct lectures and accommodate staff until buildings were cleared by a five-stage assessment process which took several months. Though 60% of buildings on the University's campuses had been assessed by the end of the third week, the University was required to arrange temporary teaching facilities in tents and portacom buildings.

Lifeline Interruptions

Lifeline disruptions have wide ranging effects on organisation operations. There was a major disruption to the electricity supply for the first week following the earthquake, and the electricity network will remain fragile in the Christchurch region for some time, due to ongoing ground movement, exposure, and the large amount of construction and infrastructure work that may disrupt services [24]. Though organisations such as hospitals and telecommunication organisations make provisions for back up electricity in the case of a prolonged outage, very few small businesses are equipped to handle electricity outages and were required to close while services were restored. In New Brighton, and other areas where power was out for several days, cafes, restaurants and dairies were forced to throw out thousands of dollars worth of stock, due to an inability to refrigerate perishable goods [59].

Organisations that rely on water as part of their service, such as hair salons, were unable to provide customers with services [59]. Similarly, the Lion Nathan brewery located in the Christchurch CBD brewery was unable to test their equipment to assess the level of damage without the return of their water and power supplies, making it difficult for the company to plan for repairs [60].

Where water services had returned, a city wide water boiling order was put into effect immediately following the earthquake, and remains in place weeks later. Businesses involved in food preparation are at a particular disadvantage as the water boil order can decrease efficiency and increase operating costs. Sewage breakages compromised sanitation for organisations, including causing ongoing issues with water supply contamination. These issues were especially troubling for organisations in the health industry that have had to make special provisions to ensure a constant supply of clean water.

Transport roots are also critical lifelines that organisations rely on for access to customers and suppliers. Bus service were non-operational for approximately a week after the earthquake, and with the main bus exchange located with the CBD cordon buses were still running at a limited capacity a month after the earthquake. Roads and bridges were severely damaged throughout the Christchurch area, and due to the closure of the CBD traffic that normal flows through the city has been redirected to the arterial roads surrounding the city meaning levels traffic congestion previously unseen in Christchurch.

Following the September earthquake infrastructure damage was estimated at approximately NZ$1 billion [61]. This estimate did not include lost income from business interruptions and decreased efficiency of operations caused by changes to lifeline services. Direct damage to lifelines across all categories was much greater following the February event, as were losses from business interruptions caused by lifeline disruption.

Business Relocation

Availability of business premises for organisations relocating following the 22 February earthquake is limited. The Property Council reports that relocation demand is much higher following the February event than the September earthquake due to the larger number of buildings damaged or inaccessible and a widespread concern among employers and staff about repopulating high-rise buildings [62]. Due to heightened demand on the available buildings, many areas offering commercial accommodation greatly increased prices. Organisations that have found new premises are, in many cases, only being offered standard long-term leases terms of four or more years.

The Canterbury Employer's Chamber of Commerce (CECC) appointed a coordinator to identify spare commercial accommodation, and help place organisations attempting to relocate. The CECC is also exploring options for temporary portable offices, and locations for portable business accommodation in clusters around the city [63].

Businesses with emergency relocation plans were able to activate temporary relocation plans quickly to maintain business continuity. For example, the business services firm BDO New Zealand Ltd. was able to relocate from their office in the Christchurch CBD to a new location in Addington west of the city in just over two weeks following the 22 February earthquake [64]. Similarly, Holmes Consulting Group, a structural and civil engineering firm relocated within a day from their office located in the Christchurch CBD to a warehouse also owned by the company, ensuring that the company continued functioning at full capacity and that the city could immediately commence building assessments [65]. Telecom NZ, New Zealand's largest telecommunications provider, and their subsidiaries activated emergency response plans, relocating select staff to an Auckland office to facilitate both ongoing employment and help manage the increased demand, and ensure that Civil Defence and Emergency Services had reliable services [66].

There is an increased demand for vacant space in areas less affected by the September and February earthquakes. For example, an industrial area west of the city, Addington, has filled much of its previously vacant single story industrial and warehouse space with organisations from the Christchurch CBD, either looking to relocate until the cordons are lifted or looking for permanent low-rise accommodation due to increased perceived risk of multi-storey buildings [67]. Organisations have also left Christchurch for other urban areas in the South Island. Aoraki Business Development and Tourism and the Timaru District Council have been working together to accommodate businesses that want to temporarily or permanently relocate to the South Canterbury city of Timaru. As of 9 March, 30 businesses affected by the 22 February event are planning to operate out of Timaru for the time being.

Staff Well-being

The emotional toll on business owners and employees feeling great personal stress and uncertainty about their economic future cannot be under estimated. In a survey of over 300 businesses in the Canterbury area following the 4 September earthquake, over a quarter of respondent organisations reported that managing staff wellbeing in the weeks following the earthquake was the biggest challenge affecting their organisation [25].

In the first week following the 22 February earthquake there was a more than 50 % increase of domestic violence incidents reported to the police, attributed in large part to heightened stress levels among the population [68]. Emotional strain is expected to be higher following the February earthquake than the September earthquake because of the increased number of deaths and injuries from the latest event. While businesses are trying to reopen, relocate, and return to normal, staff are also dealing with recovery demands at a personal level. Information is being released by several institutions including, the Ministry of Health, Organisational Counselling Programmes, the Ministry of Education and the Department of Labour to businesses to help them manage stress in their employees [69].

Perception of the City

An estimated 65,000 people, or approximately 17%, of Christchurch's population left the city following the February earthquake. Civil Defence officials in New Zealand's largest city Auckland estimated a short-term population increase of 21,000. Timaru, a town 160 km south of Christchurch, experienced a temporary population increase approximately 7,000 people [70]. Approximately 30 Christchurch businesses have also expressed interest in permanently relocating to Timaru. While these relocations are likely temporary for most individuals, ANZ Bank economists predict that the city could potentially lose 4% of its population in the year following the earthquake [71]. Long-term demographic changes are not unprecedented globally. Permanent demographic changes, including an overall population decrease, were seen on the US Gulf Coast following Hurricane Katrina [72, 73]. While the temporary decrease of the population in Christchurch had the benefit of easing the demand on already strained infrastructure, it does have long-term repercussions if potential customers are decreased as the area tries to rebuild its retail and service economy.

Non-resident perceptions of the Christchurch area are also critically important for organisational recovery. Tourism accounted for approximately 4% of New Zealand GDP in 2010, and directly accounted for nearly 5% of employment in New Zealand [74]. Tourism spending had already been falling in 2010, and is expected to decline further throughout the South Island following the 22 February earthquake. It will be an ongoing challenge to communicate to both domestic and international travellers that the rest of the South Island and much of Christchurch is functional and open for business.

Much of the CBD's guest accommodation was damaged in the 6.3 earthquake, especially many of the city's high rise hotels. As a result, Christchurch city is without a third of its usual rooms. This is being exacerbated by cordons and poor access around some parts of the city [75].

The expected boost to tourism from the pending Rugby World Cup in September 2011 is no longer applicable to Canterbury. The International Rugby Board (IRB) determined that Christchurch's AMI stadium and turf, which were damaged in the earthquake, would not be able to adequately facilitate planned tournament games by September 2011. The matches have been allocated to other cities within New Zealand [76].

Although millions of dollars of projected income have potentially been lost to tourism related organisations in the Christchurch area, available hotels will likely continue to maintain income from the influx of construction teams, researchers, and engineers. The central government has pledged NZ$4 million to help resurface the damaged AMI stadium to encourage the recovery of Canterbury rugby [77].

Positive Economic Outcomes

Many businesses in the less damaged areas of Christchurch, especially the western suburbs, experienced major surges in business following the February earthquake. The Hub Hornby was one of a few operational shopping centres in the Christchurch area for weeks following the February earthquake, and was serving crowds that surpass even peak season numbers around Christmas [78]. Similarly, residential relocations to the lesser damaged western side of the city has meant much improved section sales (the equivalent of half an average year's trading) for Gillman Wheelans Ltd, the company developing two subdivisions west of the city [79]. Company's facilitating relocations such as trailer hire companies experienced much heightened business volumes immediately following the earthquake [80]. Businesses involved in the immediate response phase such as waste removal companies and engineering firms involved in the building assessments have also seen much improved business.

Towns outside of Christchurch stand to benefit from businesses relocations. Ashburton, a town approximately 90 km south of Christchurch, has already had relocation of three warehousing businesses from Christchurch and Ashburton District Council is offering to aid businesses that want to relocate from Christchurch to Ashburton's newly developed business park [81]. Similarly, Dunedin opened a "Christchurch Embassy" to help relocated Christchurch residents connect with organisations and support services that can facilitate short-term and longer-term accommodation for both residential and commercial relocations [82].

The earthquake has spurred a potential shifting perception of the trade-off between longer commutes and safety. Anecdotally the authors have heard Rangiora, a town of approximately 12,000 people located 25 km north of Christchurch, has been referred to by some as "the new Christchurch". This reflects the views that Rangiora, which was relatively undamaged in both the September and February earthquakes, is a safer place to either go to for shopping or for permanent relocation [83].

While in the short- and medium-term, organisations in less affected areas are benefitting, in the long-term the damaged areas will generate the most economic stimulus for the Christchurch and national economies. The rebuilding effort will be the biggest construction project in the history of New Zealand, though the reconstruction will not begin in earnest until 2012.

Business Assistance

In New Zealand, various stakeholders are expected to work together to provide an effective and efficient recovery for organisations and the community. Organisations are not eligible for Earthquake Commission (EQC) insurance coverage, New Zealand's primary provider of residential natural hazard insurance (covering earthquake, natural landslip, volcanic eruption, hydrothermal activity, tsunami, some storm and flooding damage, and fires caused by those hazards). Organisations rely on a mix of private insurance coverage, various forms of government financial assistance, and support from non-governmental organisations following natural disasters.

Kachali *et al*.'s [25] organisational resilience and recovery survey results showed that all of the respondents had at least some type of insurance cover for their organisation prior to the 4 September earthquake. Approximately 90% of respondents reported being neutral, satisfied or very satisfied with their insurance package following the 4 September earthquake. Although, following the September event, the media reported extensively on business dissatisfaction with insurance, especially due to slow settling of claims or businesses not having the amount of coverage they thought they had. Insurance, however, is often inadequate for meeting the immediate needs of organisations in the aftermath of a disaster [10, 18, 84].

Several forms of external assistance are being made available to businesses. The national government announced a six-week financial support package, which has been extended, for businesses affected by the earthquake. The initial support package for Christchurch businesses and workers includes:

- The Earthquake Support Subsidy to help employers continue payment of wages while the future of the business is considered. Eligible employers will receive a payment of NZ$500 gross per week for each full-time employee. This will be paid to the affected worker. For part-time workers, the payment will be NZ$300 gross per week.
- Earthquake Job Loss Cover to support employees whose employer believes their business is no longer viable. It is also available to employees who are unable to make contact with their employer. Full-time workers in this situation will receive NZ$400 net per week, to help them transition to either finding another job or seek other welfare assistance. Part-time workers will receive NZ$240 net per week.

Initial estimates were that this support package will cost the national government between NZ$100 million and NZ$120 million. Uptake of the two programs has been high. Just over a day after it was announced, more than 10,000 people signed up for the Government's earthquake support package [85]. By mid-March 6,000 businesses, employing about 31,000 staff had received financial assistance via the support package. More than 6,500 sole traders have also applied for support. Another 3,500 people, who have lost contact with their employer, or don't believe they have jobs to go back to, have accessed financial support through Earthquake Job Loss Cover [85].

Much of the government support offered is non-monetary assistance. Training and advice, also made widely available after the 4 September earthquake, is being offered to affected organisations.

- Canterbury Employers Chamber of Commerce (CECC), and the Canterbury Development Corporation (CDC), are maintaining a database of available warehouses, offices and retail space for businesses needing to relocate. They are also offering various training and development programmes to organisations [86, 87].
- Canterbury Business Recovery Group (CBRG) is a joint venture between CECC and CDC.
    - CBRG have sent out mobile business recovery Centres to bring business advice about business continuity and other concerns to affected areas.
    - CBRG also manages the Canterbury Business Recovery Trust Fund. The trust fund has been formed to enable cash donations to businesses from the government and private sector. The CBRG will distribute the money to viable businesses affected by the earthquake. The funds can be used for recovery costs, such as: temporary location expenses, permanent relocation costs, connection to essential services (e.g. telecommunications), restoration of damage ICT hardware and files, or access to advice and expertise [88].
- The Inland Revenue Department (IRD) the agency primarily responsible for the collection of taxes and disbursement of social policy payments, is assisting recovery of businesses by:
    - Providing a range of tools and services that help organisations "self-manage";
    - Educating businesses about how they can comply with tax requirements during the recovery;
    - Offering free business seminars and tailored presentations, meetings, events and expos for businesses affected by the earthquake;
    - Waiving late penalties for late filing [89].
- New Zealand Trade and Enterprise (NZTE) is the National Government's economic development agency. NZTE has specially developed tools to assist businesses in their recovery.
    - "Biz" is a specialist information and referral service funded by NZTE to offer advice, information, contacts and training to help people start and develop businesses.
    - Business Mentors NZ are offering free mentoring assistance to help businesses develop, funded by NZTE.
    - NZTE is funding Earthquake Recovery Training workshops, which are being run through CDC and CECC. These workshops are free to attend [90].
- There is also a variety of business-to-business (B2B) support and community support being offered throughout Canterbury. Many of these offers are being managed through the Recover Canterbury website [91], and are also listed individually on the TradeMe Christchurch Earthquake Support page [92].

CONCLUSIONS AND FUTURE RESEARCH

Christchurch's recovery will extend into the next decade. Buildings will need to be repaired or torn down and rebuilt, infrastructure will have to be replaced, and land remediation will need to be done. In the interim, however, Christchurch will need to be an economically viable city with growth and opportunities for investment. In this paper we have presented a broad overview of the pre-earthquake economic environment, the financial implications of the event, and the ongoing challenges organisations are facing in their recovery.

It is important for organisations, the government, and the community to understand where they have been and where they are, before deciding where they would like to go. Canterbury's organisations now have an opportunity to adapt and improve in this new challenging environment. Therefore, more research is needed on how this earthquake has impacted various facets of the economy in order to identify areas of strength within organisations and weaknesses that can be improved upon. It is important to understand the flow of impacts through linkages in supply chains, the impacts of an organisation's neighbours on its ability to recover, and how organisational networks are accessed to aid in recovery. More also needs to be understood about what makes an organisation resilient and able to adapt following a major event, and how this changes by organisation size and type. As Christchurch and Canterbury move from response into recovery, decisions need to be made with the wider goal of improvement and growth rather than simply putting bricks back where they were.

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