

How Prepared are Small Businesses for Another Earthquake Disaster in New Zealand?

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Abstract

Earthquakes are low probability, high consequence events which are known to cause significant damage. Small to medium-sized enterprises (SBEs) are particularly vulnerable to impacts arising from such disasters, including: business disruption, employee health and safety, financial strain, or even total loss of business. Owners of these SBEs can make a few key decisions to prepare their businesses for an earthquake, in order to ensure business continuity and the wellbeing of their employees. This study sought to examine the level of earthquake preparedness of SBEs located in high seismic risk regions by examining the extent of mitigation measures adopted five years post the Canterbury earthquake disaster. Using a mixed-methods research approach, combining both qualitative and quantitative data, the research findings revealed that a majority of SBEs operating in regions of high vulnerability to disaster are underprepared for a potential earthquake disaster, despite the general increased awareness of earthquake risks in New Zealand. Cost, time, insurance processes, and access to disaster mitigation information, were identified to be the most important and constraining factors in the overall decision-making process. The research findings will provide strategies to local authorities on how to assist SBEs in making better informed preparedness decisions, ultimately improving their resilience to earthquakes, and thus improving the resilience of the New Zealand community as a whole. How Prepared are Small Businesses for Another Earthquake Disaster in New Zealand?

Keywords: Small business enterprises (SBEs), earthquake, preparedness initiatives, New Zealand

1. Introduction

The severity of the recent 2010/2011 Canterbury earthquakes demonstrated the vulnerability of communities which are inadequately prepared for such disasters. These earthquakes created significant economic and social strains on the Christchurch region, as a result of a large drop in economic activities within the central business district (CBD) of the city, and generally on the New Zealand economy. Consequently, this resulted in a staggering 34.6% drop in the number of businesses operating (Statistics New Zealand 2012). Buildings which have insufficient seismic capacity – termed “earthquake-prone buildings” (EPBs) – have been found to contribute to major losses during an earthquake (Egbelakin, 2013). An EPB is considered to be a building that will have its ultimate structural performance capacity exceeded in a moderate earthquake, and would likely collapse causing injury or death to persons in the building or to persons in another property or damage to adjoining structures (Department of Building and Housing 2004). The definition of an EPB contained in the Act is the legislative expression of the New Zealand Government’s policy objective to reduce the level of earthquake risks posed by EPBs to the public. These buildings are particularly vulnerable to impacts from an earthquake disaster, due to being built from inadequately strong construction materials, and prior to advancements in seismic design codes, specifically since 1976 (Egbelakin 2013).

The Ministry of Business, Innovation, and Employment define an SBE as one which consists of between 0 to 20 full-time employees (Ministry of Business & Innovation and Employment (MBIE) 2014). These enterprises are a prominent part of New Zealand’s economy, collectively make up 99.0% of the nation’s business population, and contribute to approximately 30% of the national GDP (Ministry of Business & Innovation and Employment (MBIE) 2014). The majority of SBEs reside in the CBD (Burgess 2008). It is common to find a large proportion of the city’s old building stock in the CBD, which are likely to be earthquake-prone due to their age and construction materials. SBEs are the majority leaseholders of these EPBs due to attractive rent prices and greater accessibility to customer foot traffic whilst residing in the CBD (Murphy 2007). Due to inherent risks posed by residing in an EPB, these SBEs are highly vulnerable to damage and losses from a potential earthquake disaster, as evident in the Canterbury earthquakes.

The decision-making process a business owner follows in order to prepare for an earthquake is crucial for maintaining business operations, and post-earthquake continuity, as well as for ensuring employee health and safety. The business owners who are tenanted in these buildings are likely to make a few key decisions regarding earthquake risk mitigation: adopt appropriate risk mitigation measures; accept the risk and do nothing about it; or ignore the risk completely (Egbelakin, 2013). Despite the rising intensity of low probability and high magnitude earthquake disasters, there is a consistently low rate of earthquake preparedness generally in New Zealand. Moreover, earthquake preparedness of local businesses is vital for local communities, whose economic prosperity depends on the types of mitigation decisions made by the owners of SBEs. Mostly, collective losses of these businesses generally devastate the local economy (Yoshida and Deyle 2005). Thus, this has created a need for a study to evaluate the types of decisions and earthquake mitigation initiatives implemented by SBEs, in order to

alleviate the damage caused by these disasters. Hence, this study sought to examine the level of earthquake preparedness of SBEs located in high seismic risk regions by examining the extent of mitigation measures adopted five years post the Canterbury earthquake disaster. The research findings will provide strategies to local authorities on how to assist SBEs in making better informed preparedness decisions, ultimately improving their resilience to earthquakes, and thus improving the resilience of the New Zealand community as a whole.

2. SBEs Disaster Preparedness

A plethora of research exists regarding businesses and their preparation for earthquakes. Studies into earthquake preparedness have been conducted predominantly internationally, and also in New Zealand, as a result of several earthquakes since 2007. Disaster preparedness can be regarded as any activity which is implemented in order to reduce damage caused by a natural disaster such as earthquake (Alesch, Holly et al. 2001). There are several of ways an SBE can mitigate risks posed by an earthquake disaster; these are termed earthquake risk mitigation measures or initiatives. Implementing these measures is vital for the resilience of an SBE, as they reduce the seismic risks that they can be exposed to, allowing them to thrive and find opportunities in times of distress (Stevenson, Seville et al. 2011). Several mitigation measures exist which are available for SBEs to implement. These comprise reasonably technical measures such as the purchase of earthquake insurance, and also less complicated low-effort measures such as employee disaster preparation. Despite the abundance of ways which an SBE can prepare for an earthquake, consistently low earthquake preparedness is reported by SBEs in New Zealand (Brown, Seville et al. 2013). Several factors have been identified in the literature to affect SBE owners' decisions to prepare for an earthquake and these are discussed in a subsequent section. The most significant ones will be outlined below.

2.1 Business Characteristics

The ability of an SBE to implement earthquake risk mitigation measures was found to be dependent on certain factors, which are inherent in the nature of the business and its physical operating environment. The size of the business, measured by the number of full-time employees, was consistently found to affect business' earthquake preparedness (Chang and Falit-Baiamonte 2002). According to Brown et al. (2013), small businesses are particularly vulnerable to the damage resulting from an earthquake due to a lack of resources; both in terms of finance and staffing that could be devoted to potential earthquake risk mitigation measures. Large businesses, on the other hand, are more readily able to raise finance due to their ease in accessing business reserves (Chang and Falit-Baiamonte 2002). They are more able to devote greater resources towards possible mitigation measures, and therefore exhibit a greater sense of preparedness compared with SBEs. Drabek (1991) found that businesses in operation longer than six years were involved with greater disaster planning. These older firms are more prominent, have greater financial resources, and more opportunities to consider earthquake planning in their daily business operations. Owning the building in which the business operates, as opposed to leasing, was found to be significant. Dahlhamer and D'Souza (1995) found that owners of the business property were more likely to adopt disaster preparedness measures than

lease-holders. Webb, Tierney et al. (2000) explained that the owners of the building have more to lose than lease-holders in the event of an earthquake, which indicated they are more likely to place greater importance on earthquake planning.

Many older buildings with the potential of being earthquake-prone located in the CBDs of many cities and towns in New Zealand are more likely to be impacted by a potential significant earthquake (Egbelakin 2013). Many SBEs are likely to be tenanted in these EPBs. These businesses are highly vulnerable to the damage dealt from earthquakes and business operations within the community in general, as was evident from the Canterbury earthquake (Brown, Seville et al. 2013). Also, whether a business is independently owned at a sole location, or if it is part of a franchise operating in multiple locations, plays a huge part in the overall decisions they make. Franchise firms have an ability to spread their risk across multiple locations (Dahlhamer and Tierney 1998). These firms have the added benefit of being at ease with regard to financing their capital and starting up costs, as they can be funded by the franchiser. Businesses operating in the insurance, finance and real estate sectors were generally better prepared for disasters (Yoshida and Deyle 2005). This is mainly due to the fact that these businesses have high regulations, and have greater awareness of risk due to the inherent nature of their work.

2.2 Behavioural Factors

Several behavioural factors could affect how owners or managers of SBEs make disaster preparedness decisions. Past experience in a disaster could intuitively enhance readiness for a disaster in the future (Egbelakin, Wilkinson et al. 2011). The decision-making process may require an individual to identify a risk, perceive and assess the risk, and through trade-offs between risks and rewards, come to a final decision on whether or not to mitigate the risk (Egbelakin, 2013). An individual's awareness of the risks they are subjected to, and how they perceive and respond to them, is critical in influencing the final decision carried out (Slovic 2001). Given that perception of risk is regarded to be the one of the most notable barriers to adopting earthquake preparedness measures (Egbelakin & Wilkinson, 2010), this facet is important to consider when studying the decision-making patterns of SBE owners. A study carried out by Egbelakin, Wilkinson et al. (2011) aimed to understand potential behavioural factors which hindered the decision-making process of seismic retrofitting in New Zealand found that many respondents have fatalistic mind-sets and were not concerned about the risks associated with an earthquake disaster, and were unlikely to implement mitigation measures in the future. Fatalistic mind-sets may be attributed to hazard anxiety, and consequently a denial of risk (Paton 2003). Moreover, Webb *et al.* (2000) emphasised that businesses which showed drastic improvements in their preparations were ones which had already prioritised planning, and had the resources to do so. This is further supported by the findings arising from the study conducted by Powell and Harding (2009), which explained that "the careful become more careful" and those who didn't have any mitigation measures in place before the disaster were less likely to employ more measures after.

Legislation plays a key role in earthquake risk mitigation in New Zealand. The Building Act 2004 contains provisions which address EPBs. TAs are required to implement an earthquake-

prone building policy, to lessen the seismic risk from EPBs, such that a perceived level of safety is developed (Egbelakin, 2013). In addition, depending on the approach taken, the TAs requires building owners to have an engineer assess their buildings, if necessary, for potential seismic risk. This is vital for business owners, especially ones who are tenanted in an earthquake-prone building. Decisions revolving around seismic strengthening are beyond their grasp, and they must rely on their landlord (the building owner) to act. Knowledge and awareness of these practices is essential in the decision-making process.

2.3 Business Operations and Emergency Planning

The ability for a business to survive a major disaster depends on the organisational structure and operations systems in place (Seville et al., 2008). In New Zealand, prevention of harm to all persons at work and other persons in the vicinity is promoted by the Building Act (2004) and Health and Safety Act (2013). The Health and Safety Management Act was enacted to ensure that employers, and their representatives, adopt practicable steps are taken to ensure the safety of their staff while at work. It is expected that a procedure for dealing with emergencies that may arise during business hours is in place and that this information is readily accessible. Also, safety and emergency policy and practices adopted by the organisation should be known to all employees.

3. Research Methods

A mixed-methods research approach was adopted in this study, combining both qualitative and quantitative data, because of the nature of the research objective, and to overcome deficiencies intrinsic to a single research approach. The basis for this choice was due to the exploratory nature of this study, which was very similar to the study which Egbelakin (2013) conducted on building owners. An online survey was conducted using a questionnaire as the data collection instruments for the quantitative study, which mainly assesses the profile of the SBEs, decision-making processes and the factors that were significant to affect an SBE to implement mitigation measures. Semi-structured face-to-face interviews were undertaken for the qualitative study, in order to gauge a more in-depth understanding of respondents' behaviour. This type of interview allows the researcher to "probe" for in-depth information. In order to ascertain a sample for data collection, a database was formed using data provided by the Napier City Council. The information contained a list of the addresses of approximately 167 SBEs located in the Napier CBD, and mainly in EPBs. Napier was selected as a case study to represent a high seismic hazard region in New Zealand. The selection criteria were predominantly based on: a high seismic hazard factor, Z , of 0.38 (Standards New Zealand, 2004); and the occurrence of a previous significant earthquake disaster in the region in 1931 (Hawke's Bay Earthquake). This earthquake resulted in the emergence of a unique Art Deco architectural style for older buildings within Napier, which has attracted great interest from the local community and the tourism industry. There is a large heritage importance placed on these buildings by the community, and it is therefore necessary to enhance decisions made by SBEs operating in such buildings. Both questionnaire and interviews were administered in one of New Zealand regions susceptible to high earthquake risks; Napier. Care was taken to exclude the interview participants from the

survey. Industry experts reviewed the findings for comments and confirmation in order to establish data validity. A total of 42 questionnaires were returned out of 167 sent out. Only 38 were usable surveys due to a large amount of missing responses, generating a response rate of 23%, which is expected for a study of this nature and is similar to that found in previous studies. The extent to which an SBE was prepared for an earthquake was measured by counting the amount of mitigation measures they had implemented as at the present time, out of a possible 21 measures. Potential disaster preparedness measures an SBE could have implemented are summarised in Table 2. A variety of mitigation measures are covered and grouped under four categories, namely knowledge enrichment, insurance and business continuity, business survival, and structural and non-structural mitigation (see Table 2 for details).

4. Results

4.1 Respondents Profile and Business Characteristics

The respondents' profiles and business characteristics are summarised in Table 1. The respondent comprises mainly micro and small businesses (90%). Therefore, the research results and findings results are limited to the research participants. Half of the respondents are business owners, and the rest were personnel acting on behalf of the owner. Sixty-three percent of respondents are above 40 years of age, and 42% of the predominant ownership comprised of female business owners (42%) and combined (male and female) ownership (42%). Seventy-four percent of these SBEs were micro-sized and 58% have been in business for at least 10 years. All SBEs were reported to be operating in the CBD, with 79% operating in the retail sector. Eighty-seven percent of SBEs are located on the building's ground floor level. More than half of the SBEs were operating in a sole location of a locally-owned business, and all were in a separate location for their business (i.e. not operating from home). A majority of the SBEs surveyed in this study leased the building in which they operate. Almost all respondents (95%) had experienced an earthquake in the past. It is interesting to note that only 29% of respondents had been in an earthquake causing physical building damage. Nearly all respondents reported no damage to their personal well-being or their business from the last earthquake they had experienced (86% and 92% respectively).

Table 1: Respondents' profiles and business characteristics

<i>Respondents' Profiles</i>		<i>Frequency</i>	<i>%</i>	<i>Business Characteristics</i>		<i>Frequency</i>	<i>%</i>
<i>Type of Respondent</i>	<i>Business Owner</i>	19	50	<i>Size of business / Number of full-time employees</i>	<i>1 - 5 (micro)</i>	28	74
	<i>Director</i>	1	3		<i>6 - 19 (small)</i>	6	16
	<i>Manager</i>	15	40		<i>50-99 (medium)</i>	4	10
	<i>Employee</i>	1	3	<i>Age of business</i>	<i>< 1 year</i>	3	8
	<i>Other</i>	2	5		<i>1-5 years</i>	9	24
<i>Age</i>	<i>21 - 30 years</i>	7	18		<i>6-10 years</i>	4	11
	<i>31 - 40 years</i>	7	18		<i>11-20 years</i>	6	16
	<i>41 - 50</i>	8	21	<i>21 - 30 years</i>	7	18	

Respondents' Profiles		Frequency	%	Business Characteristics		Frequency	%	
	years							
	51 - 60 years	10	26		31 - 40 years	3	8	
	61 - 70 years	6	16		41 - 50 years	1	3	
Gender	Female	30	79	> 50 years	5	13		
	Male	8	21	Retail, trade, and hospitality	30	79		
Number of years in business	< 5 years	16	42	Industry of business	Finance, insurance, and real estate	2	5	
	5-10 years	13	34		Business and personal services	1	3	
	11-15 years	3	8		Health services	1	3	
	16 - 20 years	1	3		Legal services	1	3	
	21 - 25 years	1	3		Art and membership organisations	3	8	
	> 25 years	4	11		Location pattern	Separate business location	38	100
						Home-based business	0	0
Years of industry experience	≤ 5 years	7	18	Operational pattern	Sole location of locally owned business	22	58	
	5-10 years	13	34		One of several locations of locally owned business	5	13	
	11- 15 years	3	8		One of several locations New Zealand wide	8	21	
	16 – 20 years	4	11		Part of a Franchise	3	8	
	21 – 25 years	4	11		Predominant ownership by gender	Male	6	16
	> 25 years	7	18			Female	16	42
			Combined - Male and Female	16		42		
				Age of predominant owner(s)	21 - 30	4	11	
					31 - 40	5	13	

4.2 Earthquake Mitigation Initiatives of SBEs located in High-Risk Regions

The extent to which an SBE was prepared for an earthquake was measured by counting the amount of mitigation measures they had implemented at the present time, out of a possible 21 measures. Table 2 provides a summary of disaster preparedness measures an SBE have

implemented. A variety of mitigation measures are covered and include: knowledge enrichment, insurance and business continuity, business survival, and structural and non-structural mitigation. The respondent's sense of earthquake preparedness was categorised based on the number of mitigation measures they had implemented, being: 0-5 (underprepared); 6-10 (somewhat prepared); 11-16 (prepared); and 17-21 (highly prepared). The research findings showed that SBEs were found to have mainly implemented low-effort, less technical mitigation measures, such as insurance, first aid kits, employee preparation, and data backup. These measures are generally easy to acquire and take less time compared to more complex measures such as the seismic retrofitting of buildings and implementation of business disaster continuity plans. Regarding insurance and business continuity plans, a majority of the SBEs had purchased business contents insurance (61%), and 55% had purchased business interruption insurance. In contrast, only three SBEs had developed a business continuity plan, while only one had a business relocation plan. Concerning the knowledge enrichment disaster preparedness activities, a majority of the respondents have discussed with their employees about what to do in the event of an earthquake (42%), while 32% have provided written information on earthquake preparedness to their employees, and 13% of the participants regularly conduct earthquake drills with their organisation. Sixty-three percent did not know whether their building was earthquake-prone or not, and about 50% of the respondents were not aware of the seismic assessment practice. Overall, the respondent's sense of earthquake preparedness was categorised based on the number of mitigation measures they had implemented. The research findings showed that 66% of the SBEs are very underprepared for survival in the occurrence of another major earthquake in the region (see Figure 1).

Table 2: Earthquake risk mitigation measures initiatives adopted by SBEs

<i>Earthquake risk mitigation measures initiated adopted by SBEs</i>	<i>Frequency</i>	<i>%</i>
<i>1. Knowledge Enrichment Disaster Preparedness Activities</i>		
<i>Talked with employees about what to do in the event of an earthquake</i>	<i>16</i>	<i>42</i>
<i>Have written information on earthquake preparedness</i>	<i>12</i>	<i>32</i>
<i>Attended a first aid course</i>	<i>9</i>	<i>24</i>
<i>Earthquake drills or exercises for your employees</i>	<i>5</i>	<i>13</i>
<i>Earthquake preparedness or training programs for your employees</i>	<i>1</i>	<i>3</i>
<i>2. Insurance and Business Continuity Plans</i>		
<i>Purchased business contents insurance</i>	<i>23</i>	<i>61</i>
<i>Purchased business interruption insurance</i>	<i>21</i>	<i>55</i>
<i>Purchased earthquake insurance to cover damage to building</i>	<i>10</i>	<i>26</i>
<i>Developed a business disaster recovery plan</i>	<i>3</i>	<i>8</i>
<i>Developed a business emergency plan for event of earthquake</i>	<i>3</i>	<i>8</i>
<i>3. Business Disaster Survival Actions</i>		
<i>Obtained first aid kit, extra medical supplies</i>	<i>18</i>	<i>47</i>
<i>Stored water and canned food</i>	<i>6</i>	<i>16</i>
<i>Stored extra fuel or batteries</i>	<i>5</i>	<i>13</i>
<i>Business relocation plan</i>	<i>1</i>	<i>3</i>
<i>Obtained an emergency generator for power failure</i>	<i>0</i>	<i>0</i>

<i>Earthquake risk mitigation measures initiated adopted by SBEs</i>	<i>Frequency</i>	<i>%</i>
<i>4. Structural and Non-Structural Measures Implemented</i>		
<i>Ensured computer and electronic data backup</i>	<i>20</i>	<i>53</i>
<i>Engineer conducted a seismic assesSBEnt</i>	<i>12</i>	<i>32</i>
<i>Secured shelves, cabinets or objects</i>	<i>11</i>	<i>29</i>
<i>Ensured heavy objects are stored on the floor</i>	<i>10</i>	<i>26</i>
<i>Secured business records and supplies</i>	<i>6</i>	<i>16</i>
<i>Retrofitted the building to higher seismic performance</i>	<i>4</i>	<i>11</i>

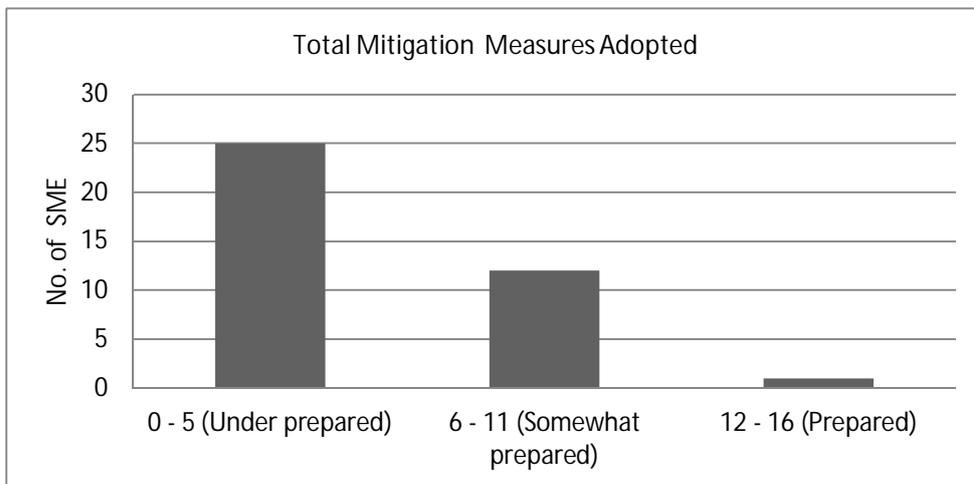


Figure 1: Summary of mitigation measures adopted by SBEs

5. Discussion of Findings

The capability of a business to implement earthquake risk mitigation measures was found to be dependent on certain factors, which are inherent in the nature and characteristics of the business, and its physical operating environment. SBEs in Napier were found to be underprepared for a potential earthquake disaster. Only five earthquake risk mitigation initiatives or measures were implemented, on average, out of a possible 21 options. This finding is similar to previous research conducted in the USA by Han and Nigg (2011). The low rate of preparedness is surprising given the region's high vulnerability to earthquake occurrence. Intuitively, a greater concern towards earthquakes would be expected due to Napier's location in a high seismic hazard zone, and its historical and cultural underpinning due to a past earthquake in 1931. Interestingly, 74% of respondents believed it was important to give consideration to earthquakes in relation to their business operations, yet a vast amount of the participating SBEs were inadequately prepared for a potential earthquake disaster. One of the respondents wrote that "Napier is making its tourist trade a little bit on the fact that it's been through an earthquake,

and so I think the knowledge of earthquakes in Napier is pretty good". Due to the region's increased awareness of earthquakes, individuals may have become complacent when giving thought to earthquake preparation. Some business owners were reported to express a sense of optimistic bias and complacency in their approach to disaster preparedness initiatives.

In addition, the majority of respondents who took part in the questionnaire were greater than 40 years of age. The research findings revealed that concern for earthquakes decreased greatly as the age of an individual increased. This may be explained by a complacent or fatalistic attitude which manifests with greater age. When asked if there were specific factors which influenced their preparation for an earthquake, one interviewee mentioned that: "It's quite nice to think that you're a bit secure because you do have the earthquake proofing done up to a standard, but I'm a bit fatalistic to be honest". Many of the respondents demonstrated similar behaviour during the face-face data collection, strongly expressing that earthquakes were an inevitable event, and no amount of preparation would be useful. Due to the large number of older respondents, there may be a prevalence of a fatalistic attitude, resulting in a lesser perception of risks and mitigation measures. This is similar to the findings of Egbelakin, Wilkinson et al. (2011), and this therefore negatively impacts overall earthquake preparedness. This finding is intriguing as one would expect individuals residing in high seismic hazard regions to exhibit more concern about earthquakes.

The size of an SBE measured in terms of the number of full-time employees could be attributed to the number of mitigation initiatives or measures adopted. A majority of SBEs had less than five full-time employees, and hence could be less prepared for an earthquake due to lack of resources to devote to disaster preparedness, and therefore lack the ability to have access to staff, and experts, specialising in disaster mitigation. This may provide a possible explanation as to why such a low sense of earthquake preparedness was observed. In addition, SBEs normally have greater financial constraints than their larger counterparts. A firm's financial capabilities have been proven to be a potential impediment in the preparedness process from past literature. As expected, cost and time were identified in the survey to be the important and constraining factors in an SBE's earthquake preparedness decision. Furthermore, respondents were found to have a low awareness and knowledge of building seismic assessment procedures. This is interesting given Napier's history with a previous devastating earthquake; one would expect that the respondents would be more proactive in their understanding and knowledge of seismic risks regarding the building in which they operate their businesses. The low level of awareness and knowledge of the building seismic risks may explain the low preparedness in Napier. For those respondents who were aware of seismic assessment procedures, it was reported that there were issues in consistency. One interviewee stated that: "*What I've noticed is there doesn't appear to be a consistent application of the rules, or understanding of the policies and I think there's been a frustration in that, businesses have found that engineers say one thing, and then another engineer comes around and says 'what were they talking about?'*" These disparities create confusion for SBEs, and complicate the decision to adopt risk mitigation measures (Egbelakin, Wilkinson et al. 2011). A low perception of risk was observed by SBEs in Napier. As discussed above, given the region's history with a prior earthquake, one would expect a greater perception of risk. The low perception may be due to the fact that 71.1% of respondents had not been in an

earthquake causing physical building damage. Past experience with an earthquake may affect an individual's perception of hazard exposure.

6. Conclusion

The objective of the study reported in this article is to examine whether SBEs located in regions of high vulnerability to seismic hazard are well prepared by adopting a range of earthquake preparedness initiatives. The research findings revealed that SBEs having less than 20 employees located in Napier were generally underprepared in the event of a potential earthquake disaster, and an average number of five mitigation initiatives or measures were observed out of a total of 21 initiatives. There is a general lack of knowledge and awareness of seismic assessments and risks posed by the building from which they operate, which could be due to the fatalistic attitudes, or a sense of complacency exhibited among the respondents. Cost, time, insurance processes, and access to mitigation information, were the most important and constraining factors for SBEs in preparing for an earthquake. SBEs need to be better informed about seismic assessment procedures. In particular, communication between TAs, building owners, and business owners must be enhanced. In addition, the local authority approach requires some form of increased consistency in building seismic risk assessment results, to allow a greater understanding of the potential risks for SBEs. SBEs need to have greater access and exposure to reliable and effective mitigation measures which have been proven to work. These must be provided by credible individuals or organisations, in order to motivate SBEs to become more active in earthquake planning procedures.

References

- Alesch, D. J., J. N. Holly, E. Mittler and R. Nagy (2001). Organizations at risk: What happens when small businesses and not-for-profits encounter natural disasters, Public Entity Risk Institute PERI.
- Brown, C., E. Seville and J. Vargo (2013). The role of insurance in organisational recovery following the 2010 and 2011 Canterbury earthquakes, Resilient Organisations Research Report 2013/4.
- Burgess, E. W. (2008). The growth of the city: An introduction to a research project, Springer.
- Chang, S. E. and A. Falit-Baiamonte (2002). "Disaster vulnerability of businesses in the 2001 Nisqually earthquake." Global Environmental Change Part B: Environmental Hazards 4(2): 59-71.
- Dahlhamer, J. and K. Tierney (1998). "Rebounding From Disruptive Events: Business Recovery Following the Northridge Earthquake." Sociological Spectrum 18: 121-141.

Dahlhamer, J. M. and M. J. D'Souza (1995). "Determinants of business disaster preparedness in two US metropolitan areas." Department of Building and Housing (2004). *The Building Act*. Wellington, Brookers Ltd.

Drabek, T. E. (1991). "Anticipating organizational evacuations: Disaster planning by managers of tourist-oriented private firms." *International Journal of Mass Emergencies and Disasters* **9**(2): 219-245.

Egbelakin, T. (2013). *Earthquake Risks Mitigation- A Stakeholder's Perspective*. Singapore Lambert Academic Publishing.

Egbelakin, T., S. Wilkinson, R. Potangaroa and J. Ingham (2011). "Enhancing seismic risk mitigation decisions: a motivational approach." *Construction Management and Economics* **29**(10): 1003-1016.

Egbelakin, T., S. Wilkinson, R. Potangaroa and J. M. Ingham (2011). "Challenges to successful seismic retrofit implementation: a socio-behavioural perspective." *Building Research & Information* **39**(3): 286 - 300

Egbelakin, T. K. (2013). *Incentives and Motivators for Enhancing Earthquake Risk Mitigation Decision*. PhD Thesis PhD, University of Auckland.

Han, Z. and J. Nigg (2011). "The influences of business and decision makers' characteristics on disaster preparedness—A study on the 1989 Loma Prieta earthquake." *International Journal of Disaster Risk Science* **2**(4): 22-31.

Ministry of Business & Innovation and Employment (MBIE) (2013). *Health and Safety in Employment Amendment Act 2013*. Wellington, New Zealand, Brookers Ltd.

Ministry of Business & Innovation and Employment (MBIE) (2014). *The Small Business Sector Report*. Wellington, New Zealand, Ministry of Business, & Innovation and Employment (MBIE).

Murphy, R. (2007). *The central business district: a study in urban geography*, Aldine Transaction.

Paton, D. (2003). "Disaster preparedness: a social-cognitive perspective." *Disaster Prevention and Management* **12**(3): 210-216.

Powell, F. and A. Harding (2009). *Business recovery and the rebuilding of commercial property*. Proceedings of Shaken Up'a workshop on recovery following the Gisbourne Earthquake. Wellington: Opus.

Slovic, P. (2001). *The Perception of Risk*. London, Earthscan.

Statistics New Zealand (2012). Business in Christchurch Wellington, New Zealand.

Stevenson, J. R., E. Seville, H. Kachali, J. Vargo and Z. Whitman (2011). Post-Disaster Organisational Recovery in a Central Business District Context, Resilient Organisations Research Report 2011/03. Resilient Organisations, Christchurch.

Webb, G. R., K. J. Tierney and J. M. Dahlhamer (2000). "Businesses and disasters: Empirical patterns and unanswered questions." Natural Hazards Review **1**(2): 83-90.

Yoshida, K. and R. E. Deyle (2005). "Determinants of small business hazard mitigation." Natural Hazards Review **6**(1): 1-12.

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2016-05-25

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