Tsunami Preparedness Communication: Understanding the Business Audience

A research report completed in partial fulfilment of the Master of Communication degree at Massey University Wellington 2017/2018.

Adrienne Sheridan

[redacted]

31/03/2018

Abstract

Previous research conducted by GNS Science pre and post the 2016 Kaikōura Quake identified that the New Zealand public does not sufficiently understand the risks posed by tsunami hazards, and in particular there is limited awareness about the different responses required for local, regional, and distant-source tsunami events.

This research was undertaken to delve deeper and generate new insights into the reasons behind that finding, specifically for one key audience: business leaders. This audience was primarily chosen because businesses play a key interdependent role in disaster response and community recovery. An audience-centred communication approach was chosen over the traditional mass communication approach most often applied in emergency management practice to date. A qualitative approach was selected because of its ability to provide complementary data to existing quantitative studies.

Data were collected from twelve business-focussed community leaders, and business owners/senior managers in coastal Tauranga (Pāpāmoa) and Wellington (Rongotai), through a series of semi-structured interview conversations and email questionnaires. The data gathering instruments were designed to better understand the participants': (1) tsunami knowledge and awareness; (2) tsunami risk perception; (3) existing tsunami preparedness; and (4) behavioural intent for future tsunami preparedness initiatives. Field observations and engagement with emergency management professionals provided greater depth of understanding and enhanced the contextual aspects of the research.

The overall findings and themes emerging from this research suggest that:

- As indicated in the wider survey, there is a lack of tsunami awareness and preparedness among the business audience

More specifically in the audience-centred context:

- There is confusion surrounding the roles and responsibilities of official emergency management organisations
- There is a need for improved organisational Health & Safety understanding and compliance concerning natural hazards in the business community
- Different stakeholders, even within the business audience, have different tsunami preparedness wants and needs

The research also identified that:

- Some business leaders are willing to act as conduits for tsunami preparedness in their organisations and communities; viewing it as part of their identity and responsibility as a business leader.

Specific suggestions for improved tsunami preparedness communication include:

- Ongoing stakeholder engagement and tsunami education with proactive 'opinion leaders' in the business community
- Adopting further targeted audience-centred approaches to improve the spread of preparedness messages through society

- A revision of existing official tsunami preparedness material and tsunami mapping to better meet the needs of end users, such as with customised co-developed material for business community needs in different regions
- Enhancing preparedness communication through the researcher's 'Five C's Model'

Table of Contents

Table of Figures

1.0 Introduction

1.1 Tsunami Overview

Described by witnesses as moving 'walls of water' and often incorrectly referred to as 'tidal waves', Tibballs (2005, p. 11) refers to McGuire, to explain that tsunami are geological natural hazards that can be differentiated from standard wind-driven waves because:

> With normal wind-driven waves, that we see all the time, it's only the top of the sea that is moving, but with a tsunami, it's the entire ocean that is moving, from top to bottom.

In the open ocean tsunami waves can travel at speeds of over 700 kilometres per hour with a wavelength of over 150 kilometres long (McFadgen, 2007). As tsunami approach land and move into shallower water, their speed will reduce and wave height will increase. Underwater turbulence fiercely sucks up everything in its path, carrying ocean sediment, debris, and people in its wake (Tibballs, 2005). Tibballs (2005, p. 11) recounts instances whereby "rocks weighing in excess of 20 metric tonnes have been plucked from sea walls and carried 180 metres inland … [and] entire beaches have been swept away".

1.1.1 Notable Historic Tsunami Events

Tibballs (2005) describes the deadliest tsunami recorded in modern times. The 2004 Indian Ocean Tsunami, or 'Boxing Day Tsunami' was triggered at 7:59am (local Indonesian time) by a 9.1-magnitude 'megathrust' earthquake, which lasted for more than four minutes, at just 30 kilometres depth. One of the most violent earthquakes on record, it released and transferred energy the equivalent of 10,000 Hiroshima atomic bombs to the water column above. The sideways movement and force was such that the seabed rose several metres and

millions of tonnes of water was displaced. Fifteen minutes after the initial earthquake, the first tsunami wave struck the Aceh Province of Sumatra, 155 miles (250 kilometres) north-east of the Quake's epicentre. With 1200 kilometres of fault-line affected, sea water powered around the Indian Ocean, striking the coasts of Malaysia, Thailand, Sri Lanka, India, Somalia, and beyond. Many of these areas were in tourism hotspots and as the tsunami occurred during the busy holiday season, so the tragedy was not confined to these host countries alone. It was a global catastrophe, resulting in over 280,000 recorded deaths, and many more remained unaccounted for, presumed swept out to sea.

Before the Boxing Day Tsunami there was very little awareness of the destruction that tsunami can cause and a common misconception existed in industrialised nations that tsunami only happened centuries ago, in places on the 'other side of the world' (Tibballs, 2005). In the years since two additional tsunami events have resulted in significant loss of life; these are Samoa's Earthquake and Tsunami of 2009, and Japan's Tōhoku Earthquake and Tsunami of 2011 (Currie, Enjamio, Girardo, & Hensel, 2013).

1.1.2 Tsunami – In a New Zealand Context

Located in the remote southwest corner of the Pacific Ocean (McFadgen, 2007), and with more than 15,000 kilometres of coastline (Currie et al., 2013), New Zealand contains numerous deep ocean subduction trenches, active volcanoes, and vast mountain ranges, making it highly susceptible to a host of deadly natural hazards (McFadgen, 2007). In New Zealand earthquakes are identified as the most significant cause for tsunami, particularly if generated from the Hikurangi Subduction Zone (G. Leonard, observation, July 28, 2017). Despite the threat tsunami pose in New Zealand, public perception of tsunami risk remains

low, primarily due to the historic infrequency and size of tsunami events occurring here (Currie et al., 2013).

McFadgen (2007) notes that over the past 150 years tsunami in New Zealand have been relatively small, although this has not always been the case. Accounts of what happened in New Zealand prior to European arrival are gleaned through Māori oral traditions, which are passed down through the generations. Many of these oral traditions describe natural disasters, including tsunami, that are supported through geological and archaeological evidence (McFadgen, 2007). While often difficult to date and interpret, many Māori oral traditions speak of ground shaking and waters receding before inundation, and refer to 'Taniwha', representing 'sea monster' or 'danger in the water' (McFadgen, 2007). Catastrophic events are also represented in Māori place names, folklore, and cultural practices (McFadgen, 2007). For example, Okato in New Zealand's North Island can be translated to mean "sweeping wave", which is consistent with a devastating tsunami known to have occurred there (McFadgen, 2007; NZ History, 2017).

1.2 Official Emergency Management/Tsunami Preparedness Organisations in New Zealand

The three main groups officially involved with overseeing tsunami preparedness, hazard, and emergency management efforts in New Zealand include: (1) the Ministry of Civil Defence and Emergency Management (MCDEM) and their sixteen regional offices; which in this case is the Bay of Plenty Emergency Management Group (BOPEM) and the Wellington Regional Emergency Management Office (WREMO); (2) the relevant city and regional councils; and (3) GNS Science (GNS).

1.2.1 MCDEM

The emergency management framework used at MCDEM is the 'Four R's approach', emphasising: risk reduction, readiness, response, and recovery (G. Leonard, field communication, July 28, 2017). Initiatives are also being introduced to encourage individuals and communities to consider aspects of personal responsibility and resilience building (Ward, Becker & Johnston, 2008). This can be seen in the "Long, Strong, Get Gone" campaign, recently disseminated across a range of mass media platforms. Here, MCDEM recommend that instead of waiting for official warnings, individuals should evacuate immediately when earthquakes are long (lasting longer than one minute), or strong (difficult to stand up in) (Currie et al., 2013).

1.2.2 BOPEM and WREMO

BOPEM and WREMO are MCDEM's relevant semi-autonomous regional organisations that coordinate Civil Defence and Emergency Management services and initiatives in collaboration with the seven councils existing in the Bay of Plenty region (BOPEM, n.d.) and the nine councils existing in the Wellington region (WREMO, n.d.).

1.2.3 Local Councils

Effective communication strategies are essential when council representatives engage with the public (Gough, Johnston, & McSaveney, 1999). The main councils relevant to this project are the: Tauranga City Council and Bay of Plenty Regional Council in Pāpāmoa, and the Wellington City Council and Wellington Regional Council in Rongotai.

Johnston (1998) noted that many of the Bay of Plenty residents surveyed about natural hazards in their region expressed concern about a lack of natural hazards strategy from their

council and felt that in many cases preparedness work was undertaken on an ‘ad hoc’ basis. This was also acknowledged by Pāpāmoa ward Councillor, Steve Morris, during a community meeting, in which he explained how for nine years the council did nothing to prepare for tsunami, but in the past three years several improvements had been developed (S. Morris, observation, July 27, 2017). A Wellington example provided by Currie et al. (2013), explains that members of the public declined to be interviewed in their survey because of a lack of trust in the local council.

1.2.4 GNS Science

GNS has shown a strong interest in understanding hazard preparedness among the public in recent years (Currie et al., 2013) and is considered to be both a credible and neutral source of hazard information. Currie et al. (2013) note that many potential participants refused to participate in their research until GNS was mentioned; suggesting that the role of GNS in matters of preparedness could be increasingly leveraged.

2.0 Literature Review

2.1 Theoretical Review: Emergency Management and Tsunami Evacuation

2.1.1 Hazards, Disaster, and Catastrophe

Measured in terms of injuries incurred, lives lost, property damaged, and environments degradated; disasters are not determined by the hazard itself, but rather by the ability of people and communities to manage the consequences (Coppola & Maloney, 2009). Catastrophic disasters are more likely to occur in areas that are either underdeveloped and/or densely populated, with poor infrastructure and/or limited disaster preparedness planning (Du, Ding, Li, & Cao, 2015). For example, Oliver (2011) explains that India, Indonesia, and Haiti have experienced a disproportionate number of natural catastrophes throughout history, and believes that many in the United States and Europe may exhibit "a disbelief that such a thing could befall them" (p. 17).

2.1.2 Vulnerability

While loss and destruction are outcomes commonly associated with disaster and catastrophe, it is clear that some people and groups appear more vulnerable than others (Paton, 2007a). Typically influenced by a range of physical, social, economic, and environmental variables (Coppola & Maloney, 2009), "vulnerability refers to the population's capacity to anticipate, cope with, and recover from the impact of a hazardous event." (Du et al., 2015, p. 27). Examples of vulnerability can be seen when different groups of people or communities experience the same hazard, yet experience opposite outcomes (Coppola and Maloney, 2009).

2.1.3 Tsunami Warnings and Evacuations

2.1.3.1 Warning System Technologies

A range of technologically advanced warning systems are currently being tested and introduced in New Zealand, and discussions are currently underway to determine whether fixed position, tone-only tsunami siren systems are needed in more coastal cities, such as Tauranga (G. Leonard, field communication, July 28, 2017). According to Fraser, Leonard,

and Johnston (2013), Wellington City has mobile sirens that can be placed on vehicles, which are driven around the coastal areas to warn the public of an imminent tsunami approaching. However, these are clearly unsuitable for local-source events, due to the time delay and risk to personnel, who would need to drive into hazardous zones to issue the warnings. Warning sirens have a number of flaws and can create a false sense of security, especially for local-source events, therefore perceptual issues surrounding the role and function of tsunami warning sirens must be considered (Auf der Heide, 1989; Fraser et al., 2013). Research conducted by Currie et al. (2013) found that many Wellington residents they surveyed about tsunami sirens expected a warning to sound, but were unsure of what it would sound like and when it would be used. To increase their effectiveness, suitable early warning frameworks and public communication initiatives are needed (Fraser et al., 2013; Leonard, Johnston, Paton, Christianson, Becker, & Keys, 2008), alongside measures designed to enhance the awareness of natural tsunami warning signs.

2.1.4 Evacuation Example from the Literature

Existing evacuation literature is usually either heavily focussed on U.S.-based disasters, such as hurricanes and bush fires, or is geared towards distant-source, rather than local-source tsunami events (Fraser et al., 2013). However, the 2011 Tōhoku event provides some useful insights and lessons regarding local-source tsunami evacuations, in which people: (1) experienced confusion around evacuation warnings; (2) left safe zones prematurely because they incorrectly assumed the worst was over; and (3) perished due to delayed or non-evacuation, while looking after others (Fraser, Leonard, Matsuo, & Murakami, 2012).

2.1.5 Use of a Motor Vehicle to Evacuate

Mode of travel is a key aspect to consider in tsunami evacuation planning (Fraser et al., 2013). Current evacuation literature indicates that most people attempting to evacuate will do so by car because of the perceived time and safety benefits, familiarity, and convenience of cars in 'normal' circumstances (Fraser et al., 2013; Lindell, Kang, & Prater, 2011). Following an earthquake falling debris and damaged roading networks, coupled with increased traffic congestion can create significant issues with fatal consequences, particularly in urban coastal communities (Fraser et al., 2012). Fraser et al. (2013, p. 8) refer to a study by Yun and Hamada (2012), which found that 26 percent of all fatalities in the Tōhoku event were caused by people being stuck in, or abandoning, their vehicles during tsunami inundation. Disaster prevention officials from Japan's Kamaishi district also expressed that the importance of evacuating on foot was not fully impressed onto their residents, causing numerous fatalities (Fraser et al., 2012). In contrast, locations reporting lower fatalities attributed this to prior messaging, encouraging people to evacuate on foot (Fraser et al., 2012).

2.1.6 Vertical Evacuation Structures and Designated Evacuation Buildings

Designed to provide a source of refuge in low-lying tsunami inundation zones, vertical evacuation structures have saved the lives of many (Fraser et al., 2012) and are currently being built in strategic locations throughout the Pāpāmoa community. However, in areas unable to house these structures, existing concrete buildings can also be designated for evacuation purposes in advance (Fraser et al., 2012). An example from Ōfunato, Japan showed that emergency management officials reported some initial resistance from building owners there, citing concerns about night-time access and questioning who would be responsible for the evacuees (Fraser et al., 2012). This is a valid concern, as consent must be obtained from business owners, before buildings are designated.

2.1.7 *'Tsunami Tendenko'* Philosophy

A relatively new initiative proposed in tsunami evacuation literature advocates the *tsunami tendenko* philosophy. The premise behind *tsunami tendenko* is that every individual in the community knows what to do in a tsunami evacuation and must immediately self-evacuate, even if it means 'leaving others behind' (Fraser et al., 2012). While this may seem easy in theory, it is a challenging task in practice and is fundamentally at odds with some cultural practices and the current way of thinking. Currie et al. (2013) questions whether this can actually be adopted in practice; while Fraser et al. (2012) offers examples from Tarō, Kesennuma City, and Ishinomaki in Japan highlighting its usefulness. In these examples, parents are said to have died driving to collect their children from schools that were not inundated, or where their children survived on the upper floors of school buildings.

2.1.8 Schools and Tsunami Evacuation

Like businesses, schools play an important role in their local communities and in tsunami preparedness efforts. They were not directly included in this research, however schools were frequently mentioned by business leader participants in the interview conversations. New Zealand has no formal requirement for tsunami exercises in schools, and while most schools do understand that they have a duty of care for their students until they have been returned to their parents/guardians, a majority of schools, even those in coastal locations, have never conducted tsunami drills (Johnston, 2011; Fraser et al., 2013). Schools have also been used as 'Civil Defence Community Hubs' in previous hazard evacuations in New Zealand (field observation, 2017). However, as noted by Emergency Management Bay of Plenty representatives (field communications, November 17, 2017) schools are now being discouraged for use in community evacuations because certain controls are necessary to ensure that 'unsavoury characters' are not entering school grounds.

2.2 Theoretical Review: Businesses Preparedness

2.2.1 Business and Preparedness

As seen in the Christchurch and Kaikōura Quakes, natural disasters can have a devastating impact on local business and community outcomes. Nevertheless in previous research, businesses have displayed limited preparedness activity (Lindell & Perry, 2002; Paton & McClure, 2013). For example, a study by Forsyth and Johnston (2005) following the 2003 Fiordland earthquake, found that businesses were less likely than the general public to stockpile food and water, and to secure heavy movable items to lessen earthquake damage. Given that household preparedness is already low, these findings were noted as a key area of concern. A lack motivation and action from business leaders who fail to prepare, takes on additional significance and its implications can become more widespread (Paton & McClure, 2013). With this in mind, government and emergency management agencies are urged to make a special effort to contact businesses in advance to ensure they are adequately prepared (Lindell & Perry, 2002).

In a business setting, post-hazard issues can be felt through the entire supply chain and may include: production problems, inability to access premises, disruption to key infrastructure, and loss and/or damage to equipment, materials and stock (Paton & McClure, 2013). Eroded social structures, cognitive limitations, and decision-making in stressful post event situations further impair their response and recovery outcomes (Nilakant, Walker, Kuntz, de Vries, Malinen, Näswall, & van Heugten, K, 2017). Businesses supplying non-essential items and services often suffer the most significant economic downturn (Paton & McClure, 2013), as shifts in consumer spending following a disaster can inevitably make it difficult for these businesses to survive (Finsterwalder & Grey, 2017). On the other hand, an increase in demand for certain businesses, such as trade-based organisations, can present new

opportunities in the recovery phase (Paton & McClure, 2013), providing they can survive that long.

2.2.2 The Roles of Business in Society

Every business and every disaster is unique (Finsterwalder & Grey, 2017), but by understanding the relationship that exists between businesses and their employees, and businesses and their communities, a more comprehensive understanding of preparedness can be developed (Paton & McClure, 2013).

The Roles of Business in Society

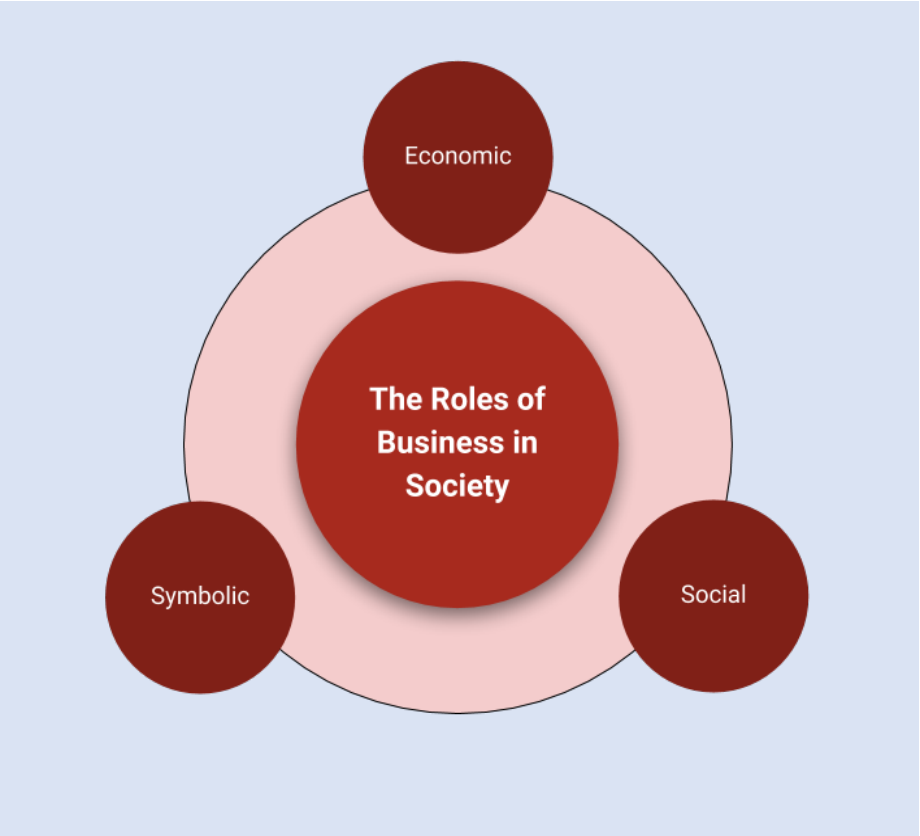


Figure 1 The Roles of Business in Society (Researcher's own, 2018)

2.2.2.1 Economic Role of Business in Large-Scale Hazard Events

Numerous examples from around the world have shown that when businesses are forced to close, for whatever reason, they become economically and competitively disadvantaged (Paton & McClure, 2013). Prepared businesses are often better equipped to safeguard the livelihoods of their employees and to support the economic recovery of their community (Paton & McClure, 2013). For instance, after the Christchurch Quakes, the CBD area was closed and 'red-zoned' for more than 18 months, causing widespread unemployment and economic losses (Paton & McClure, 2013). And following the Boxing Day Tsunami, decimated crops and fishing boats resulted in over 400,000 people losing their livelihoods in Sri Lanka alone (Tibballs, 2005). By engaging with business leaders it is hoped that some of these losses can be avoided if disaster strikes.

2.2.2.2 Social Role of Business in Large-Scale Hazard Events

" … Businesses and other organisations should not, indeed cannot, exist in isolation from the communities in which they are embedded" (Hall, Malinen, Vosslamber, & Wordsworth, 2016, p. 13). Many business leaders feel a responsibility to 'give back' to their local communities (Coppola & Maloney, 2009). This feeling can be amplified after disaster scenarios, with prepared business leaders often being in a position to fulfil an important social role by donating their time, expertise, equipment, and supplies to recovery efforts (Paton & McClure, 2013).

2.2.2.3 Symbolic Role of Business in Large-Scale Hazard Events

Finsterwalder et al. (2017, p. 134) refers to Nelson (2006) to explain how department stores can be more than just a retail outlets, and in cases such as in Pāpāmoa, they can also be considered as symbolic local institutions. In light of this, when businesses are able 'bounce back' from a hazard event, it can empower the community to do the same through an

increased sense of normality and symbolism. The opposite can also apply when businesses are unable to recover, as seen in the highly publicised and ongoing Christchurch Cathedral re-build debate.

2.3 Theoretical Review: Barriers to Preparedness

2.3.1 Tsunami Preparedness Barriers

Business leaders are exposed to barriers, as is anyone in the general public (Paton & McClure, 2013), but their specific barriers can also be unique. There are numerous socio-cultural and practical barriers involved in tsunami preparedness. The researcher has selected some key barriers found in existing literature and throughout the report findings to highlight some of these challenges.

2.3.2 Socio-Cultural Barriers to Preparedness

The socio-cultural environment provides the setting in which risk perception is interpreted, making it a powerful force to consider in emergency management communication (Smith & Petley, 2009). Some of the key socio-cultural barriers relevant to this research are outlined below.

2.3.2.1 Risk Perception

Risk perception studies explore why and what people fear (Coppola & Maloney, 2009). In the context of this communication-based report the major focus is on subjective risk perception, which does not stem from reproducible or formalised processes, and can change over time (Smith & Petley, 2009). The public tend to take more precautions for high-frequency events, over low-frequency events, regardless of whether the low-frequency event carries higher potential loses (Slovic, Fischhoff, & Lichtenstein, 1982; Paton & McClure, 2013). Paton and

McClure (2013) assert that this bias is largely a result of people's propensity towards a short-term rather than long-term outlook.

A person's risk perception generally forms as a result of the complex interaction between the attitudes of those around them and previous personal experiences dealing with the hazard, therefore perceptual barriers can be inaccurate and difficult or frightening to modify (Smith & Petley, 2009). In instances where people are unable relate to, or cannot understand hazards, their risk perception can further reduce and barriers to preparedness can occur (Smith & Petley, 2009). For example, in their Wellington-based survey, Currie et al. (2013) found that many participants did not perceive tsunami to be a credible threat in New Zealand, even though they were being interviewed in potential inundation zones. Furthermore, of the Timaru participants surveyed in Becker (2010), most felt that a disaster event 'could happen', rather than 'definitely would happen' there.

2.3.2.2 Apathy

Another major socio-cultural preparedness barrier to overcome, is apathy. Hewitt (1983a) argues that "the apathy people show to disaster issues is undoubtedly a causal factor for calamitous events" (McEntire, 2004, p. 196). This sense of hopelessness inevitably leads to reduced preparedness planning and self-protective action (Oliver, 2011). For example, it is often difficult for emergency management agencies to generate enough public support and funding to implement effective preparedness initiatives because, as Oliver (2011, p. 17) explains:

> You are asking people to prepare for events they don't want to think about and use resources they don't want to use; but if the events do happen and you are not prepared, you will be blamed.

2.3.2.3 Fatalism

Not limited to aspects of national culture, culture also refers to a range of cultural components or sub-groups existing in our society. Business culture is one such group. Referring to a study by Ripley (2008), Oliver (2011, p. 16) argues that disaster survivors are more likely to be found in deterministic cultures, whereby people believe their own purposeful actions can make a difference to the outcome of catastrophic events. However not every culture embraces this type of approach, in fatalist cultures people subscribing to this view may believe:

> It won't happen here, if it does happen here, it won't happen to me. If it does happen to me, it won't be that bad. If is that bad, then I couldn't have done anything about it anyway, so why try?" (Oliver, 2011, p. 15).

2.3.2.4 Culture of Dependency

Lower levels of self-protective action can also be born from a "culture of dependency" mindset, created when people incorrectly assume that governments and/or emergency management organisations are fully prepared and will always step in to help them in an emergency situation (Oliver, 2011; Coppola & Maloney, 2009). Auf der Heide (1989) supports this observation, noting that oftentimes public awareness of a hazard risk is underestimated, and the response capability of emergency organisations is overestimated. In light of this, a lack of mutual engagement and misunderstandings can occur when emergency

managers fail to understand that the general public are unlikely to receive and interpret preparedness information in the same way as them (Paton & McClure, 2013).

2.3.2.5 Community Developments

In addition, it is important to consider the negative impact that social developments have on preparedness (McEntire, 2004). One of these social structures is capitalism. Key critical school figure, Karl Marx (1818-1883) postulated that capitalism would produce great wealth, and simultaneously create significant social inequities (McEntire, 2004). This point is illustrated when "individuals, businesses, and governments … overlook the importance of mitigation and fail to participate in strategies to reduce disasters because of competing interests" (McEntire, 2004, p. 196). This can be seen in the development of high-end beachfront suburbs and in population-dense, disaster-prone areas (Auf der Heide, 1989), which are currently underway in Pāpāmoa.

While population growth is inevitable in New Zealand, it is essential that this is managed sustainably, without knowingly compromising people's safety. Sustainable development ensures that the needs of the present are sufficiently considered without compromising the needs of future generations (Jurin, Roush, & Danter, 2010). However as critical theorist and sociologist Mileti (1995, p. 122) argues, effective and sustainable adaptation to natural hazards is regularly constrained through a lack of judgement in decision-making (McEntire, 2004). To counter this, Mileti (1999) stresses that a shift in thinking is required, in which short-term goals are rejected and a preparedness culture is established (McEntire, 2004).

2.3.3 Practical Barriers to Preparedness

2.3.3.1 Limited Mitigation Efforts

Mitigation efforts aim to reduce the consequences of a disaster occurring and can include various aspects ranging from land use planning, structural building codes, to warning systems (Coppola & Maloney, 2009; Paton & McClure, 2013). In a business context, there is a perception that mitigation efforts are expensive and complicated to carry out (Paton & McClure, 2013; Webb, Tierney, & Dahlhammer, 2000). As a result, many business owners are willing to prepare for small-scale events, but avoid long-term measures that can help facilitate their business' survival and resilience (Paton & McClure, 2013).

2.3.3.2 Insufficient Organisational Emergency and Continuity Planning

Organisational emergency and continuity planning is a proactive, holistic, and systematic management process designed to reduce the consequences of potentially disruptive events to a manageable level both during and after hazard events. Overall, these plans should:

1. Be executable without warning
2. Minimise loss of life and injury
3. Safeguard assets and property
4. Limit the pervasiveness of disruptions
5. Reflect the organisation's culture and beliefs
6. And, provide an integrated, time-bound, and coordinated emergency management framework that works in collaboration with other agencies and organisations (Bowers, 2012; Auf der Heide, 1989; Paton & McClure, 2013).

Industry-specific plans will vary, depending on a range of factors relating to the functions and capabilities of each organisation, so responsibility for the creation and maintenance of continuity plans lies with an organisation's senior management team (Bowers, 2012). Importantly, these managers must be supportive and committed to implementing the plan, and be willing to 'free-up' the resources needed (Bowers, 2012).

Bowers (2012) offers the following additional steps that can be taken to improve continuity planning and application, as follows:

1. Leaders and staff must be well trained in the response procedure in their own and other key roles, in case their colleagues become absent or incapacitated.
2. Planners must consider alternative communication and technology systems in case of failing infrastructure.
3. And 'backup' locations should be earmarked in advance, to allow the efficient transfer of business functions to other locations out of the disaster zones.

2.3.3.3 Lack of Knowledge and Training

Auf der Heide (1989) argues that although written continuity plans are important, they are not enough on their own to guarantee organisational preparedness. And cautions that plans can also lead to an 'illusion of preparedness' if they are not tied to relevant training programmes and exercises. While training drills can help provide some familiarity, by supporting the response capability of employees (Paton & McClure, 2013), communication strategies surrounding the drill must also be attended too. For example, in national exercises such as MCDEM's 'ShakeOut' Drill, business community engagement is needed to ensure the business audience is aware of the initiative, so they can effectively 'get onboard'.

2.3.3.4 Time and Money

The public, including business leaders, are exposed to various type of hazards on a daily basis. The more uncommon the hazard risk, the less likely people will be willing to devote time or money to it (Morgan, Fischhoff, Bostrom, & Atman, 2002; Coppola & Maloney, 2009). In a business setting it is usually difficult for most managers to perceive and substantiate the benefits of preparedness; yet to be successful management support and funding for necessary equipment and supplies is essential (Auf der Heide, 1989). For instance, Auf der Heide (1989) explains that in situations where staff members are assigned disaster planning tasks, they are usually still expected to continue on with their daily duties at the same time and are unlikely to be paid any extra for their efforts. Further, rewards and recognition are seldom offered to personnel wanting to contribute to disaster preparedness activities in their organisation (Auf der Heide, 1989). This is in line with Leonard, Paton, Johnston, and Mitchell (2004) who identified that hazard issues are generally perceived as being less important than other day-to-day demands and activities.

2.4 Theoretical Review: Communication Theory

This theoretical review discusses applied preparedness communication and reiterates the role that communication theory and practice can play in improving tsunami preparedness outcomes. It concludes with an overview the key communication theories that guided the researcher through this project.

2.4.1 Applied Preparedness Communication

Applied communication research has been highly effective in promoting change and awareness in organisational and public health settings for decades due to its speciality in understanding how important information is communicated to internal and external audiences

(Kreps & Herndon, 2001; Coppola & Maloney, 2009). With this in mind, applied communication techniques have the potential to generate data that offers socially relevant feedback and solutions for pressing problems and challenges found in everyday life (Frey, Botan, & Kreps, 2000; Kreps & Herndon, 2001), although they remain under-utilised in emergency management contexts to date (Arneson, 2001; Coppola & Maloney, 2009).

2.4.2 Four Stages of Emergency Management Communication for Tsunami Events

Emergency management communication involves four distinct phases (*see Figure 2*). This project is primarily focussed on the initial preparedness phase, which is underpinned by a desire to reduce hazard vulnerability for as many people as possible, by educating and equipping those who may be affected by a disaster, and those who may assist in one (Coppola & Maloney, 2009).

The Phases of Emergency Management Communication

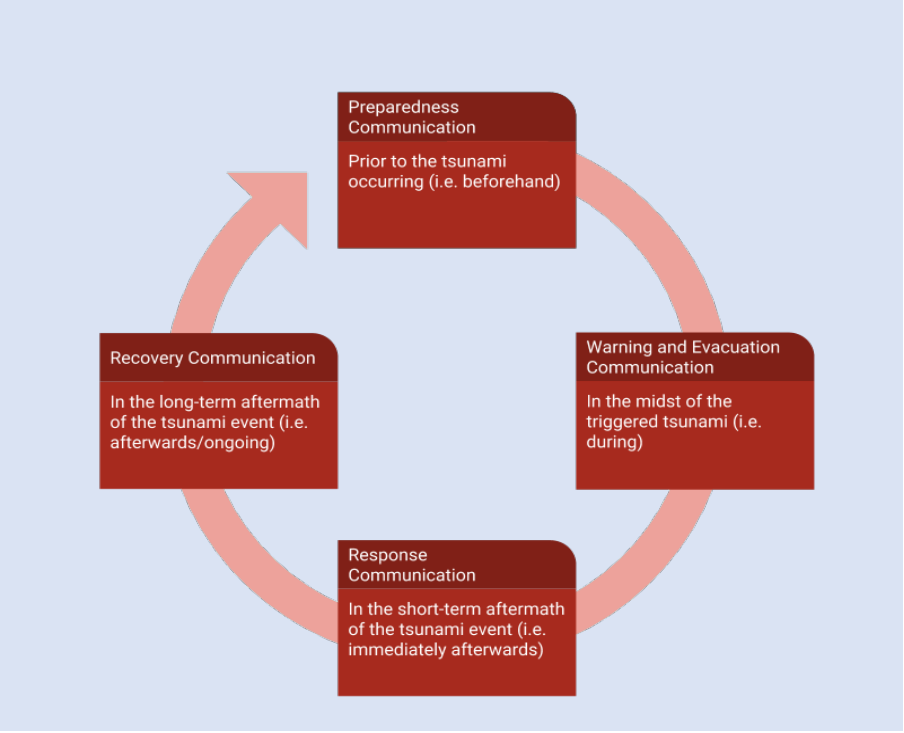


Figure 2 Four Phases of Emergency Management Communication (Adapted by Researcher)

2.4.3 Guiding Communication Theory: Segmentation Theories

As noted, emergency management communication is a challenging task, requiring a detailed understanding of: (1) the intended audience; (2) their social setting; and (3) the most suitable communication channels and methods that can be used to connect with audiences (Coppola & Maloney, 2009). The general public is highly diverse, so trying to reach everyone through a mass media approach creates a risk that those most able, or willing to, improve their preparedness behaviour will be missed (Coppola & Maloney, 2009). To counter this, segmentation theories distinguish various subgroups within an audience or population based, to ensure meaningful messages can be developed and delivered effectively (Lester, 2016). From a specialised communication perspective segmentation strategies should consider aspects, such as the audiences' preferences, behaviours, attitudes, existing knowledge, learning styles, and actual willingness to be involved (Coppola & Maloney, 2009).

2.4.4 The Situational Theory of Public Relations

The situational theory of public relations culminates two previous theories developed by classical theorists Dewey (1927) and Blumer (1966), in which topics of decision-making, information use, and public opinion are explored (Kim & Grunig, 2011). Originally a public relations based theory, its application is actually much broader (Kim & Grunig, 2011). Refined and formalised by J. E. Grunig (1968) the situational theory of public relations aims to: (1) gauge the publics' responsiveness to a given problem or situation; (2) predict their anticipated communication behaviours; (3) understand the effect of the communication on their cognition, attitudes and behaviours; (4) explore the extent and quality of communication in key stakeholder relationships; and (5) assess the likelihood that publics will be willing participate collectively in the initiatives (Grunig, 2013).

2.4.4.1 Independent Variables of the Situational Theory of Public Relations

Communicators apply the situational theory of public relations by segmenting the population into smaller target audiences based on the following three independent variables:

1. Problem Recognition

   Problem recognition is the first step to be discussed (Illia, Lurati, & Casalaz, 2013; Lester, 2016). This concerns the extent that individuals know something needs to be done about a problem, topic, issue, or situation; which causes them to actively think about possible solutions to overcome it (Grunig & Hunt, 1984; Johnston & Sheehan, 2014).

2. Constraint Recognition

   Next is constraint recognition. Constraint recognition occurs when people believe there is a barrier, or obstacle, in eliciting changes to the problem, topic, issue, or situation (Lester, 2016). This is important because when people perceive that there are too many barriers, they will be less likely to: (1) communicate; (2) get involved and/or (3) change their existing behaviours towards it (Kim, 2011; Lester, 2016). Constraints may come in many forms, however the main barriers include time availability, access to resources, and personal vulnerabilities.

3. Level of Involvement

   Level of involvement considers how personally and emotionally invested a person is about the problem, topic, issue, or situation (Grunig, 1984; Lester, 2016). The more willing and able people are, the higher their level of involvement and commitment will be.

2.4.4.2 Two Additional Dependent Variables of the Situational Theory of Public Relations

Grunig later added two further dependent variables to the theory. The first, information seeking is defined as an active communication behaviour involving the intentional scanning of the environment for messages relating to a specific topic (Kim & Grunig, 2011). Accordingly, if an individual perceives a particular issue or situation as being a problem,

understands that it is personally relevant to them, and sees no major barriers toward it, they will be more motivated to seek out information about it (Kim & Grunig, 2011). Conversely, information processing typically occurs through unintentional and passive encounters with messages (Kim & Grunig, 2011). Grunig has conducted extensive investigations into the validity of these variables over the years and continues to support its existence and predictive capability (Hamilton, 1992), asserting that "only the unsophisticated public relations practitioner would try to communicate with active publics through the mass media" (Grunig, 1989, p. 19; Hamilton, 1992, p. 132).

The Situational Theory of Public Relations Variables

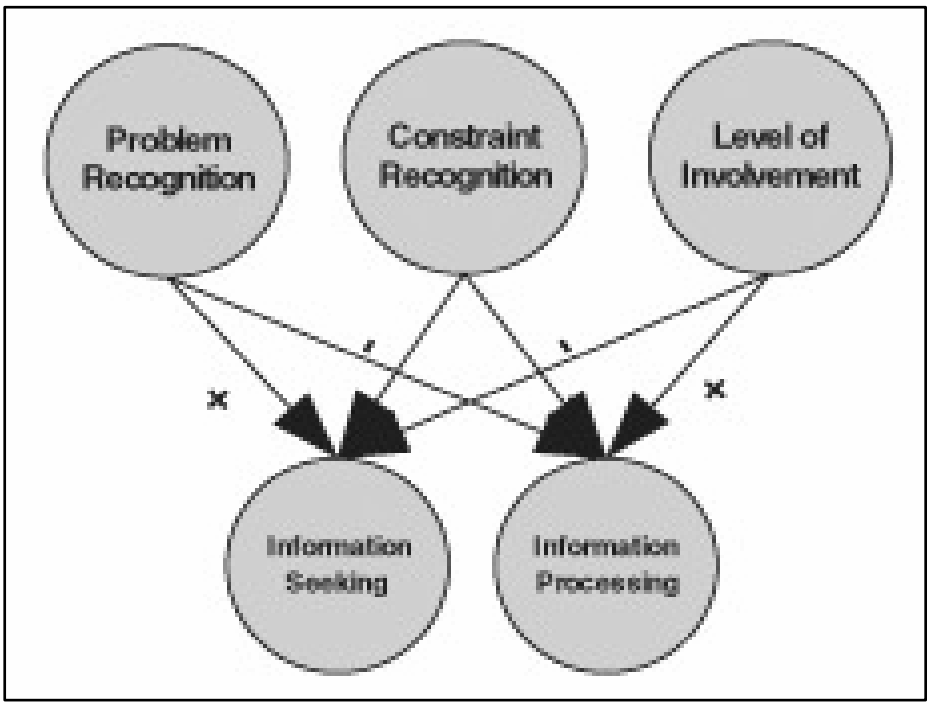


Figure 3 Variables in the Situational Theory of Public Relations (Kim & Grunig, 2011).

2.4.4.3 Four Key Segments of The Situational Theory of Public Relations

By understanding an individual's association with each of the variables above, communicators can classify publics into one of the four public segments below:

1. Active Publics

The least passive, active publics identify the topics or situations as being a problem and are actively involved in finding a solution to it (Lester, 2016). They will typically go out of their way to understand and engage with the information that is made available to them (Illia, 2013; Lester, 2016) and display a willingness to share that information with others (Kim & Grunig, 2011). According to this theory, active publics are the highest priority public for communicators to target in their communication efforts.

2. Aware Publics

Aware publics see the problem, topic, or situation at hand, but do not currently seek a solution to it (Lester, 2016). Often times the constraint recognition variable will determine whether a public can move from the 'aware' to 'active' segment, therefore any identifiable barriers should be reduced or eliminated as quickly as possible (Lester, 2016).

3. Latent Publics

Latent publics are aware of the topic or situation, but do not recognise it as being a legitimate problem (Lester, 2016), although this is subject to change (Johnston & Sheehan, 2014). Importantly, latent publics will only process information given to them by chance, and they will rarely reflect upon it (Illia, 2013; Lester, 2016).

4. Non-public

Non-publics represent the most passive of the four segments (Lester, 2016). They do not acknowledge, or expect to be affected by, the problem, topic, issue or situation at hand (Johnston & Sheehan, 2013; Lester, 2016). Thus, they are the lowest priority group to target in communication initiatives.

The Four Key Public Segments of the Situational Theory of Public Relations

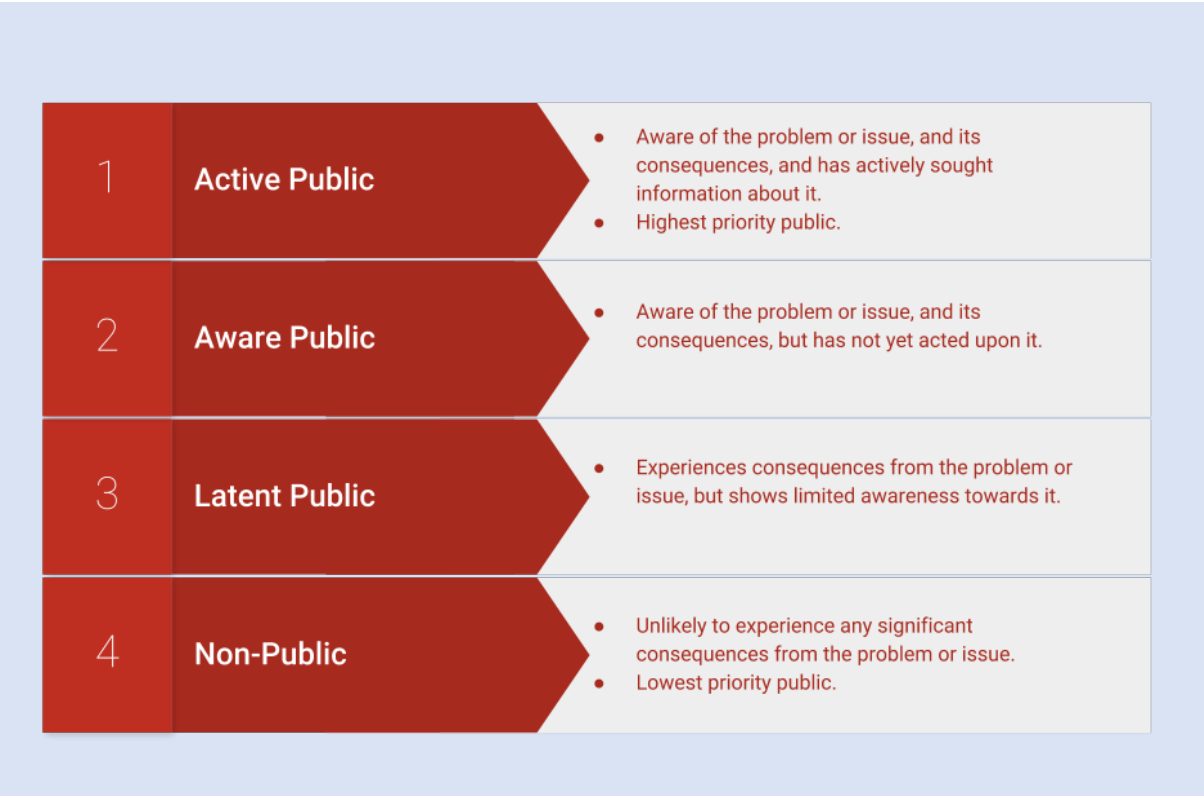


Figure 4 The Four Publics in the Situational Theory of Public Relations (Kim & Grunig, 2011).

2.4.5 Diffusion Theories: Two-Step Flow of Communication Theory and Opinion Leadership

Diffusion theories were first conceptualised following a study during the 1944 US presidential election, in which Lazarsfeld, Berelson, and Gaudet (1948) found that radio, newspapers, brochures and other similar media had only a slight influence on voter decision-making (Cohen, 1964). Instead, voters were most influenced by people in their own lives, such as their friends, family, colleagues, and/or community contacts (Cohen, 1964). The basic premise behind the two-step flow theory is that ideas flow from the mass media on to 'opinion leaders', and from 'opinion leaders' on to the less active segments of society (Katz & Lazarsfeld, 2006). Fundamentally at odds with the 'hypodermic needle' or 'magic bullet' approaches of the day, in which audiences were characterised as passive receivers of information (Rogers & Kincaid, 1981; Cohen, 1964; Dearing & Meyers, 2012), Katz and Lazarsfeld (2006, p. 33) urged communicators to "make room for people as intervening

factors" in the persuasion process. And viewed mass communication efforts as contributory factors, rather than the overriding factor in creating attitude and behaviour change (Cohen, 1964). In doing so, this theory decreased the importance of mass media communication and increased the importance of interpersonal communication networks in attitude change initiatives.

2.4.5.1 Opinion Leadership

'Opinion leaders' are defined as informal mediators (Cohen, 1964) with "the ability to informally influence other individuals' attitudes or behaviour in a desired way with relative frequency" (Rogers & Agarwala-Rogers, 1976, p. 138). Difficult to identify to the untrained eye, 'opinion leaders' can be found across every economic and social level of society (Katz & Lazarsfeld, 2006). Making up about five percent of a social system (Dearing & Meyer, 2012), they have greater access to external or expert sources of information and display higher conformity to the social norms of the groups they lead (Rogers & Agarwala-Rogers, 1976). Their influence tends to occur through dialogue and example setting within their social groups (Dearing & Meyer, 2012). As trusted group members they can either help or hinder adoption processes, by accepting or rejecting the new ideas they are presented with (HCCC, n.d.).

The Two-Step Flow of Communication Theory and Opinion Leadership

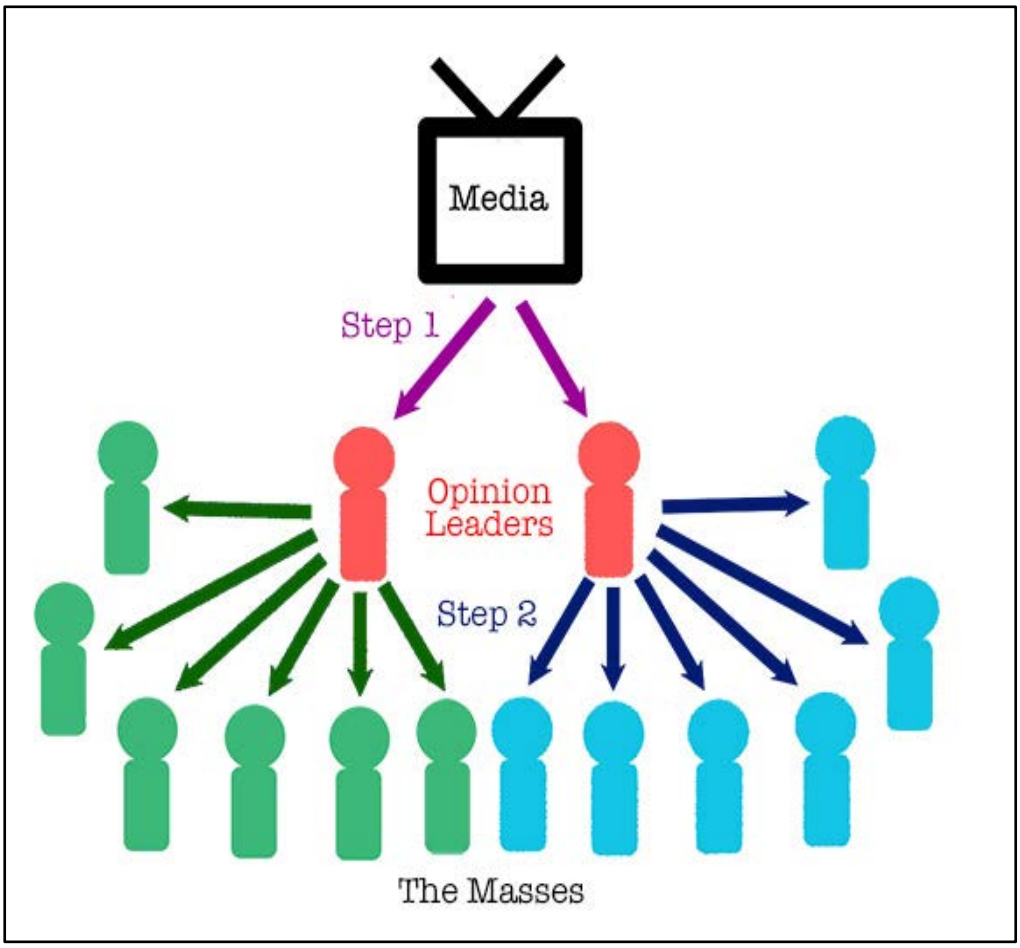


Figure 5 The Two-Step Flow of Communication Theory (Kuchta, 2017)

2.4.6 Diffusion Theories: Diffusion of Innovations Theory

In 1962 Everett Rogers extended upon the two-step flow model, by developing the diffusion of innovations theory. In doing so, Rogers reviewed thousands of studies and integrated vast amounts of empirical and practical data from various contexts around the world (Baran & Davis, 2012; Seibold, Lemus, Ballard & Myers, 2009). One such case conducted by Rogers and colleagues in 1972, served as a catalyst for the application of the diffusion studies approach in this tsunami preparedness project.

Initially found in Littlejohn and Foss (2004), the theory is explained with regards to a rapid and highly successful programme initiated by the South Korean government in 1968 aiming to reduce its burgeoning population problem (Rogers & Kincaid, 1981). Drawn to this case by the opportunity to gain valuable insight into communication networks, Rogers and colleagues interviewed approximately 1000 women from twenty-four villages across the country (Littlejohn & Foss, 2004), where approximately 12,000 mothers' clubs had previously been established to spread family planning information and to encourage women to adopt birth control (Rogers & Kincaid, 1981; Littlejohn & Foss, 2004). Each club consisted of approximately twenty-five members; which Rogers later hypothesised as being an ideal number to create attitude and behaviour change, particularly if communication channels are available for new ideas to be communicated from external sources (Rogers & Kincaid, 1981). In the early stages these groups were mainly focussed on indirect small-scale community initiatives that did not threaten existing points of view (Rogers & Kincaid, 1981). This approach strengthened trust relationships and created a fertile foundation to support group members and to utilise the newly developed communication networks. The clubs overcame many obstacles; nevertheless birth rates dropped considerably over a short period of time and what started out as a family planning initiative, soon extended well beyond its original purpose, by simultaneously enhancing community spirit and resilience (Rogers & Kincaid, 1981). Importantly, the most successful of these groups were those with well-connected leaders, who engaged regularly with group and community members via ongoing face-to-face communication (Littlejohn & Foss; 2004) and in the groups where members could continue to discuss issues among themselves (Littlejohn & Foss, 2004).

The linkages between this case and the Pāpāmoa community for this project are seen in the findings section of this report. The researcher is yet to identify diffusion studies having been previously applied to tsunami preparedness communication research.

2.4.6.1 Diffusion of Innovation Theory: The Key Five Elements

The five main elements operating within the diffusion process are: (1) knowledge/awareness of the new innovation or idea; (2) the chosen communication channel, or medium used; (3) the social setting, and (4) cultural setting involved in the diffusion process; and (5) the time taken for the new innovation to be adopted in society (Seibold et al., 2009; McLean, 2017).

1. Knowledge/Awareness of the Innovation

   Individuals experience a high degree of uncertainty when deciding whether to adopt and implement a new innovation or ideas (Rogers et al., 1996). Yet, this uncertainty takes on greater significance in an emergency management context, where there is often limited experiential knowledge to draw on. In the absence of available hazard information and/or understanding, people typically turn to others to make sense about what they should do to manage their exposure to natural hazards (Paton & McClure, 2013). Therefore, the diffusion of innovations theory specifies adopters impressions as an important part of their decision-making process. Rogers codifies these as: relative advantage, compatibility, observability, trialability, and complexity, with each of constituting the perceived benefits and costs of a positive adoption decision (Dearing & Meyer, 2012). These aspects are outlined in the graphic below.

Decision-making Considerations in the Diffusion of Innovations

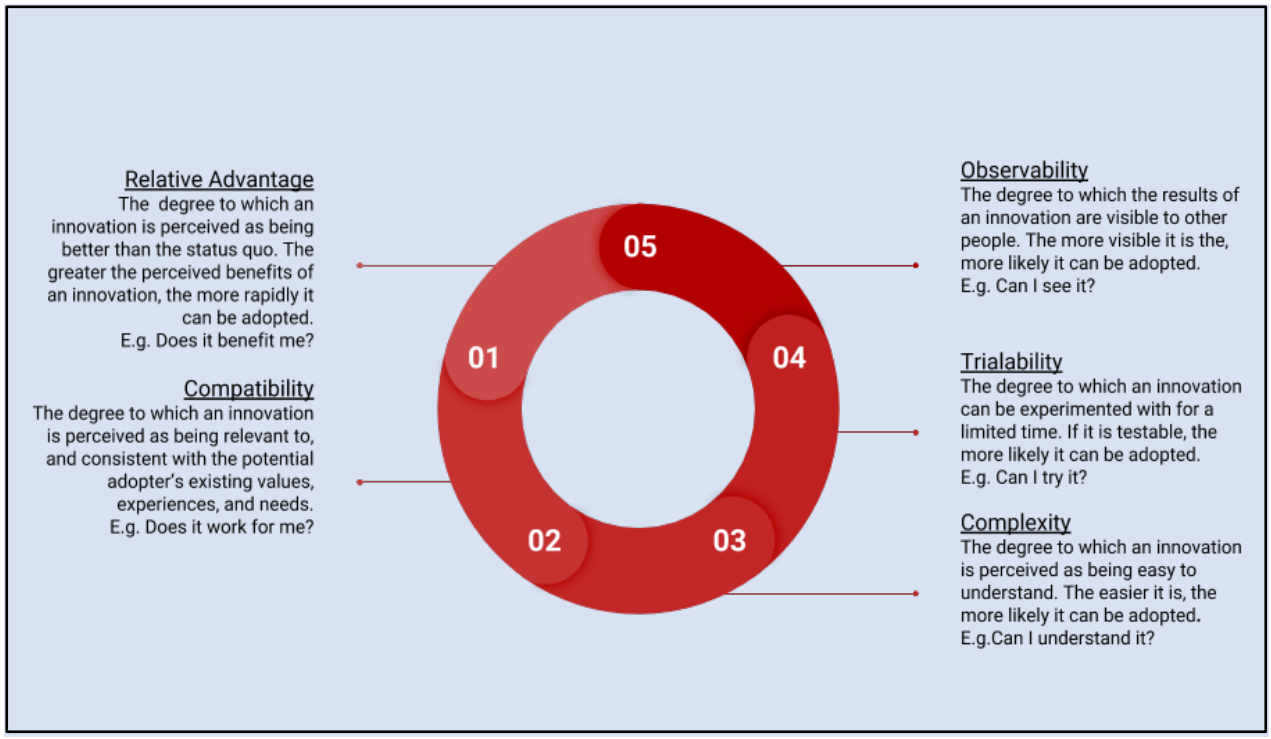


Figure 6 Decision-making Considerations in the Diffusion of Innovations (Adapted from HCCC, n.d; Bajabaa, 2012; Rogers, 1995)

2. Communication Channels and Networks

Communication filters through a nexus of mediating components, such as individual predisposition, perceptions, influences, and experiences that are brought to light through networked communication channels (Cohen, 1964). In their book, *Communication Networks*, Rogers and Kincaid (1981) are critical of the use of linear, one-way models of communication for creating social change. Arguing for a more convergent, or holistic model, and stressing that there are no guarantees that one-way mass communication will be received or acted upon in the way the sender intends; they continue by noting that when people are viewed as "object[s] or unit[s] of analysis … the relational nature of human communication is lost" (p. 39) because unlike with physical phenomena or objects, people have their own minds and purposes (Rogers & Kincaid, 1981).

These crucial factors must not be overlooked when selecting and applying audience-based communication strategies (Rogers and Kincaid, 1981). As each audience will have different communication needs, it is vital to consider the most suitable channels of communication to meet those needs (HCCC, n.d.). For example, one audience may prefer traditional communication channels such as the radio, while another may prefer face-to-face community meetings, or any combination of the two (HCCC, n.d.). To reiterate, information alone will often not be sufficient enough to move individuals toward a positive decision and seriously contemplate action, but rather as the diffusion theory suggests, dialogue is usually the key (Dearing & Meyer, 2012). Furthermore, if the correct channel is not carefully chosen at the outset, members of the public will not adequately be made aware of the innovation and will not discuss it within their communication networks (Johnson & Sheehan, 2014). Hence, the diffusion of innovations theory has gradually evolved into a local level framework to guide communications planning in a contemporary social context (Melokte, 2012).

The role of interpersonal communication networks is stressed here more than with any other communication theory (Rogers, Singhal, & Quinlan, 1996). Interpersonal communication networks help potential adopters to answer questions about an innovation, build familiarity with it, and increase its appeal (HCCC, n.d.). Katz and Lazarsfeld (2006) also explain that communication initiatives are far more likely to succeed if mass communication approaches are reinforced by interpersonal networks to create usable knowledge of new practices that encourage audiences to adopt exogenously introduced ideas (Katz & Lazarsfeld, 2006; Melkote, 2012).

3. Social Setting

The social setting serves as an 'anchorage point' for individual opinions, attitudes, habits, and values to be collectively and continuously generated and maintained among like-minded individuals (Katz & Lazarsfeld, 2006). Rogers et al. (1996) note that people will primarily evaluate new ideas, and decide whether to adopt them, on the basis of discussions like-minded peers who have already adopted or rejected the innovation for themselves. This is emphasised when 'opinion leaders' are in some way important to the potential adopter, as in a business and community context (Rogers & Kincaid, 1981; Littlejohn & Foss, 2004). Additionally, Katz and Lazarsfeld (2006) found that attitudes and opinions are more stable if they are shared within a group because people tend to change their minds collectively, rather than individually. This change can either occur internally from within the group or externally through contact with outside change agents and/or agencies (Littlejohn & Foss, 2004). The essential point here is that diffusive activity is carried out through social relationships within a social setting (Dearing & Meyer, 2012). However, as "individuals in modern society are usually members of more than one group [or subgroup]" (Katz & Lazarsfeld, 2006, p. 94), tied together in a range of different contexts, each audience needs to be studied within the groups and contexts to which they belong, or can be influenced by (Katz & Lazarsfeld, 2006).

4. Culture

Culture is a fundamental part of diffusion studies, both in the nature of what is being diffused, and as an element of the context in which diffusion takes place (McLean, 2017). Diffusion studies lacking an understanding of culture are likely to be mechanical exercises (McLean, 2017). By gaining a thorough understanding of the local culture, communicators can better identify 'opinion leaders', and select the most appropriate communication channels for the social setting (HCCC, n.d.).

2.4.6.2 Diffusion of Innovation: Adoption Rates

The time variable is considered to a much greater extent in the diffusion of innovations, than in any other communication theory (Rogers et al., 1996). Resistance levels and the amount of social support needed to adopt new innovations will vary across social systems, particularly as behaviour change usually takes many years to occur and spread (Littlejohn & Foss, 2004). Recognising this, Rogers and colleagues viewed the diffusion of innovations theory as a means to shorten this time lag.

The Diffusion Theory Curve

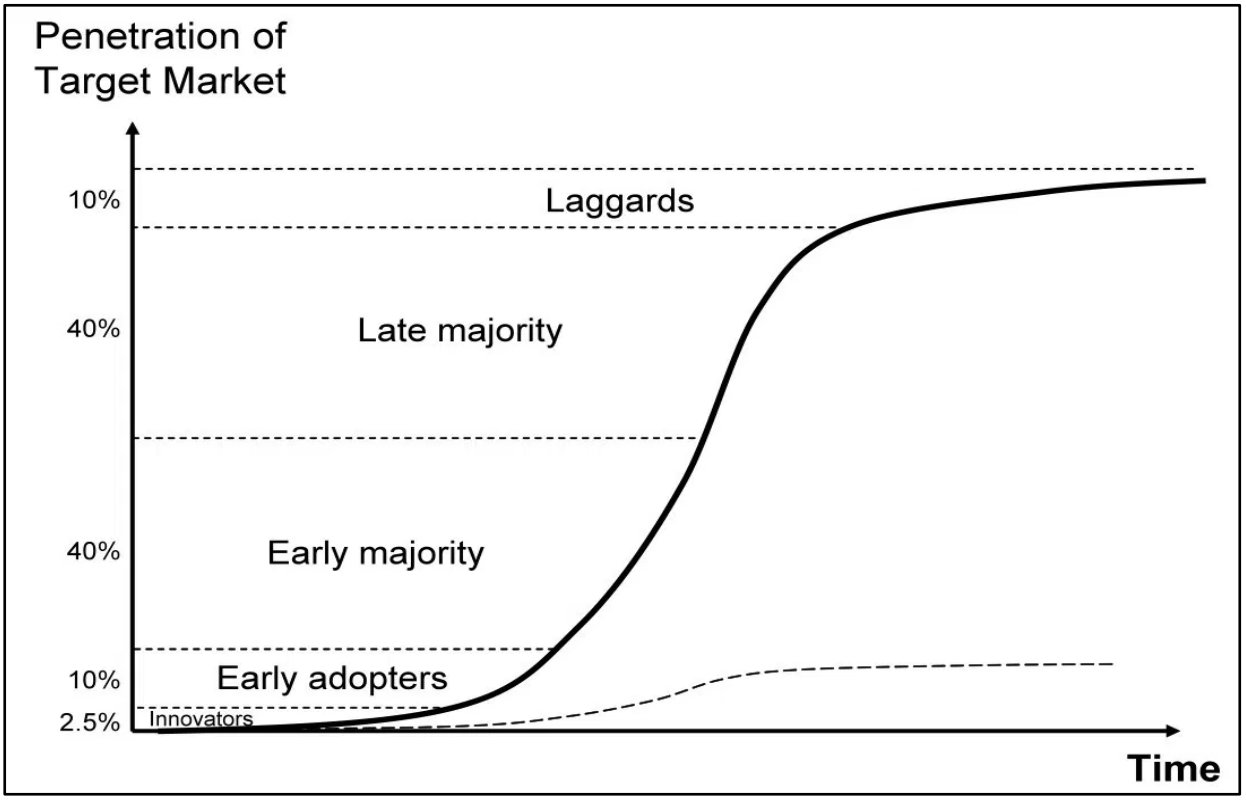


Figure 7 The Diffusion of Innovations Curve (InvestAura, 2017)

This curve illustrates how people are initially slow to adopt new behaviours, but as the behaviours become better known and accepted, more people start to practice it, until it eventually becomes self-sustaining and critical mass occurs (Rogers et al., 1996; HCCC,

n.d.). The horizontal x-axis represents the time taken to adopt an innovation, while the vertical y-axis shows the percentage of people adopting it (HCCC, n.d.). For example, in the beginning, fewer people may be familiar with, or trust an innovation, so the adoption percentage is low (HCCC, n.d.). As time passes, and more people begin to adopt it, the narrower and taller the curve will become (HCCC, n.d.). A closer look also shows how the different elements, explained earlier, can accelerate the adoption path, particularly in close-knit, resilient communities (HCCC, n.d.), such as Pāpāmoa.

2.4.6.3 Diffusion of Innovations: Adopter Characteristics

The above figure also indicates five established categories identified by Rogers to explain the common adopter characteristics and behaviours generally found in society. These are outlined as follows:

1. Innovators (2.5% of the population)

   Making up just 2.5 percent of the population, innovators are the smallest proportion of adopters in a social system (Dearing & Meyers, 2012). The first to adopt an innovation, innovators are highly active scanners of information in their environment, who feel few constraints on their behaviour and explore ideas through heterogeneous information sources (Dearing & Meyer, 2012). Willing to take risks, and by no means passive receivers of information, they are described by Dearing and Meyer (2012, p. 43) as:

   > Creators, inventors, and sources of change ... [who are] ... extremely active in testing, manipulating ... and doing what it takes to create, both through language and through action, an innovation that precisely addresses the requirements of an acutely felt local problem.

2. Early Adopters (13.5% of the population)

Making up approximately 13.5 percent of the population, early adopters adopt an innovation earlier than most and without having previously received large amounts of information about it (Bara & Davis, 2012). They prefer credible communication from experts and specialised media sources (Coleman, Katz, & Menzel, 1966). Like innovators, early adopters are also more likely to take time out of the daily schedule to participate in external initiatives (Coleman et al., 1966). They thrive in leadership roles and embrace change ideas and opportunities (LaMorte, 2016). Additionally, early adopters do not need large amounts of persuasive material to convince them to change their behaviours; instead communication strategies appealing to this group will likely include printed manuals and information sheets that can be implemented within their own environments (LaMorte, 2016).

3. Early Majority (34% of the population))

Making up a further 34 percent of the population, the early majority still adopt new ideas before the average person. However, they will usually need to see evidence that at innovation works, or is possible, before they are willing to adopt it (LaMorte, 2016). Rarely leaders, the communication strategies appealing to this group include success stories from those similar to them, or clear evidence of the innovation's relevance and effectiveness (LaMorte, 2016).

4. Late Majority (34% of the population))

Those in the late majority are sceptical of change and uncertainty, and will only adopt an innovation once it has been successfully trialled by the majority of the population first (LaMorte, 2016). The 34 percent of people in the late majority are most likely to

be influenced by the decisions of those in their own social circles, such as their family, friends, neighbours, and work colleagues (Coleman et al., 1966).

5. Laggards/Non-Adopters (16% of the population)

Laggards are the last to adopt an innovation (Dearing & Meyer, 2012). They typically exhibit less social integration than others and are more likely to be passive rejecters of information (Dearing & Meyer, 2012). Making up approximately 16 percent of the population, these people typically fear change and uncertainty, and are the hardest group to stimulate behaviour change among (LaMorte, 2016). Strategies appealing to this population most often include pressure from people in the other adopter groups (LaMorte, 2016) and their own personal experience with the phenomena. People in this group that will never adopt an innovation, are known as non-adopters.

2.4.6.4 Diffusion of Innovations: Applied versus Critical Approaches

Applied approaches to the diffusion of innovations, emphasise the: (1) characteristics and perceptions of the innovations; (2) characteristics and perceptions of the innovators; and/or (3) varying parts of the social/environmental context (Dearing & Meyer, 2012; Wejnert, 2002). With this in mind, potential adopters are often viewed as being reactive, socially connected receivers and evaluators of new innovations or ideas (Dearing & Meyer, 2012). However in the critical approaches, adopters actually do more than this. They are viewed as influencers, who are simultaneously being influenced themselves (Dearing & Meter, 2012). Critical theorist Green (2004) posits that although external change agents are an important source of information in organisations, the main agencies for organisational change are its internal leaders (Dearing & Meyer, 2012). As full partners in the innovation process, they actively frame the innovation's meaning, which is particularly relevant with innovations that

aim to serve the public by making a difference in social conditions (Dearing & Meter, 2012). In this context, business leaders serving as tsunami preparedness conduits also become 'partners', who can create meaningful initiatives in their organisations and communities.

2.4.6.5 Diffusion of Innovations: Limitations and Recommendations for the Future

Despite the insights offered by diffusion studies, some limitations still remain. For example, in 1999, Katz (1957) noted that although the number of diffusion studies continues to rise, the growth of appropriate theory in this area remains at a standstill (Dering & Meyer, 2006). To counter this, Rogers et al. (1996) urged scholars to apply diffusion approaches to new contexts, whereby the focus of the individual as the unit of adoption is "broadened to the level of organisations and communities of practice" (p. 430). Rogers et al. (1996) also advocated for an increased use of qualitative methods and stressed the need for diffusion approaches that acknowledged locally generated solutions, to ensure the theory remained culturally appropriate and relevant to its end-users.

2.4.6.6 Combining the Situational Theory and Diffusion Studies Approaches

By segmenting participants into publics using the situational theory of public relations, and further categorising them according to the diffusion of innovations adopter characteristics, the most suitable 'opinion leaders' can be identified. Therefore, the best possible combination for a tsunami preparedness conduit in a business setting would be an 'Active Public', who is also identified as an 'Innovator' or 'Early Adopter'. With necessary support and engagement opportunities these people could then become highly influential 'flag-bearers' for tsunami preparedness, by facilitating a preparedness culture and developing initiatives that can help preparedness messages be reinforced and diffused throughout their communication networks.

3.0 Methods and Research Design

This methods chapter begins by outlining the literature that supports the chosen methodology for this research, it then discusses the steps used in the research design, including ethics, sampling, recruitment, data collection, and data analysis. The methodological review process carried out during this project has guided the researcher toward a better understanding of how and why different research methods are selected and applied. Rather than a singular approach, qualitative, hermeneutic phenomenology, pragmatism, and transdisciplinary methods were all utilised. Collectively these methods have provided a valuable methodological foundation for this research to be built upon.

3.1 Rationale for Qualitative Methods in this Research

'Paradigm wars' between quantitative and qualitative methodologies have existed for many years, however there is now a growing acceptance that both approaches have different goals and merits depending on: (1) what the research is aiming to achieve, and (2) the specific skills that the researcher possesses (Mutch, 2013; Graziano & Raulin, 2013). In this context, it is already becoming clear that the New Zealand public is largely unprepared for a significant tsunami event, and that confusion exists regarding the necessary responses required for different tsunami source events (*see* Dhellemme & Leonard, 2016). We now need to know *why* this is and *how* this situation can be improved. The researcher has selected qualitative research methodologies to best interrogate these issues. Five key benefits of qualitative research for this report can be seen in its:

1. *Naturalistic setting*

   Qualitative research makes sense of, and interprets phenomena, in the natural environment where the communication takes place (Jugenheimer, Kelley, Hudson, & Bradley, 2014; Litchman, 2014).

2. *Human Centredness*

   Litchman (2014, p. 31) quotes Holloway and Biley (2011, p. 974) to explain that qualitative research is "the most humanistic and person-centred way of discovering and uncovering thoughts and action of human beings."

3. *Descriptive accounts from the lived experiences*

   Qualitative research gathers descriptive accounts of the participants' unique lived experiences, to understand phenomena and the different meanings assigned to it (Mutch, 2013; Litchman, 2014).

4. *Consideration for complexities*

   Qualitative research is suited to complex topics that are unlikely to produce precise solutions (Beech, 2015).

5. *Flexibility to evolve*

   Qualitative research is flexible and evolves throughout the research process, allowing the researcher to modify protocols in response to realisations in the material, and through interactions with people being studied (Litchman, 2014).

3.2 Rationale for Phenomenological Research Methods in this Research

Broadly speaking, phenomenological research describes and interprets phenomena (Creswell, 2013). Its approaches are flexible and non-prescriptive (Daymon & Holloway, 2011), subjectivity is valued and context is vital (Cohen, Kahn, & Steeves, 2000). Cohen et al (2000, p. 3) use Kant's distinction (as summarised by Roche, 1973) to explain how phenomenology is the study of phenomena, or our experience of things, and not the study of noumena, or physical things. Here tsunami is the *noumena*; whereas people's experiences of tsunami, tsunami preparedness and their subsequent behavioural intent represent the *phenomena*, and serves as the major focus of this study.

A primary aim of phenomenology is to answer questions of meaning, and therefore it is particularly useful for better understanding multiple new topics or those requiring a fresh perspective (Cohen et al., 2000; Creswell, 2013). This report emphasises Gadmer's (1989) hermeneutical branch of phenomenology, which aims to retrospectively understand how people make sense of their everyday experiences through the use of language to recount their experiences to others (Cohen et al., 2000). Phenomenological researchers are tasked with accessing and interpreting people's everyday 'common-sense thinking' and must talk at great length with their participants during the data collection process (Daymon & Holloway, 2011; Litchman, 2014). As a result, a considerable amounts of qualitative data is generated (Cohen et al., 2000). The obtained data can be organised around these three common frames:

1. *The experiences of a place*

   Places are more than just a location on a map. They are anchored in their own unique history, culture, and ecosystem (Anttiroiko, 2014; Kapferer, 2008). Dynamic and largely defined by the people who live in them (Ind & Mariussen, 2015), places have 'power over people' (Boisen, 2015) in that they can positively or negatively influence people's perceptions, prospects, and value systems.

2. *The experiences of events over time*

   The various ways people experience events over time is highly important (Cohen et al., 2000) because it illustrates how a heterogeneous group of individuals can share subjective and objective experiences of the same phenomena (Creswell, 2013). Therefore, phenomenology describes the commonalities individuals experience through their shared and lived experiences with that phenomenon (Creswell, 2013).

3. *The ways of talking about experiences*

   Words are the primary way people express their meanings (Cohen et al., 2000). Hence, phenomenological researchers pay considerable attention to both language and the users of language. This is because people's understanding of language and the

> meanings they generate are often contained in the narratives or stories they tell to themselves, to those in their social circle, and to researchers "who come asking" (Cohen et al., 2000, p. 60).

3.3 Rationale for Pragmatic Research Methods in this Research

Litchman (2014) explains how pragmatic research should extend the literature and encourage action. Pragmatism comes in many forms, as pragmatics are not tied to any one system of philosophy or reality, but instead select multiple methods and techniques according to the specific needs presented by each study (Creswell, 2013). Consistent with the qualitative and phenomenological methods (previously discussed), pragmatism focuses on answering the *what* and *how* aspects of research and strongly emphasises contextual factors (Creswell, 2013). Furthermore, the final product of the research is of great concern to pragmatic researchers, as it aims to include the participants voice, a detailed description and interpretation of the research problem, and reflexivity from the researcher (Creswell, 2007). It should also remain unequivocally focussed on the consequences and outcomes that follow (Creswell, 2013).

3.4 Rationale for Transdisciplinary Research Methods in this Research

Wickson et al. (2006, p. 1047) explains how the scholarly landscape is rapidly changing and there is "... growing demand for research that takes account of complex contexts and interactions between natural and social systems". They argue that generalist, reductionist, and de-contextualizing approaches of the past, need to evolve and transdisciplinarity could be the solution (Wickson et al., 2006). Three distinguishing features include of transdisciplinarity include its:

1. *Problem-solving focus*

   As society is facing problems that manifest in the 'real-world', research must also seek to solve these problems in a 'real-world' context (Wickson et al., 2006).

2. *Evolving methodology*

   As transdisciplinary research develops in an iterative manner, responses also evolve based on information gained from participating stakeholders (Wickson et al., 2006).

3. *Need for collaboration*

   There is broad agreement that no single prescribed methodology exists in for transdisciplinary research and that the dissolution of disciplinary boundaries in both theoretical development and professional practice is necessary (Wickson et al., 2006; Lawrence & Després, 2004). A major objective of transdisciplinary research is to make knowledge less fragmented and compartmentalised by integrating academic scholarship with society at large (Arnold, n.d.; Pietrobon & Maldonato, 2010).

Specified as a backbone of this research project from its conception, transdisciplinary research is proving to be a highly effective and emerging approach to meeting the demands of emergency management and preparedness issues in a contemporary context. For this project, information was gleaned from a range of academic, governmental, and business stakeholders to gain holistic 'real-world' solutions to the issues and situations at hand.

The role of transdisciplinary researchers must also be mentioned here, as transdisciplinary researchers develop a deep understanding of the problem they are investigating and engage directly with it (Wickson et al., 2006). Much like in the critical approaches, they must go beyond objective practices and intertwine themselves in the research, rather than simply reporting on it (West & Turner, 2010).

3.5 Rationale for Audience-centred Design, Exploratory and Explanatory Research Analysis

3.5.1 Audience-centred Design

An audience centred approach was chosen because most emergency management and preparedness communication initiatives undertaken in New Zealand have been delivered through a 'mass' approach, on the basis that 'because natural hazard events can affect everyone, we have to tell everyone' [i.e. the masses]. However the general population receives and interprets information in a non-uniform manner (Coppola & Maloney, 2009). Therefore an audience-centred approach advocates for better identification and understanding of, the specific needs and characteristics of the audience, in order to effectively 'speak their language'. The more defined an audience, the more tailored the research and communication efforts can be (Coppola & Maloney, 2009).

For this project, the business audience was primarily chosen because: (1) the researcher has a background in business studies, (2) businesses play important roles within society (*see figure 1*) that can be leveraged in a tsunami event; and (3) there has been limited prior research conducted with this audience in tsunami preparedness literature. The Pāpāmoa community was chosen because: (1) the researcher was a resident there for six years, including at the outset of this project; (2) new tsunami preparedness initiatives, such as evacuation mapping, has recently been established there; and (3) it is an 'at-risk' coastal community with a rapidly growing coastal population. The Rongotai community was chosen because: (1) the JCDR research team is based in Wellington; (2) the 'Blue-Line' project has been underway in Rongotai for several years; and (3) the Rongotai community evacuated during the 2016 Kaikōura Earthquake, which occurred around the same time as this project was conceptualised. Coincidentally, neither communities currently have tsunami warning sirens

installed, so are dependent upon an awareness of natural warning signs and an understanding of the distinct responses required for local, regional, and distant source tsunami events.

3.5.2 Exploratory Analysis

This research was conceptualised as an exploratory study from the outset, as no prior tsunami preparedness communication research has been conducted with the Pāpāmoa or Rongotai audience, and limited existing understanding of the role of the business audience in tsunami preparedness exists. The project also explored the participants existing knowledge, awareness, and perceptions, and their future behavioural intent in tsunami preparedness initiatives.

3.5.3 Explanatory Phenomenological Analysis

Consistent with the approaches underpinning this project, the research aims to explain the participants 'lived experience' in the context of tsunami preparedness. In explanatory analysis, significant statements and quotes made by the participants during data collection are 'singled out' to gain a better understanding of how the participants experience the phenomenon at hand (Creswell, 2013). Statements and quotes are integrated with contextual factors and setting features, to form a thorough description of the phenomena, leaving the reader with a better understanding of each participant's experience (Creswell, 2013).

3.6 The Research Process

3.6.1 Sampling Techniques

In phenomenological research, the sample sizes are generally expected to include somewhere between four and fifteen carefully chosen participants (Creswell, 2013). Random sampling is not considered a reliable or suitable method here, because it is fundamentally at odds with the

phenomenological approach (Cohen et al., 2000). In light of this, a purposeful two-tier sampling method was selected by the researcher.

3.6.1.1 Purposeful Sampling

Purposeful sampling is a type of non-probability sampling technique chosen to suit the purposes of the research (Mutch, 2013; Denscombe, 2014). In purposeful sampling, decisions involving whom or what to include are based on certain criteria. In particular, those in the sample should share common characteristics or experiences in relation to phenomena of study (Daymon & Holloway, 2011). In this case, each participant has a business or business interest in a possible Pāpāmoa or Rongotai tsunami inundation zone. In accordance with both the theoretical underpinnings and objective of identifying potential tsunami preparedness conduits, or 'opinion leaders', the participants were also determined based on their willingness to be directly involved in the project. Informants were selected because they could provide greater depth and understanding about contextual factors, such as the local people, culture, issues, and events relevant to the study. Tsunami can impact any business in its path, therefore the size and type of business was not a major concern for this piece of research.

It is also important to note, that it is often more challenging to source participants from business organisations than the general public, because as Muto (2001) explains, businesses may be weary of allowing researchers in and there may be additional concerns regarding ethical issues, such as confidentiality. Their time is often even more limited than that of the general public too. With that in mind, the researcher is very thankful to the participants and informants for warmly welcoming her into their organisations.

3.6.1.2 'Two-Tier' Sampling

An additional 'two-tier' sampling system was also applied, in which informant conversations occurred prior to any participant data being collected, to ensure the researcher had a thorough understanding of tsunami and tsunami preparedness, and the local business and community contexts, before meeting with participants. This decision was highly beneficial and is recommended in future research, because it ensured that the researcher represented the funding organisations (GNS, the JCDR, and the School of English and Media Studies) in a knowledgeable and professional manner, and helped trust and credibility to be established.

3.6.2 Selecting the Sample and Background Profiling

The researcher initially conducted an online review of businesses and business leaders in the sample location, to identify and profile potential informants and participants. This helped the researcher gain a contextual overview of the Pāpāmoa and Rongotai business community, and prioritised which community/business leaders to contact first.

In a business context with senior business leaders, time is often limited and additional negotiations were often required to find a suitable time and day for interviews to be scheduled. In light of this and with a preference for indirect communication, four Pāpāmoa participants elected to carry out a qualitative email questionnaire instead. Of note, focus groups were initially offered to participants as well, but it soon became apparent that this method would not be suitable for this particular business context. A separate group of 'business-focussed' community informants were added to provide additional contextual information about the Pāpāmoa and Rongotai communities and relevant historical events in the area.

Once identified and contacted an informant/participant database was developed and updated throughout the project; keeping account of all relevant communication, online media content, and community initiatives informants/participants have been involved in. By taking this detailed approach the researcher had a thorough understanding of the informants/participants and their organisations, prior to the interviews being conducted. During the interview conversations, this helped the researcher to: (1) quickly build rapport with the informants/participants; (2) make better use of the informants/participants time; and (3) establish trust and credibility about this research project and the organisations represented.

3.6.3 Research Questions

The thirteen research questions listed in the report were drafted after the research objectives were finalised, to ensure the interviews remained focussed and meaningful, and that the findings could be effectively compared and contrasted. Hence, these ‘base questions’ were asked of all the participants and analysed accordingly.

The base questions were drafted in a funnel format, which begins with a broad line of questioning and becomes more specific throughout. This approach helped the researcher to establish rapport with participants, and directed their thoughts towards existing tsunami hazards, risk perceptions, and communication sources, before delving into their future behavioural intent. Considerations were also made to ensure that future responses were not unduly influenced by previous questions or prompts (Frey et al., 2000). For instance, RQ4 about the different tsunami sources was intentionally mentioned after the participants had already described their understanding of a tsunami in RQ3.

3.6.4 Interview Structures

3.6.4.1 Interview Guide

A pre-prepared interview guide was used to ensure that similar data was collected from all informants/participants (Daymon & Holloway, 2011). Initially ten 'base questions' were developed by the researcher and this transdisciplinary project's Master of Design student, Harmony Repia, and reviewed by our Supervisors (Associate Professor Elspeth Tilley, Dr. Erika Pearson, Tristram Sparks, and Jo Bailey), Dan Neely from WREMO, and Dr. Sally Potter and Dr. Graham Leonard from GNS. Then some additional, more audience-specific questions were added to our interview guides to enable greater synthesis and some cross-pollination of the main research themes to occur.

3.6.4.2 Participant and Informant Interview Schedules

Each participant and informant interview conversation was originally intended to be approximately 30 minutes duration, however all ended up lasting between one and three hours. Again, in a business context where 'time is of the essence', this further highlights the willingness of the businesses audience to contribute. The participant interviews were qualitatively-based and semi-structured around the thirteen main research questions, and five main research objectives. The research questions were are asked of all participants.

Informants were asked a slightly different set of less structured questions, relating to issues relevant to their local communities. The researcher was a Pāpāmoa resident for six years, so already had a thorough understanding of the community culture; however the interviewed Pāpāmoa Informant could offer considerable information about community preparedness issues and its growing population through his experience as a local ward councillor and tsunami siren campaigner. Conversely, the researcher was unfamiliar with the Rongotai community prior to data being collected there and relied upon the Rongotai Informant to

share information about the Rongotai community and their collective Kaikōura Earthquake experiences.

3.6.4.3 Interview Tools

Informants and participants were given the option of an audio-recorded interview or researcher fieldnotes. In most cases researcher field notes were the preferred method. This was largely due to three main factors: (1) because of the nature of the 'off the record' information being provided; (2) the public location of many interviews (i.e. cafés), and (3) to maintain rapport or 'authenticity' of the conversational approach between both parties. In the audio-recorded conversations, researcher notes were also taken in case of equipment malfunction, which occurred in one Pāpāmoa participant interview.

3.6.4.4 Interview Resources

The researcher took a folder along to each interview, which included eight existing tsunami preparedness communication initiatives for valuable participant feedback. A photo of these can be seen in the Appendices, and consisted of:

1. A WREMO Earthquake Planning Guide
2. The set of five Pāpāmoa and Mount Maunganui evacuation maps
3. A Rongotai evacuation map
4. A Hawaiian (Hilo Bay) tsunami preparedness guide for businesses
5. A business emergency planning checklist booklet
6. A photograph of Wellington's 'Blue-Line' project
7. 'ShakeOut' Drill information
8. The WREMO community workshop brochure

Feedback provided by interviewed participants about these sample resources is provided in the ‘Key Findings and Discussion’ section of the report.

3.6.4.5 Interview Setting

The researcher gave participants the choice of interview location. For those that had to remain onsite due to the nature of their role, their own business office or meeting rooms were chosen. The remaining interviews were conducted in local Pāpāmoa and Rongotai cafés near the coast, and in one case a participant travelled to the researcher's location (45 minutes’ drive away) to participate in the interview.

The interview setting is an important consideration in this type of fieldwork, for instance, in the business-based interviews participants were able to show the researcher site-specific information, relating to their preparedness initiatives, such as staff notice boards or the evacuation exits. The Rongotai cafe was also highly beneficial because it overlooked Lyall Bay Beach and the participants could gesture where they would evacuate too on the hills above, and imagine its potential impact, with a number of transient workers, and children playing on the beach at the time of the interview.

3.6.4.6 The Interview

A highlight of the data collection process was the openness displayed by the participants. Each participant offered something new to the research; actively sharing their concerns, insights, experiences, and suggestions freely. Most also expressed a willingness to continue

engagement with the researcher and/or future tsunami preparedness initiatives beyond the initial interview.

3.6.5 Email Questionnaire

In Pāpāmoa, four participants requested to conduct a qualitative email questionnaire asynchronously. The questions provided were based on the same thirteen research questions explained earlier (*see 3.6.3 Interview Questions*). Communication samples (*see 3.6.4.4 Interview Resources*) were available on request, but none of the email participants requested to see them. It took between one and six weeks for these email questionnaires to be returned.

3.7 Ethics

It is essential that research be carried out with integrity, honesty, and concern for the wellbeing of those being studied (Daymon & Holloway, 2011). Graziano and Raulin (2013, p. 25) explain that "each individual scientist [or researcher], in each research project, must make thoughtful judgements of how best to contribute to science and humanity" and that "it is the personal responsibility of each researcher to conduct his or her work so as to enhance both scientific understanding and human welfare." They continue to note that personal responsibility falls into these two basic categories, which served as ethical benchmarks for the researcher during the project: (1) to protect those who participate in the study, and (2) to ensure the research is conducted and reported accurately and honestly.

The researcher initially sought approval from the Massey University Human Ethics Committees and this project was deemed 'low-risk'. The researcher acted ethically throughout the project, by making 'follow-up' contact with informants and participants

requesting further preparedness information/action, and prescribing to the ethical guidelines outlined below.

3.7.1 Protecting Informants and Participants

To ensure the researcher protected the informants and participants in this project, specific considerations were given to: (1) gain their informed consent; (2) protect them from harm and deception; and (3) protect their privacy and confidentiality. To elaborate:

1. Informed Consent

   The participants in this study provided their free and informed consent to participate and could withdraw their consent at any time, none of which did so.

2. Protection from Harm

   Care was taken to ensure the participants suffered no emotional, physical, or reputational harm during the research, or as a result of the research outcomes. Counselling support information was on-hand, if needed, but it was not. In situations where participants assumed tsunami evacuation sirens were installed in their communities, the researcher advised these participants that this is not the case, and they must not wait for a siren to sound in a tsunami event.

3. Privacy and Confidentiality

   Participants' privacy and anonymity was adhered to through the use of generalised descriptions and confidentiality measures were undertaken, ensuring that information and examples provided during 'off the record' interview conversations were not disclosed. The informants and participants are all in senior leadership roles in their organisations and communities; therefore discretion was carefully maintained, without diluting the important data they provided.

3.7.2 Ethical Conduct and Reporting

The researcher confirms that all research data has been interpreted, reported, and referenced honestly. No vital information was unduly withheld or omitted from the report.

3.7.3 Qualitative Measures and Triangulation Techniques

In qualitative research validity, reliability, transferability, and credibility measures are used (Mason, 2001). Triangulation techniques were also selected to further enhance the credibility and applicability of the research.

3.7.3.1 Validity

Validity shows that the study actually measures what it sets out to do (Mutch, 2013). Although there are no set rules concerning the number of responses, the sample chosen should allow researchers to answer the key research questions and fulfil the objectives of the study (Bell, 1993). The researcher is confident of the validity in this piece of research, as the sample allowed all research questions and objectives to be meaningfully answered within the research parameters.

3.7.3.2 Reliability

Reliability considers whether the research instrument would produce similar results if applied by another researcher (Denscombe, 2014). Although this cannot be proven completely, the researcher has a kept a thorough 'research trail' to support the research methods and decision-making processes and to validate the interpretations made (Denscombe, 2014). However to note, the very nature of interpretative research makes it subject to some variation.

3.7.3.3 Transferability

Transferability concerns the extent that the findings can be transferred to other instances (Denscombe, 2014). For example, whether these findings be transferred to another community or hazard. As an audience-centred project, the principles and approaches could be applied in another setting and for another natural hazard, although it is not recommended that these findings be duplicated without consideration for any divergent contextual factors found among other audiences and settings.

3.7.3.4 Credibility

Credibility is concerned with ensuring the final research document is accurate, honest, and comprehensive (Daymon & Holloway, 2011). The researcher took a number of steps to ensure the research process and reporting is ethically robust, as outlined in the ethics section of the report. Credibility also highlights whether the findings will be able to resonate with those in, or familiar with, the case or setting (Denscombe, 2014). The pragmatic 'real-world' approaches undertaken by the researcher aim to encourage applicable findings and recommendations that will help improve tsunami preparedness in a New Zealand business and community context, particularly among the intended Pāpāmoa and Rongotai audience.

3.7.3.5 Triangulation of Method

Three methods were used to collect data: (1) semi-structured interview conversations; (2) email-based questionnaires; and (3) naturalistic observation. These methods were selected based on the communication needs and preferences of the business audience. Interview conversations revealed the richest data, with the email questionnaires enhancing these findings. Naturalistic observations utilised the researcher's strengths, while providing contextual reinforcements to holistically interpret the findings.

3.7.3.6 Triangulation of Sample

Three different types of respondents were sought in this research: (1) informants (relevant community leaders), participants (business leaders, owners, senior managers), and expert advisors (local emergency managers and tsunami science advisors). Again, this approach allowed deeper holistic insights to be gained, which is vital in audience-centred research.

3.7.3.7 Triangulation of Communication Theory

Three complementary communication theories guided the researcher in this project. Initially, the situational theory of public relations was applied to segment the general public into a targeted audience and highlighting how the willingness of participant's to be involved, their information-seeking behaviours, and their specific constraints have a strong influence on their ability to be proactive conduits for preparedness. Next, two diffusion theories were applied, the two step flow of communication, highlighted the importance of informal communication networks on the flow of information in society, viewing interpersonal communication as the major factor in influencing public opinion. And the diffusion of innovations theory, explained how effective engagement with identified 'opinion leaders' helps facilitate the spread of new ideas and practices through society by removing uncertainty, speeding up the adoption process, and enabling social change to occur. By triangulating these theories, the researcher was able to identify the most suitable 'opinion leaders' to act as tsunami preparedness conduits in the Pāpāmoa and Rongotai business communities at the present time.

3.8 Presentation of Data

As the research data is provided by two separate audiences, both data sets are compared, contrasted, and presented through a 'question-and-answer' reporting format whereby answers to each question summarised for both cases (Yin, 2014). This approach was chosen with the reader in mind, as a range of topics were discussed and it allows the reader to go straight to

the questions of interest. This is useful to highlight the need for, and importance of an audience-centred approach to tsunami preparedness communication. It also helps to determine the characteristics and problems that are predictable and recurrent, across both locations (Auf de Heide, 1989). It will conclude with a summary of each participant's/informant's profile applying the communication theory principles, and explaining the potential ways that they can act as conduits in their businesses and communities.

4.0 Key Findings and Discussion

This research was designed around the following five research objectives, exploring the business leaders':

1. Previous Hazard/Tsunami Knowledge, Awareness, and Experience (RQ2-RQ5)
2. Tsunami Risk Perception (RQ6)
3. Existing Tsunami Preparedness Information and Sources (RQ7-RQ9)
4. Barriers to Tsunami Preparedness (RQ10)
5. Identity and Future Behavioural Intent (RQ11-RQ13)

Unless indicated, the collected Pāpāmoa and Rongotai data is presented and discussed separately for each question, to highlight the differences that exist between the two audiences, before being combined and discussed as a whole.

Note: To protect the confidentiality of participants the comments in the analysis are presented at random and intentionally left un-coded. The number of responses to each question have been summarised to show that comments were not gathered and selected from a single participants; however in qualitative research the emphasis must not be placed on numerical analysis and values, but rather the interpretations and descriptions presented throughout the report.

4.1 Interest and Motivation for Research Involvement (RQ1)

RQ1: Why are you interested in contributing to this research and/or tsunami preparedness?

In line with the 'funnel interview approach' selected; this question was originally included as an 'icebreaker' that could also be used to explore the participants' motivations and intentions for being involved in the project. In the end, it became one of the most insightful questions, serving as an invaluable prelude to the forthcoming research objectives.

Pāpāmoa
3x Asked/contacted
3x To help/out of concern
2x To improve awareness/preparedness
2x Responsibility to be prepared
2x Responsibility as a resident

Overall, the Pāpāmoa participants contributed because they were invited and wanted to help. However, more specifically those completing interviews were typically motivated to contribute based on their perceived responsibility as leaders within their organisations and/or community.

→ "Because I was asked and have a responsibility as a business and community leader."

→ "Because I was asked and out of gratitude for the community. I see it as part of my responsibility and wanted to contribute to global scholarship in this area."

Whereas, those completing the email questionnaire were more motivated as residents of their community.

→ "Because I am a resident of Pāpāmoa."

→ "Because of where I live; I am a Pāpāmoa resident."

These findings are useful because highlights the different behaviour patterns, motivations, and perceptions of 'active publics' and potential 'opinion leaders' among the target audience.

Rongotai
5x To improve awareness/preparedness
3x Kaikōura Quake experience
2x Responsibility as a resident
1x Responsibility to be prepared
1x Prompted by family member
1x Family member's tsunami experience
1x Asked/contacted

In Rongotai all participants were given the option of completing either an interview or email questionnaire. All elected to complete an interview. Here, the overwhelming motivation to

contribute was based on personal experiences following the 2016 Kaikōura Earthquake, and a desire to improve their awareness and preparedness as a result.

→ "Because of my experiences following the Kaikōura Quake."

They also seemed to understand the importance of preparedness as a concept, to a far greater extent than their Pāpāmoa counterparts, and were more willing to have an open conversation about it.

→ "I personally think it's vital to contribute, and to be better prepared and more aware."

→ "By contributing we can help improve responses and increase awareness around tsunami."

Combined

7x To improve awareness/preparedness

4x Asked/contacted

4x Responsibility as a resident

3x Responsibility to be prepared

3x To help/ out of concern

3x Kaikōura Quake experience

1x Prompted by family member

1x Family member's tsunami experience

Summary

Overall, the Pāpāmoa participants participated because they were asked and wanted to help, either as leaders or residents in their community, while the Rongotai participants saw it as a valuable opportunity to improve their tsunami awareness and preparedness. This question was insightful because it illustrates many of the key points found throughout the report. The participants responded because they were contacted [engagement], were motivated because they felt a responsibility [identity] to improve tsunami preparedness/awareness [education/behaviour change/resilience] in their organisations and local communities [audience--based, not mass appeal].

4.2 Previous Hazard and Preparedness Experience (General and Tsunami Specific) (RQ2)

RQ2: Do you have any previous experience with hazard/disaster events and/or disaster preparedness initiatives in your business or community? Please explain.

This question provided an opportunity for participants to share any significant life experiences that may have motivated them to contribute, shaped their risk perception, and/or influenced their current preparedness level. Furthermore, having been in the Christchurch Earthquakes the researcher understands that recounting disaster scenarios can be distressing for some individuals. Therefore, this question allowed the researcher to gauge the participants sensitivity toward the topic before continuing, and to share her personal insight of a disaster scenario. This approach enhanced the rapport between the researcher and the participants,

with many explaining how much they appreciated someone with ‘real-life’ experience conducting this type of research.

Pāpāmoa

Hazard/Disaster Experience (generally)

3x Yes

4x No

‘Yes’ Examples

3x Previous/current work role

2x Christchurch Earthquake recovery

The Pāpāmoa community is a ‘young’ community, which has not recently been exposed to many major natural hazards events. However, they do have three useful examples of community recovery scenarios to draw on, as discussed with the participants. First, two participants mentioned the Pāpāmoa response to the 2011 Christchurch Earthquake recovery, in which the community rallied together to provide for new families relocating to Pāpāmoa after the Quakes. Second, the 2011 grounding of the Rena ship, which resulted in an major oil spill along the entire Pāpāmoa coastline (see Sargisson, Hunt, Hanlen, Smith, & Hamerton, 2012). And third, the 2013 PSA kiwifruit outbreak in neighbouring Te Puke. In each of these cases a collective community response shone through and ‘bureaucratic red tape’ decisions frustrated locals, who felt it hindered their ability to respond, as residents and guardians of

their community (*Kaitiakitanga* principle; see Marsden, 1992). With this in mind, it is likely that if faced with another potential recovery scenario, the Pāpāmoa community would seek to respond collectively, and independent of bureaucratic authority.

→ "I was involved in the Christchurch Earthquake recovery in the Bay of Plenty. I was the president of the Pāpāmoa Progressives, when the Rena ran aground, and I was here for the PSA kiwifruit outbreak as well."

→ "My [family members] were in the Christchurch Earthquakes and moved to Pāpāmoa afterwards. I was here during the Rena grounding. There was an emergency team, staff and volunteers in the area for that. And I was involved in two bomb scares, when I worked in town."

Rongotai

Hazard/Disaster Experience (generally)

5x Yes

'Yes' Examples

5x Kaikōura Earthquake

2x 2015 Storm

2x Previous/current work role

1x 2013 Seddon Earthquake

1x Tsunami threat from Chile Earthquake

Most of the Rongotai data collection coincided with the one year anniversary of the Kaikōura Earthquake. It is clear that this event left a lasting impression on the Rongotai participants, who explained that it was:

→ "A huge learning experience."

→ "A wake-up call here. It was terrifying."

→ "The most severe earthquake that I've ever experienced; the people here have a tangible experience now."

The Rongotai participants also identified two other general natural hazard events: the 2013 Seddon Earthquake and the 2015 Wellington Storms.

→ "During the 2013 Quake I worked over at the ASB sports facility and there was a national event on at the time with 1000 people to evacuate from the stands."

→ "In the 2015 Storms we had roofs come off and windows broken. Wellington was being demolished."

One Rongotai participant also described workplace incidents that occurred when he was working overseas.

→ “I've been in bomb scares and bomb threat evacuations, in winter, in the middle of the night, on some of London’s busiest streets.”

Combined

Hazard/Disaster Experience (generally)

8x Yes

4x No

‘Yes’ Examples

5x Kaikōura Earthquake

3x Previous/current work role

2x Christchurch Earthquake recovery

2x 2015 Storm

1x 2013 Seddon Earthquake

1x Tsunami threat from Chile Earthquake

Comparatively, it appears that the Rongotai sample has had significantly more natural hazard exposure, and work-related events/experiences than the Pāpāmoa sample. Nevertheless, Pāpāmoa does have plenty of experience with community recovery initiatives prior to 2013.

Both samples also had a participant who has experienced bomb threat evacuation during work hours. These two participants each showed the researcher an existing evacuation procedure posters (for general emergencies), which they had put on display in shared staff areas. They also explained their intended evacuation procedure at length with the researcher.

Interestingly, those completing the email questionnaire (who are all from Pāpāmoa), all answered 'no' to this question. This could represent a methodological bias, as it was expected that the qualitative interviews would provide a richer source of data than the survey method, primarily because: (1) more prompts or clarification of the question can be offered; (2) more rapport can potentially be established; and (3) more consideration is often given to the question. However, in line with the theoretical approaches applied in this project, 'opinion leaders' and 'active publics' are more likely to participate in a face-to-face interviews and thoroughly consider the issues at hand. Therefore, the participants completing the survey, and subsequently answering 'no', may have actually experienced a hazard event, but did not fully consider it when initially answering the question; there may be a link between hazard event experience and opinion leadership/active publics; or most likely a combination of the two.

Pāpāmoa Tsunami Experience (specifically) 7x No

None of the Pāpāmoa participants have previous tsunami experience.

Rongotai Tsunami Experience (specifically) 4x No 1x Yes

Only one Rongotai participant had some experience with tsunami. The participant began by sharing a family member's account of being in the Boxing Day Tsunami:

→ "He [family member] got hit with the water and thrown into a concrete wall and then it threw him over the wall and back into the water. He said there was nothing you could do and that the cars in the water would literally just disappear."

And also explained his experience of being in a distant-source tsunami evacuation in the Wairarapa, following an earthquake in Chile several years ago.

→ "Someone knocked on our door and said 'tsunami' and we were like oh yeah right, so went down to the beach to have a look and we sat on the hill to see if we could see anything, but that was probably the stupidest thing that we could do! I used to be blasé about these [preparedness] type of things."

The participant's tsunami risk awareness has increased through personal tsunami experiences and informal communication with others. However, despite acknowledging his previous error in judgement, it appears that other barriers (to be discussed later) have prevented this added awareness to translate into preparedness actions, as he explains:

→ "I'm still not prepared!"

Combined
Tsunami Experience (specifically)
11x No
1x Yes

Tsunami are low risk, high frequency events, so unsurprisingly the participants have limited, or no direct personal experience with them or their potentially devastating consequences.

Pāpāmoa
Preparedness Experience
3x Yes
4x No

The three Pāpāmoa interview participants each described various preparedness responsibilities required as part of past and present work roles and the preparedness concept comes naturally to them.

→ “I've always considered preparedness issues in all of my roles.”

→ “Preparedness is a major part of my work responsibilities.”

One of these participants is also a long-time Pāpāmoa resident and active campaigner for ‘fixed air-raid’ tsunami warning sirens to be installed in the community.

→ “In Pāpāmoa I am known as a ‘tsunami siren crusader’.”

Rongotai
Preparedness Experience
4x Yes

In Rongotai, the participants had a wide range of experience with preparedness initiatives provided by the health department, human resource management departments (in larger organisations), and local council groups.

→ “We have inspections from the Health Department and put posters up around the building to let people know about the different risks.”

→ “Our HR department deals with most of that kind of stuff.”

→ “I've had roles at the Lower Hutt City Council Health and Safety group.”

Two participants (both of which the researcher has identified as potential ‘opinion leaders’ in Rongotai) have contacted Civil Defence to be involved in official community preparedness initiatives. One successfully completed a course. The other (confidential) is arguably the most passionate participant and is a highly skilled first responder, did not get contacted back. This adversely affected MCDEM’s credibility with the participant.

→ “I contacted Civil Defence once, to be a volunteer, but no one got back to me.”

Combined
Preparedness Experience
7x Yes
4x No

In Pāpāmoa, participants discussed their preparedness experience in terms of current and previous work roles. Whereas in Rongotai, they discussed it in terms of official preparedness agencies and/or department initiatives. Hence, it is already becoming clear that the Rongotai

participants view preparedness as a separate and more formalised process or practice; beyond that of their standard managerial and workplace responsibilities.

4.3 Tsunami Knowledge, Understanding, Awareness (RQ3-RQ5)

RQ3: How would you describe a tsunami? [Specifically: What is a tsunami? Why does a tsunami occur? When can tsunami occur? Who is at risk of a tsunami? What are some natural warning signs of a tsunami?]

This series of questions, which explicitly relate to objective one, are designed to explore the participant's existing tsunami knowledge and awareness, allowing their responses to be 'benchmarked' against each other and against any subsequent research with these participants at a later date. For greater synthesis, a combined summation of the responses is provided for these findings.

Pāpāmoa

What is a tsunami?

3x A single large wave

2x A lot of water/body of water

2x A Wall of water

1x Did not specify, showed awareness

Most in the Pāpāmoa sample explained a tsunami as a large single wave or body of water.

→ “A large wave.”

→ “A heck of a lot of water surging onto land.”

However, one participant did make the connection between the tsunami hazard and its effect on the community.

→ “A wall of water that travels inland some distance and causes damage and loss.”

Rongotai

What is a tsunami?

2x A single large wave

2x A body/displacement of water

2x Did not specify, showed limited awareness

1x Wall of water

Again, reference was made to tsunami as being a large single wave.

→ “I have a general awareness of what it is; it's a big wave.”

An excellent description was made by one participant, however this participant was unaware that tsunami are usually more than one ‘wave’.

→ “It is a large displacement of water after movement on the tectonic plates; water recedes and unlike with a typical wave, it is a huge body of water that increases and speed and height the closer it comes in, and is above the high tide mark.”

Notably, two participants in Rongotai made specific reference to the fact that, after the first wave they would be tempted to go down to the coast out of curiosity. The researcher cautioned them against doing so, but this does highlight the fundamental importance of educating the public about how tsunami behave and how the public need to respond in, and prepare for, the tsunami aftermath and not only the initial evacuation. These crucial aspects appear to be missing from most existing communication material.

Combined

What is a tsunami?

5x Wave

4x Body/displacement of water

3x Wall of water

3x Did not specify showed limited awareness

Many tsunami eyewitnesses in the literature refer to tsunami as being like a ‘wall of water’, which was mentioned by three participants (two in Pāpāmoa and one in Rongotai). There was surprisingly, only one reference to the term ‘tidal wave’ (as tsunami are historically referenced as), in which one Rongotai participant knew tidal waves were different to tsunami, but did not know how.

→ “It is a large wall of water, I believe it’s only one wave or wall of water. I know it’s different to a tidal wave, but not sure how.”

Further investigation would be useful to determine whether other audiences (e.g. the elderly population) actually know the difference between the two, as this may impact their risk perception.

All participants understood that tsunami are ocean/coastal based. There was a higher than expected general/basic knowledge of what a tsunami is; however the most common description of a tsunami was a ‘single large wave’. In the interview conversations (not able to be verified in the questionnaire), many seemed legitimately surprised to hear that tsunami most often travel in a series of ‘waves’, and that oftentimes the second or third ‘waves’ are the largest and most destructive. To counter this flawed perception, more education is needed; but also an alternative solution could be for tsunami to be likened to/communicated as ‘tsunami trains’ (or similar) in preparedness material. Further research into the perceptual issues created when single tsunami waves are shown in signage and designed material could also be useful in the future.

Pāpāmoa

Why does a tsunami occur?

5x Understood seismic/earthquake trigger

1x Weather trigger

1x Did not specify, showed awareness

1x Did not specify, did not show awareness

Overall, very high awareness of seismic/earthquake trigger being the main cause of tsunami in New Zealand.

→ "They are normally triggered by under ocean earthquakes or tectonic plates shifting."

Two participants did not provide an answer to this question; one showed considerable awareness, while the other did not. Some confusion still exists about whether tsunami are weather related, but tsunami are not weather events, and do not produce wind generated waves.

→ "It is triggered by seismic or weather triggers."

Rongotai

Why does a tsunami occur?

5x Understood seismic/earthquake trigger

All Rongotai participants understood that tsunami in New Zealand typically occur due to a seismic/earthquake trigger; which could indicate awareness/traction of the ‘Long, Strong’ messaging, and/or higher earthquake hazard awareness following the Kaikōura Quake.

→ “It's normally associated with earthquakes or movement of the tectonic plates, which causes movement in the ocean.”

→ “From movement on the tectonic plates.”

Combined

Why does a tsunami occur?

10x Understood seismic/earthquake trigger

1x Weather trigger

1x Did not specify, showed awareness

1x Did not specify, did not show awareness

The above average understanding of seismic/earthquake triggers displayed in both the Pāpāmoa and Rongotai participants is encouraging. Although, more emphasis on the fact tsunami are not like standard wind-driven waves could still be beneficial.

Pāpāmoa

When can tsunami occur?

3x Understood seismic/earthquake trigger

3x Anytime

1x Did not specify, showed awareness

1x Did not specify, did not show awareness

Again, seismic/earthquake triggers were most commonly referred to by the Pāpāmoa participants. Participants also began specifying ‘long’ or ‘strong’ earthquakes explicitly; further supporting the traction of recent media messaging.

→ “After a strong earthquake.”

Most specified/understood that tsunami can happen anytime; without advanced warning.

→ “It can occur at any time.”

However, high awareness that tsunami can happen at any time does not necessarily mean people will be motivated to prepare in advance. As shown earlier, awareness does not automatically increase or lead to preparedness.

Rongotai

When can tsunami occur?

5x Anytime

3x After an earthquake

1x After movement on the tectonic plates

1x With a full moon

Again, we see very high awareness of the seismic/earthquake trigger for tsunami. All Rongotai participants confidently mentioned that tsunami can occur anytime.

→ "Anytime, typically after an earthquake."

→ "Anytime, when there is movement on the tectonic plates."

Although, one participant did question whether tsunami are more likely to happen when there is a full moon:

→ “With a full moon?”

This may relate to previous media reports and social media posts from the likes of Ken Ring in relation to historical earthquake events/predictions.

Combined

When can tsunami occur?

8x Anytime

4x After movement on the tectonic plates/seismic trigger

3x After an earthquake

1x With a full moon??

1x Did not specify, showed awareness

1x Did not specify, did not show awareness

Pāpāmoa

Who is at risk of a tsunami?

3x People/businesses/communities in coastal areas

2x People living near shoreline/coastline/coastal zone

2x Did not specify, showed awareness

High general awareness that people living near the coast/low lying coastal areas are most at risk; however despite these participants all being from the business community, only one participant made specific reference to businesses in the coastal zone being at risk. This may be indicative of a belief that tsunami 'only happen to other people', an issue that will be raised again later.

→ "People living near the coast."

→ "People living in low lying coastal areas."

→ "Coastal properties, local communities, and businesses in low lying areas."

Most participants did not necessarily make the connection that people do not always live and work at the same location (i.e. in a coastal zone), or that transient people may be visiting/entering a tsunami inundation zone at different times. No references were made to the 'red-zoned' areas on the evacuation maps either.

Rongotai

Who is at risk of a tsunami?

2x People in coastal areas

2x Curious people sightseeing

1x People near a fault-line and the sea

1x People in the 'Red Zone'

1x People experiencing post event risks 1x All of areas between Miramar and Wellington Harbour 1x Did not specify, showed awareness

As with the Pāpāmoa participants, there is high general awareness that people living near the coast/low lying coastal areas are most at risk.

→ “People in the coastal areas.”

→ “Anyone along a fault-line and close to the sea.”

However, overall a much broader awareness of ‘who is at risk’ was provided by the Rongotai participants. For example, acknowledgement was made that ‘curious’ people go down to the beach during tsunami warnings and after earthquake events, putting them at risk too.

→ “Curious people going down to the beach after a warning has been issued.”

→ “Lots of people would want to go sightseeing after a tsunami.”

→ “I know I shouldn't, but I'd be curious to go and have a look.”

Concerns were also raised by two participants about the reliability of existing tsunami evacuation mapping in Wellington and whether the evacuation maps are credible or merely

‘guesswork’. More feedback on tsunami mapping is mentioned later in the findings and discussion sections.

→ “People in the ‘Red Zone’ are most at risk, but it's still only modelling.”

→ “I think a tsunami here [in Rongotai] could go all the way to the harbour. Miramar is vulnerable too, but I think we [in Rongotai] are the most vulnerable group in Wellington.”

Additionally, only one participant also made the connection that people are not only at risk during the tsunami, but in the aftermath as well. The potential for post-tsunami illness/disease, widespread damage to infrastructure, and loss of income was discussed at length with this participant.

→ “There are post-event risks to consider too.”

Combined

Who is at risk of a tsunami?

5x People in coastal areas

3x Did not specify, showed awareness

2x Living near shoreline/coastline/coastal zone

2x Curious people sightseeing

1x Near a faultline and the sea

1x People in the ‘Red- Zone’ 1x People experiencing post event risks 1x All of areas between Miramar and Wellington Harbour

Overall the Rongotai audience seemed to have a more complete understanding of the risks posed by tsunami, discussing it from a preparedness, response, and recovery perspective. It is important to mention that Wellington Hospital is only 3 kilometres from Lyall Bay Beach; whereas Tauranga Hospital is more than 17 kilometres from the main Pāpāmoa Beach (with bridge access only). This long distance would inevitably increase post-tsunami risks in Pāpāmoa, as many of the sick or injured would struggle to access vital medical care. Based on a discussion at a Pāpāmoa community meeting, attended by the researcher, a hospital is not expected to be built in Pāpāmoa for at least another 50 years. Two Pāpāmoa medical centres and a dental clinic were invited to participate in the research, but did not respond.

4.3.1 Tsunami Source Awareness and Terminology (RQ4)

RQ4: What is your understanding of the differences between distant, regional, and local-source tsunami events? [Include examples, if possible].

This is perhaps one of the most important questions asked in the research because tsunami sources were identified as being a key area of confusion for the New Zealand public, following research conducted by GNS Science in 2016 and was a major catalyst behind the establishment of this project. Each of the three tsunami sources (distant, regional, and local) have been summarised individually below.

Note: one of the Rongotai interviews was conducted with a community leader [confidential], who was asked an entirely different set of questions, and has therefore has been intentionally excluded from this question. The informant did not appear to show awareness of tsunami source terminology, although did evacuate following the Kaikōura Earthquake and confidentially spoke of this experience, and the subsequent confusion experienced in Rongotai at the time.

Pāpāmoa

Distant-source

4x Specified an overseas earthquake

2x Did not specify, showed some awareness

1x No understanding at all

There was generally good understanding that distant-source events are typically triggered by an overseas earthquake, however the responses were not delivered confidently and confusion existed over the possible locations. No mention of likely tsunami arrival times given for distant-source events.

→ "I suppose it's a large event or earthquake offshore."

→ "An event that would have happened somewhere in the Pacific; maybe a tsunami or an earthquake."

→ “A long way from our shores; for example Japan or other countries in the Pacific Basin.”

Rongotai Distant-source 3x Specified tsunami [not earthquake] generated in Chile or Asia 1x No understanding at all

Very limited awareness of, and familiarity with, source terminology was shown among the Rongotai participants.

→ “No idea.”

→ “I’ve got no idea, but assume it must be from Chile.”

However, the Rongotai participants did have a good understanding that tsunami occurring in distant-source locations would take a longer time to reach New Zealand. Some described it in relation to the earthquake source, while others in relation to a tsunami source. Chile and various Asian countries were provided as distant-source examples.

→ “This would be from Indonesia or Chile and would be 14 to 16 hours away.”

→ “Anywhere. For example, Japan. I'd rely on a Civil Defence alert [in this case].”

Combined

Distant-source

4x Specified an overseas earthquake

3x Specified tsunami [not earthquake] generated in Chile or Asia

2x Did not specify, showed some awareness

2x No understanding at all

All participants expressed uncertainty about the source terminology, but understood it would be generated overseas, rather than in New Zealand waters. If this question was repeated, it may be useful to ask this independent of the regional or local-sources, to avoid giving clues or prompts about its meaning in relation to the other sources.

Pāpāmoa

Regional-source

2x Did not specify, showed some awareness

2x No understanding at all

1x Kermadec Trench

1x 'Above our region'

1x Specified local-source

More confusion seemed to exist regarding the regional-source examples.

→ “I don't know.”

→ “I have no understanding.”

Two Pāpāmoa participants’, completing the questionnaire, offered these regional-source examples:

→ “An event that would have happened above our region; for example, off the East Coast of New Zealand.”

→ “Closer than distant-source; for example, the Kermadec Trench.”

Rongotai
Regional-source
2x No idea
2x Within New Zealand

Again, the uncertainty was evident in Rongotai.

→ “I’ve got no idea, must be closer than a distant-source, so in our general area.”

→ “I’ve got no idea with that terminology, I guess it depends how distant the source is?”

→ “No idea.”

Two Rongotai participants offered these examples:

→ “This would be from White Island or anything down that South Island fault line [alluding to the Alpine Fault - unsure of name], and there's one off the North Island [alluding to the Hikurangi Trench - unsure of name].”

→ “Somewhere from within this country; so Kaikōura.”

Combined

Regional-source

4x No understanding at all

2x Did not specify, showed some awareness

2x Within New Zealand

1x Kermadec Trench

1x ‘Above our region’

1x Specified local-source

1x Kaikōura

1x White Island

1x Alpine Fault & Hikurangi Trench (by knowledge, not by name).

All displayed some confusion or disconnection with the source terminology. Regional-source showed the most limited awareness of source terminology and examples, with participants appearing to 'guess' many of their responses. A wide range of examples were provided, although the variance of answers indicates uncertainty and confusion still exist in line with the previous GNS studies mentioned earlier.

Pāpāmoa

Local-source

3x Specified general localised event

2x Specified 'White Island' [volcano]

1x Specified 'Mayor Island' [volcano]

1x Specified 'East Cape' [earthquake]

1x No understanding at all

Local-source events are the most challenging for emergency management personnel, with the Hikurangi Subduction zone presenting the biggest risk to New Zealand. Yet, none of the Pāpāmoa participants mentioned the Hikurangi Subduction Zone or that in a local-source event there would be no time for official warnings, meaning an immediate evacuation would be required. In the previously noted community meeting, Councillors explained to the 250 strong crowd that:

→ “An earthquake originating in the Kermadec Trench would pose the greatest threat to Pāpāmoa because a tsunami could arrive in Pāpāmoa in 50 minutes.”

More communication around the Hikurangi threat and the required response of local-source events are vital in this community, particularly as unlike in Rongotai, Pāpāmoa currently has an aged population, limited high ground, and one main road out. All of these can have severe implications during evacuation in a local-source event.

Again, the participants expressed their confusion around source terminology.

→ “I have no understanding.”

Volcanic eruptions were primarily specified by Pāpāmoa participants as examples of local-source events, as yet earthquakes were perceived as the most significant hazard threat to Pāpāmoa and were named as the main natural warning sign/trigger for a tsunami occurring (i.e. not volcanoes), it suggests that these participants did not either comprehend or communicate source terminology sufficiently, and/or are largely unaware of the meaning of local-source events and responses.

→ “White Island is the biggest risk because it’s just out there [pointing toward to beach].”

→ “Mayor Island; I've read the Becker et al. report about mapping [in Pāpāmoa] and it alluded to Mayor Island being the biggest threat here.”

→ “I’d say it would be closer to home, for example, White Island or East Cape.”

Rongotai

Local-source

2x Wellington/Cook Strait

2x Means evacuate immediately

1x Not specified, but evacuated immediately after the Kaikōura Quake

1x No understanding at all

Confusion was still evident around local-source terminology in the Rongotai sample too.

→ “We don't hear this terminology very much, so I've got no idea.”

→ “I know that natural warning signs are important and I understand there are different sources, but not necessarily the terminology.”

Two participants knew immediate evacuation would be needed for a local-source event, but did not know where it could be triggered from, or the meaning of the terminology used.

→ “I’ve got no idea, but it must be immediate, so [I would] evacuate immediately.”

Two participants ‘guessed’ a local-source example:

→ “It would be somewhere in Wellington?”

→ “This would be generated somewhere in the Cook Strait, [with] 15 minutes to get out.”

Combined

Local-source

3x General localised event

2x White Island [volcano]

2x Wellington/Cook Strait [earthquake]

2x Evacuate immediately/15 minutes

2x No understanding at all

1x Mayor Island [volcano]

1x East Cape [earthquake]

1x Not specified, but evacuated immediately after the Kaikōura Quake

Local-source terminology and awareness is clearly very limited in both Pāpāmoa and Rongotai. All participants expressed that they did not understand and/or were unfamiliar with the source terminology. No one noted that a siren/official warning system would not be able to be activated in a local-source event and there was no clear mention of 'Hikurangi Subduction Zone'. It is likely that this confusion also extends nationwide.

The 'Long, Strong' message is based on a local-source scenario, but current messaging does not link this to a 'local-source' event or use the associated terminology. If this message is going to continue being used, there must be additional emphasis on this being a response for a local-source tsunami and that in a regional, or distant-source event no earthquake would be felt. There may also be potential for local-source tsunami to instead be communicated as 'immediate source' or 'immediate response' tsunami, as this is a better indication of source location and/or the necessary response time/procedure required.

To strengthen awareness around the three tsunami sources and the associated warning/evacuation guidelines, a simple colour coded map using the source terminology and likely arrival times/response could also accompany official tsunami preparedness information, such on the evacuation mapping or information boards, and in television or social media reports.

4.3.2 Natural Warning Signs of a Tsunami (RQ5)

RQ5: What are some natural warning signs of a tsunami?

This question probes tsunami awareness more deeply by exploring the participants' existing understanding of the natural warning signs of an impending tsunami. This is especially

important for local-source events, where there is no time for an official evacuation warning. Furthermore, as neither Pāpāmoa or Lyall Bay beaches have tsunami warning sirens installed, these communities rely on people understanding the natural warning signs to ensure they evacuate immediately. In line with the 'Long, Strong' messaging, 'an earthquake lasting longer than a minute, and/or one strong enough to knock people off their feet' is the most reliable and obvious natural warning sign for local-source events, particularly if the ocean is not visible due to location or darkness (i.e. at night).

Pāpāmoa

Natural Warning Signs

3x Water receding

3x Earthquakes

2x Earthquakes, specifically long/strong

1x Roaring sound

1x Did not specify, showed awareness

It is clear that a majority of participants understand that an earthquake typically precedes a tsunami, with two participants also specifying 'long, strong' earthquakes. However, no reference was made to the different tsunami sources or evacuation times.

→ "A large earthquake which lasts longer than 1 minute, or when you cannot stand up due to the tremor."

→ “Tide recedes a long way out, and may hear a roaring sound.”

Note: Three of the emailed Pāpāmoa participants used similar wording to answer this question and it was inconsistent with their other answers given, which could indicate that they conducted a ‘Google’ search for this answer. If so, this highlights the benefits of synchronous, rather than asynchronous research methods for questions relating to existing knowledge and awareness.

Rongotai
Natural Warning Signs
3x Earthquakes
1x Earthquakes, specifically long/strong
1x Water receding

The Rongotai participants each noted the earthquake, as being a natural warning sign, with one participant specifying a long, strong earthquake. Again, there was no link made to the different tsunami sources or evacuation times, in relation to feeling the initial earthquake.

→ “After a long, strong, earthquake.”

→ “The earthquake itself.”

Only one participant in Rongotai referenced an awareness of unusual sea behaviour, i.e. the beach emptying, as a natural warning sign, which suggests this message could be further communicated to the public. Interestingly, this participant was the only one with some form of tsunami experience. This further strengthens the idea that experiences helps to create awareness, but not necessarily preparedness.

Combined

Natural Warning Signs

6x Earthquakes

4x Water receding

3x Earthquakes, specifically long/strong

1x Roaring sound

1x Did not specify, showed awareness

Earthquakes were most frequently identified as the main natural warning sign of a tsunami, particularly in Rongotai where the impact of the Kaikōura Earthquake was still fresh. 'Water receding' was a sign only noted by one participant in Rongotai, compared to half of the Pāpāmoa participants specifying it. This could be attributed to Pāpāmoa locals spending more time at the beach and having a greater understanding of the ocean's behaviour. As one participant noted:

→ "People live here [in Pāpāmoa] for the beach."

4.4 Perception of Hazard Threats (RQ6)

RQ6: What hazards do you see as being a significant threat to yourself, your organisation, your community? [up to five main hazards each]. And why?

If people do not believe there will be a tsunami, they will be less likely to prepare for it. Subsequently, behaviour change and a preparedness culture would become difficult to create and sustain. This question also asked participants to rank the hazards that they perceive as being the biggest threat. The ranking approach was effective because it encouraged the participants to ponder the question more thoroughly and led them to provide a rationale or justification, as to why they held their opinion.

Pāpāmoa

Tsunami Risk Perception

4x Did not view tsunami as a significant threat

2x Viewed tsunami a significant threat

1x Not specified

Hazard Rankings

4x Earthquakes

3x Flood

2x Volcano

2x Cyclone

2x Weather

1x Fire

1x Bomb scares

1x Same for any hazard

1x Regionally dependent

Pāpāmoa's interviewed participants all placed the tsunami risk well down their list of perceived hazard threats; while those completing the questionnaire tended to rate tsunami as a more significant threat. This could be because the word 'tsunami' was intentionally unspecified in the phrasing of this question during the interview, so that it did not unduly influence the responses, but in the email survey the word 'tsunami' was in the section heading labelled 'tsunami risk perception' and may have perceptually affected these rankings.

General tsunami risk perception comments from the interviewed Pāpāmoa participants, included:

→ "The risk is the same as in any natural disaster, what can you do?"

→ "There is unlikely to be a tsunami here. They do pose a threat, but earthquakes are more likely in Wellington, volcanoes in Rotorua etc., each region has its own risks."

Conversely, two participants completing the questionnaire expressed that:

→ “Tsunami are a real threat to Pāpāmoa, because we live on the coast so are prone to them.”

→ “Because of where I live, I would be at risk of a tsunami and an earthquake.”

The following is a hazard threat ranking example from an interviewed Pāpāmoa participant:

→ “Earthquakes, bomb scares, floods, fire, tsunami would be last.”

These rankings were provided by two surveyed participants:

→ “Weather, for example strong winds or heavy rain; earthquakes; tsunami; volcanic eruption; cyclones.”

→ “Tsunami, because we live on the coast; earthquake, because New Zealand is on fault lines and is prone to earthquakes; cyclones, originating in the Pacific in the Summer months; floods, because of high rainfall and living in low-lying areas.”

The Pāpāmoa participants perceived that this risk perception question was about the likelihood of a tsunami actually occurring, rather than the possible consequences or whether they perceived a tsunami would impact their business and/or community outcomes. Even though it was made clear that this research was based in a business context and that business leaders were sourced for data collection; no-one explicitly noted the link between a tsunami event and business continuity/survival post-tsunami. The Pāpāmoa participants discussed

tsunami, and tsunami risk objectively, as though they ‘happen to other people, but not to them’. In essence, this is a short-term view of tsunami risk, rather than long-term/holistic perception of tsunami risk.

Rongotai

Tsunami Risk Perception

2x Did not view tsunami as a likely threat, but thought it would be devastating

2x Expressed in relation to personal/organisational impact

2x Thought it could happen/might be a possibility

Hazard Rankings

5x Earthquakes

4x Storms

2x Industry-specific hazards

1x Flooding

In terms of natural hazards, earthquakes were rated as the most significant risk with all the Rongotai participants. To capitalise on this, increased methods could be applied in Rongotai to increase the association that earthquakes and local-source tsunami can go hand-in-hand. The ‘Long, Strong’ message is a starting point, however more can still be done to strengthen

their association in the minds of participants, which could also be further explored in future research.

Weather related hazards also featured prominently in the Rongotai data, particularly storms. This is consistent with existing literature arguing that recently and/or more frequently occurring natural hazards are more likely to be perceived as a genuine threat.

→ "Earthquakes are hands down the biggest threat; then storms because it's amazing how much water can come across [Lyall Bay] in a storm; and then tsunami."

Two other Rongotai participants, immediately discussed industry-specific hazards as being a more significant threat in their organisational context. A travel/transport company health & safety manager noted:

→ "First, in my industry it would be the risk of passengers, because they can be a hazard if they had a weapon etcetera. For us, it would be road and traffic hazards next; then, earthquakes. Volcanoes would be fourth and tsunami last."

An Aquatic Centre Manager, noted:

→ "In this business it's definitely drowning. Next, it's spinal injuries from diving incidents. Then, earthquakes (which are so freaky), followed by cyclones and flooding."

Both of these organisations have existing comprehensive general health & safety guidelines, and a safety focussed culture operating within their organisations. However, they currently have no clear tsunami specific material, but are open to developing it in future. With that in mind, if tsunami can be viewed more specifically as a health and safety issue and treated in the same way as other potential workplace hazards, preparedness initiatives could more effectively permeate throughout businesses/workplaces. For instance, as a Rongotai participant explained:

→ "We have to document all the hazards that occur."

Combined

Tsunami Risk Perception

4x Did not view tsunami as a significant threat

2x Did not view tsunami as a likely threat, but thought it would be devastating

2x Viewed tsunami a significant threat to the Pāpāmoa community

2x Expressed in relation to personal/organisational impact

2x Thought it could happen/might be a possibility

1x Not specified

Hazard Rankings

9x Earthquakes

4x Storms

4x Flood

2x Volcano

2x Cyclone

2x Weather, general

2x Industry-specific hazards

1x Fire

1x Bomb scares

1x Same for any hazard

1x Regionally dependent

Higher frequency and/or more recently experienced hazard events are identified by both audiences as posing the most legitimate threats. Participants did acknowledge if they happen they could cause major damage, but do not necessarily believe they would happen.

Regionally specific hazards, such as White Island were identified frequently in Pāpāmoa; while storms and other weather related hazards featured highly in Rongotai. Industry specific hazards were well noted in Rongotai, but not in Pāpāmoa.

In line with fatalism, none of the participants mentioned that advanced preparedness or mitigation efforts can play a role in reducing their tsunami risk and vulnerability. Therefore,

if people can understand that tsunami are initially hazards, and are not always disasters, they may feel more empowered to be prepared because the thought does not overwhelm them. It is clear that perception has a significant effect on preparedness uptake, which must be addressed in order to achieve the sustained behaviour change required for tsunami preparedness to be achieved in a business context.

4.5 Existing Preparedness (RQ7)

RQ7: What have you, your organisation, and your community already done to prepare for a tsunami event? And do you feel this is enough to be prepared in case of a tsunami event? [If yes, why? If not, why not?] Please explain.

This question explores the existing preparedness measures that participants have already undertaken, and whether they are aware of any existing organisational or community based tsunami preparedness initiatives. Importantly, it also asks whether they perceive these actions to be adequate enough. In an emergency management context, the more prepared people are the better. However, preparedness is often viewed as an 'all or none' activity far more complex and comes in varying degrees. For example, people may have water and a first aid kit, but no food or batteries; they may have enough supplies to last a day or two, but not a week; or they may view preparedness in terms of their ability to evacuate, rather than recover from an event.

Pāpāmoa Personal Preparedness Initiatives 4x Evacuation routes

2x Not specified 1x Personal responsibility 1x First aid kit

Across the Pāpāmoa audience the main personal preparedness activity adopted by participants is evacuation route planning, but unfortunately no-one has actually walked their route in advance.

→ "I have planned an evacuation route from my home."

→ "I've done nothing, but I do know where to head if a tsunami warning occurs."

In the Pāpāmoa community meeting attended by the researcher, concerns were raised by attendees that many of these routes have been flooded for months and there are also cases '8 foot high fences from developers' blocking the routes. The researcher has also viewed several instances of the routes terminating to steep banks fenced with barbed wire. Given that tsunami evacuation routes are the primary personal tsunami preparedness initiative noted, it is vital that these are developed and maintained effectively to ensure credibility and trust are created and maintained.

Rongotai

Personal Preparedness Initiatives

1x Evacuation routes

1x Information from schools

1x Information from family with past Civil Defence involvement

1x Water supplies

Consistent with a diffusion studies approach, the Rongotai audience described their personal preparedness (below) in relation to family members, which emphasises the role of informal communication networks as being influential in decision-making and behaviour change effectiveness.

→ "My parents have water, but I live with two other people now and they have nothing like that."

→ "My [child] does this stuff at school ... social studies type stuff."

→ "My [close family member] used to be involved with Civil Defence, so I've had more exposure through her. In the past I would be quite blasé."

Combined

Personal Preparedness Initiatives

5x Evacuation routes

2x Not specified

1x Personal responsibility

1x First aid kit

1x Information from schools

1x Information from family with past Civil Defence involvement

1x Water supplies

Planned evacuation routes are the main personal preparedness activity in Pāpāmoa although no-one has walked the route for themselves, and route enhancements need to be made. The role of interpersonal communication networks are highlighted too, mainly in Rongotai with at least four participants discussing their existing personal preparedness considerations in regards to their family members.

Across both audiences there was no mention of communication plans, or what to do once evacuated (e.g. how long to stay in their zone, food supplies, walking the routes in advance etc.). This was source of confusion in Rongotai after the Kaikōura Quake, as many did not know when they could return to their homes. Notably, the 'Long, Strong' message does not inform of how to evacuate, what to do before/after evacuation, or educate about the actual tsunami. It only relates to the natural warning sign for a local-source event (i.e. the earthquake). Therefore, this message alone is not sufficient.

Pāpāmoa

Organisational Preparedness Initiatives

2x Fire emergency planning and six monthly organisational fire drills

2x General emergency planning

2x Evacuation routes

2x Nothing

1x Kit

1x Not specified, showed little awareness

0x Tsunami specific preparedness planning for their business

General emergency evacuation plans and regular fire drills were most often specified for existing organisational preparedness initiatives in Pāpāmoa. Although, several also think that their organisations have done 'nothing' to specifically prepare for natural hazard emergencies.

Pāpāmoa Plaza Manager, David Hill, comments:

→ "There is a general emergency plan and the retailers know to come to me as the manager. We have a monthly mall meeting and we do two fire evacuation drills with the fire department each year."

And Pāpāmoa Library Manager, Ngareta Payne, explains:

→ "There is a fire drill every six months organised by the Fire Department and the Council. We have fire wardens on staff and a disaster (mainly fire) evacuation process. I put on a 'high-vis' vest, to show that there is something serious, and tell people to get out into the car park [our evacuation point]. In our last fire drill we evacuated everyone in 3 minutes."

Rongotai

Organisational Preparedness Initiatives

2x Explains general earthquake/tsunami risk to employees/clients

3x Existing social media channels

2x Establishing guidelines/preparedness culture

1x Internal communication plans for general emergencies

0x Specific tsunami preparedness planning for their business

As with the Pāpāmoa sample, explicit tsunami-specific preparedness planning had not been undertaken by any of the Rongotai participants' businesses to date, however general emergency evacuation initiatives were mentioned by some.

→ “We are open for 115 hours per week, so we have assigned meeting points for general emergency evacuations, ours in the tennis club. And our policies and procedures are updated annually.”

→ “We often tell people at work about what to do in an emergency, such as an earthquake, but we don't tell them what to do in a tsunami. People are just made aware because of where we are that it could be a possibility.”

Evacuation ‘Go-Bags’ and water stores were mentioned by one participant:

→ “I've talked to the staff about ‘Go-Bags’ and we've got tons of water.”

The desired establishment of a ‘preparedness culture’ was also noted by the travel/transport organisation:

→ “I've only been at this company for a month and part of my role is to establish new health and safety guidelines and plans, so I'm working on revising out emergency plans at the moment. We are trying to establish a ‘preparedness culture’ and understand the different risks. For example, we have a model on a poster at work. It has a bus on it and each of the wheels has a different priority within the organisation, when I started I noticed that they didn't have anything regarding health and safety, so I've decided to add health and safety to the steering wheel, to show that health and safety will be a main driver of the organisation. We are hoping to include it in the staff induction and have generic site specific information available too.”

Three participants also referred to the use of existing social media platforms/channels to communicate with others during and following an emergency scenario, with one participant explaining:

→ "We've got communication systems in place. It's a council based organisation, so we have clear emergency lines and an internal Facebook site to share information and initiatives."

Combined

Organisational Preparedness Initiatives

3x Existing social media channels

2x Explains general earthquake/tsunami risk to employees/clients

2x Fire emergency planning and drills

2x General emergency planning

2x Evacuation routes

2x Nothing

2x Establishing guidelines/preparedness culture

1x Internal communication plans for general emergencies

1x Specified kit

1x Not specified, showed little awareness

0x Specific tsunami preparedness planning for their business

Tsunami specific preparedness planning had not been undertaken by any of the participants' businesses as such. Instead, general emergency evacuation planning, the utilisation of social media channels, and regular fire drills are identified as the main preparedness initiatives in the organisational context. The desire for a 'preparedness culture' was mentioned by three Rongotai participants. This could be supported in the future through ongoing communication and engagement from credible preparedness communicators and emergency management agencies. And in accordance with the theoretically-based recommendations in this report.

Pāpāmoa

Community Preparedness Initiatives

2x Maps

2x Civil Defence notifications

2x Information boards at beaches

2x Sirens

2x Brochures

2x Evacuation routes

1x Bridges

1x Tsunami signage in the community

A comment made by Pāpāmoa Ward Councillor, Steve Morris, summarised the situation in Pāpāmoa:

→ “People are aware of tsunami here, but are not prepared.”

Another participant asserted that:

→ “Pāpāmoa is more prepared than Tauranga and Mount Maunganui. The ward councillors live here, so have a vested interest and are more supportive.”

At the Pāpāmoa community meeting, Ward Councillors explained:

→ “For nine years the Council did nothing [about tsunami evacuation], however in the past three years planning has improved, there are evacuation routes, maps, and vertical evacuation structures being built. Now no other city is as good, as ours.”

Pāpāmoa participants all seemed highly aware of these new community initiatives.

→ “Tsunami signs are in the community showing which direction to head if a tsunami occurs.”

→ “Tsunami maps were distributed out to the community showing the safe areas to head too.”

→ “Local authorities have put out brochures about tsunami awareness and evacuation routes nearest to everyone.”

However, this is not without issue, as noted by one participant, who went to the media to express concern over failed Civil Defence text alerts.

→ “ Local authorities have tried to set up a text alert system, which do not work.”

It is encouraging that a number of community initiatives could be recalled in Pāpāmoa, but continued re-evaluation and enhancement of these initiatives is still needed. One such example is that follow-up evaluations have never been initiated or completed by Emergency Management Bay of Plenty, an issue that was brought up by the researcher in a discussion with an official there. User feedback is very important to allow for ‘tweaks’, enhanced engagement, and additional publicity of the initiatives undertaken.

Another observation made by the researcher, relates to the signage on top of the vertical evacuation mound (located at Gordon Spratt Reserve/Pāpāmoa College). This sign appears to be a ‘bigger version’ of the tsunami signage used on the information boards at the beach and in the evacuation maps. It informs people about where to evacuate too and in a large font it tells people to “walk, not drive” and to take an emergency pack etc. It also uses “Long, Strong, Gone” (i.e. not Get Gone) message. This is a fundamental error, because once the public have arrived on the mound after evacuating these messages are of no value. Instead, the sign needs to advise evacuees about what they need to do now that they have evacuated

and should be tailored accordingly. Further to this, in a NZCS conference field trip to the mound (in November, 2017) the researcher observed many of the attendees question whether the mound would be big enough for evacuees to fit on top of it in a tsunami evacuation. Further, Emergency Management Bay of Plenty have calculated a space for approximately 3000 evacuees, however the existing signage (which is more the a metre wide) could also be placed lower down the mound to avoid using up valuable 'people' space at the top of the mound.

Once evaluations and other enhancements have been made; it is recommended that people should then be encouraged to walk the evacuation routes in advance and suitable community-led events can be established to help promote these initiatives. This was supported by the Pāpāmoa participants interviewed, all of whom are willing to contribute to future community preparedness events (as noted later). The researcher also discussed the idea with officials during data collection meetings, but there was confusion among them as to whether events would actually be allowed on the mounds "in case a tsunami occurred during the event" (personal communication, 2017). In March, 2018 it was announced that that "The Inaugural Never Happens? Happens community event" will be held on Saturday, April 7 from 3.30pm to 7pm (personal observation, 2017). While this is encouraging to see, it is hoped that least some of the aforementioned enhancements have been carried out between the data collection period and the writing of this report. It is also highly likely that there may have been some missed opportunities for the business leaders and potential 'opinion leaders' identified in this report to have made an important contribution.

Nevertheless, one of the most concerning issues regarding community preparedness in Pāpāmoa is that three participants explicitly believed that tsunami warning sirens were installed there. This represents nearly half of the all the Pāpāmoa participants. By applying this finding to the diffusion of innovation model, it is likely that over half of the Pāpāmoa population also believe sirens are installed. To stress, these comments were provided directly from the participants, without any prompts:

→ "[The community has] tsunami mapping, sirens, and brochures."

→ "I'm not really sure, other than sirens and new bridges."

→ "[There are] Civil Defence notifications, sirens, signposted routes, and information at the beaches."

One participant even commented that the Council:

→ "Already has sirens all along the beach to warn us and they will be installing some more soon."

Later, this participant noted that their intended evacuation response would be initiated after a tsunami siren sounds. This business is located within a kilometre of the main Pāpāmoa Beach.

An understanding of the natural tsunami warning signs is crucial in this situation. It is no use having evacuation signage and safe zones if people are waiting for a warning siren before evacuating. In particular, as Pāpāmoa is a fast growing city, with many new residents arriving constantly, this messaging must communicated frequently and regularly. It cannot be ignored.

Rongotai

Community Preparedness Initiatives

2x Police/Crime community preparedness concerns

1x WREMO Facebook alerts

In Rongotai, no specific reference was made about existing preparedness initiatives or events being held in the community. Some participants discussed the 'Blue Line' project and evacuation mapping in other questions, but not in response to this question.

One participant recalled the WREMO Facebook alerts, but was concerned that there was no local Rongotai area alert page on social media. This participant had been signed up to regional alerts, but cancelled the account because the coverage area was to wide (as far up as the Wairarapa) and information was often too light-hearted, or not meaningful enough:

→ "The alerts and posts on their sites were too frequent and irrelevant."

There are active Lyall Bay community Facebook and Twitter accounts that report on most local activities and hazard situations, although these are not administered by formal emergency management agencies and are not hazard-specific.

Concern was also raised about the potential for crime and civil unrest in the community in the aftermath of a tsunami, with the absence of local police in the area.

→ “There are no police in the area.”

→ “Houses got looted in Seatoun after the Kaikōura Earthquake.”

Only one, highly active community informant, knew there are no sirens or information boards at Lyall Bay beach.

<u>Aware of No Information Board at Lyall Bay Beach</u>

→ No. I didn't know there was no information board at Lyall Bay. I've seen one somewhere [later discussed that it is outside the Kilbirnie Citizens Advice Bureau], but I didn't know there were none at Lyall Bay.”

→ “No. I didn’t know that there were none at Lyall Bay; there needs to be though.”

→ “No. I think there definitely needs to be one at Lyall Bay.”

Lyall Bay beach is iconic and being located next to the airport, it has many transient visitors. Already lined with ‘save the dune’ signage, information boards should be erected there immediately.

Aware of No Tsunami Siren at Lyall Bay Beach

Rongotai participants were all shocked and unaware that there are no sirens installed at Lyall Bay.

→ “Really? No, I did not know that. There definitely needs to be one [installed] at Lyall Bay.”

→ “There might be tsunami warning sirens, but I've never heard them, they use to test them up north in Kerikeri when I was there.”

Tsunami sirens are not compulsory, so some communities will have them and others will not. This is an important message for all New Zealand coastal communities, particularly as new residents are migrating to coastal communities in large numbers. There are numerous arguments for and against them, as outlined in the literature review, but regardless of these arguments from a communications perspective it is paramount that the public is made aware that no sirens are currently installed and that sirens will not sound for immediate tsunami evacuations, so that they become familiar with natural warning signs and know to evacuate immediately in local-source scenarios. This is especially important with the airport (i.e. population dense and transient people) being located there.

Combined

Community Preparedness Initiatives

2x Maps

2x Civil Defence notifications

2x Information boards at beaches

2x Sirens

2x Brochures

2x Evacuation routes

2x Police/Crime community preparedness concerns

1x Bridges

1x Tsunami signage in the community

1x WREMO Facebook alerts

1x ‘Blue Line’ project

Plenty of personal, organisational, and community initiatives were outlined by the participants in Rongotai and particularly in Pāpāmoa, although there is still a feeling from the participants that more can and should be done to improve preparedness initiatives and preparedness outcomes.

4.6 Tsunami Preparedness Communication Sources (RQ8)

RQ8: (a) What official/controlled/formal tsunami and tsunami preparedness messages/initiatives/campaigns are you aware of? (e.g. an emergency management campaign); (b) What unofficial/uncontrolled/informal sources/channels have you sought tsunami and tsunami preparedness information from? (e.g. advice from friends etc.) and (c) If so, which of these sources have motivated you to prepare and/or provided you with meaningful information about tsunami preparedness, and why were these effective for you?

In line with the diffusion studies approach applied in the research project, this communication based series of questions was designed to better understand where and how the participants have already accessed/received tsunami and tsunami preparedness communication messages, and whether these sources have actually motivated them to act and be prepared. It was also asked to indirectly probe whether the 'Long, Strong' campaign (released in the media at the time of the interviews) had been effective.

Pāpāmoa

Formal Sources

4x Text alerts

3x Evacuation mapping

3x Civil Defence

2x 'Long, Strong'

2x Brochures

2x Local council/councillors

2x Media, tv advertising

1x Media, radio

1x Media social media/Internet

1x Evacuation route signage in communities

1x Information boards at the beaches

1x ‘Be Ready’ pack

Pāpāmoa

Informal Sources

1x Information from school

1x Conversations with family

1x Conversations with neighbours

Pāpāmoa

Motivated to act and/or were effective

4x None, I’m still not prepared

2x Wants a tsunami sirens installed

1x All work in collaboration

1x School information, because I know where to evacuate too.

Formal Communication Sources

Again, many of the recently developed Pāpāmoa community initiatives were mentioned by the Pāpāmoa participants. However, despite their knowledge of formal communication campaigns and initiatives, many of the participants admit that none of these initiatives have sufficiently motivated them to act, because they are still unprepared. Only two participants mentioned 'Long, Strong' messaging specifically; although many reported hearing/seeing information on radio, television, and on social media, which is very likely to be associated with this campaign. The specific desire for tsunami sirens to be installed was brought up again, by two of the participants.

Informal Communication Sources

Pāpāmoa has strong geographically determined socio-cultural boundaries and is in a rapid growth phase. Residents are proud of their community and it is known to have a number of clear informal networks operating. In the course of the research this became evident and the research sample area was reduced (from Tauranga, Mount Maunganui, and Pāpāmoa), to focus exclusively on the Pāpāmoa audience. The 'tight-knit' community spirit is illustrated by one Pāpāmoa participant, who exclaimed:

→ "Pāpāmoa should be cut off from Tauranga at the bridge!"

In this socio-cultural context, informal conversations with friends and family, and in special interest groups are important communication channels that should be harnessed. Although the participants have not identified informal communication networks as tsunami preparedness channels, they offer untapped potential to be highly influential, if the right information and

support is provided. One of the most effective ways that Pāpāmoa business leaders can act as tsunami preparedness conduits is through creating and supporting collaborative community-led initiatives, in which informal communication networks and conversations are able to reinforce formal tsunami preparedness messages, as seen in the Korean family planning example of diffusion studies provided in the literature review (*see 2.4.6*).

Also on that note, the potential for local school based initiatives may be especially useful in communities such as Pāpāmoa as well. The role of schools were mentioned many times by the participants with children, or by business leaders employing parents of school-aged children. In Pāpāmoa, school life is a central interest of many in the community and the community vertical evacuation mounds are (or will be) located on or next to school grounds. Future exploration of the role of informal communication networks operating in schools, using a diffusion studies approach could provide rich insight into the reinforcement of preparedness messages in that context. For instance, one Pāpāmoa participant completing a questionnaire explained that she knows where to go in a tsunami because she received evacuation information from her child's school, but knows little other than that. The concept of *tsunami tendenko* (*see 2.1.7*) highlights how the role of schools and businesses in evacuations are interrelated.

Rongotai Formal 2x Text alerts 1x Evacuation mapping

1x ‘Long, Strong’

1x WREMO emailing list

1x Never received anything from the Council or Civil Defence

Rongotai

Informal

1x School information

1x Conversations with family

Rongotai

Motivated to Act

4x None, I’m still not prepared

1x Experience from other earthquakes

Formal Communication Sources

Various formal and official channels were mentioned, including the nationwide mobile text alert broadcast, which was conducted around the same week as the Rongotai data was collected. With regards to the broadcast, approximately half of the Rongotai participants reported receiving the alert and it was very well received by them. Nonetheless, perceptually it is important for people to understand that these broadcast messages are to be used as a tool to assist them with immediate evacuation, but that it should not replace other mitigation and

preparedness measures, otherwise many of the perceptual concerns raised about tsunami sirens could apply with the cell broadcasts as well. Feedback on these broadcasts is being conducted by GNS social scientists at the time of this publication, and it is beyond the scope of this report. However, the participants in Rongotai admitted that none of the formal messages and initiatives have effectively motivated them prepare.

While not specified by the participants in this question, comments made elsewhere in the interview discussions indicated that community 'Blue Lines' and maps are supported and have increased general tsunami awareness. However, despite adding value, participants again felt that this additional awareness did not equate to preparedness.

Informal Communication Sources

The Rongotai participants did mention their friends and family in relation to their personal preparedness and Kaikōura Earthquake experiences, but indicated that they would prefer to discuss tsunami preparedness with other like-minded individuals in the business community.

→ "Collaboration is needed within organisations all across New Zealand."

→ "We need involvement with like-minded people in the business community."

→ "We could collaborate with Civil Defence, but they have to have business knowledge."

Therefore, because of this desire to collaborate with like-minded individuals, informal communication networks can be harnessed through special interest business networking groups and throughout the participants' business organisation using the principles of opinion leadership. Considering this, the researcher now based in Wellington, would like to extend upon this research of tsunami preparedness, by researching larger business organisations and franchises, to enable tsunami preparedness initiatives to be established with like-minded business leaders, to help preparedness communication permeate throughout the New Zealand business community.

Combined

Formal

6x Text alerts

4x Evacuation mapping

3x Civil Defence

2x Local council/councillors

2x Media, tv advertising

2x Brochures

2x Long, Strong, Get Gone

1x Media, radio

1x Media social media/Internet

1x Evacuation routes in communities

1x Information boards at beaches

1x ‘Be Ready’ pack information

1x Media and communication is lacking

1x WREMO emailing list

1x Never received anything from the Council or Civil Defence

Combined

Informal

2x Conversations with family

2x Schools

1x Conversations with neighbours

Combined

Motivated to Act

8x None, I’m still not prepared

2x Wants tsunami sirens installed

1x Child’s school

1x All in collaboration

As noted by one participant tsunami preparedness information all work in collaboration. There is no single 'magic bullet'. This question further illustrates that tsunami preparedness initiatives need to be able to connect with audiences to motivate them to change their preparedness behaviour and take action to become sufficiently prepared. The different needs of the two audiences are also beginning to emerge with the Pāpāmoa business audience viewing preparedness in terms of the geographical community and the Rongotai business audience viewing it in terms of the business community in a wider geographical sense.

'Long, Strong' message (specifically)

As mentioned earlier, one of the main reasons for asking RQ8 was to gain feedback on this message. Based on the responses provided, only a few participants specifically referred to the message themselves, so to counter this, the researcher asked all interviewed participants whether they had heard this message and to provide feedback on it.

Pāpāmoa

'Long, Strong' message

1x Not familiar

1x Aware - dislikes

1x Aware - advises the community

1x Aware - not specified

One Pāpāmoa participant was completely against the ‘Long, Strong’ message and even became physically agitated by the thought of it exclaiming:

→ “No, I don't like it! I can't stand it! It's horrific! There are too many other variables to consider and it just makes fun of the situation. Tsunamis are not funny.”

Despite this participant’s aversion to the message, he did recall it and knew to evacuate immediately after a long or strong earthquake, although it is likely that this participant would have already known when to evacuate anyway. Nevertheless, in cases where people respond so adversely there is still a danger that sender credibility can be compromised in the mind of the receiver. The response of the other Pāpāmoa participants toward the message is best describe as ‘neutral’, but the message does seem to be gaining some recall traction.

Rongotai

‘Long, Strong’ message

2x Aware - neutral

1x Aware - advises the community

1x Unaware - prefers ‘Walk Along’

The Rongotai participants seemed more familiar with the ‘Long, Strong’ message than their Pāpāmoa counterparts, but the overall feeling was that it was too simplified and does not provide enough useful information/instruction.

→ “Yes, I know the ‘Long, Strong’ message from the radio and TV. It's good, but I'm sure that there's some ‘when it's safe to leave’ caveat on it. It's been memorable, but possibly hasn't given me enough information. It hasn't motivated me, but it is something that we can say to the staff. If it’s strong enough to throw you off your feet, or goes on for a long time ... but don't go while it still shaking!”

The researcher identified that in Wellington an alternative slogan is used by WREMO, because the ‘incorrect’ grammar (of ‘get gone’) is causing frustration for some. Instead the WREMO documentation typically uses ‘be gone’. The researcher asked one participant for his feedback on this alternative, to which he replied:

→ “Yes, I’ve heard the ‘long, strong, gone’ message on the radio and it makes sense; it's understandable. ‘Get Gone’ is better than ‘Be Gone’ because that sounds rude, like you're shooing people away.”

One of the Rongotai participants had not heard either of the versions specified above (due an unrelated personal situation at the time of the message release). By the time of this interview, the researcher had developed a third possible alternative: ‘Long, Strong, Walk Along’; which still rhymes, but directly includes the ‘on foot’ evacuation component. With that, the researcher asked for feedback on this option as well. Of all three alternatives offered, the ‘walk along’ option was preferred by the participant (and potential ‘opinion leader’) hearing each alternatives for the first time.

→ “I really like the ‘walk along’ option because it tells you what to do as well. It’s great!”

This message could also be extended for campaign purposes to include something to the effect of: “If an earthquake is longer than a minute or strong enough to knock you off your feet, immediately walk along the planned community evacuation routes provided.”

Combined

‘Long, Strong’ message

2x Aware - neutral

2x Aware - advises the community

1x Aware - dislikes, credibility and too many variables

1x Aware - not specified

1x Not familiar

1x Unaware - prefers ‘Walk Along’

Overall, many people are beginning to become aware of, and recall the official ‘Long, Strong’ message that was released through television, social media, and radio channels, but opinions of its effectiveness remain mixed. The researcher observed that the ending of the message was reducing the message impact and its grammatical issues caused people ‘trail off’ when saying the ‘Get Gone’ component (arguably the most important part in relation to

tsunami). The WREMO ‘Be Gone’ alternative was poorly received by the participants, and ‘Gone’ was not considered to be ‘active enough’ when initially considered by Civil Defence (personal conversation, 2017). Participants wanted the message to contain more information, so the researcher developed an alternative of ‘Long, Strong, Walk Along’; which could be a useful option, if the benefits of changing the original message at this late stage, can out way the costs and concerns of retaining it.

4.7 Feedback on Existing Tsunami Preparedness Communication (RQ9)

RQ9: Please describe whether you believe the following tsunami preparedness initiatives would be effective in your business and/or community? (Samples were provided).

To help answer this highly revealing research question, the researcher provided eight different samples of existing tsunami preparedness initiatives at each interview to obtain participant feedback on existing tsunami preparedness material and its associated value in the business setting. For this section the responses are summarised, the important features of each initiative is explained, and the participants feedback is offered.

Note: As an alternative for those completing the email questionnaire, the initiatives were specified and it was noted that samples were also available on request. However, none of the participants completing a questionnaire asked to view these samples. While their general feedback on each initiative is included, more weight should be placed on the interviewed participant responses.

Pāpāmoa

WREMO Brochure

2x Dislikes everything

1x Dislikes, too much information, but likes pictures

4x Not specified [Pāpāmoa Questionnaire sample]

Rongotai

WREMO Brochure

3x Dislikes everything

1x Dislikes, too much information, but likes pictures

5x Did not receive a copy in their household or business.

Combined

WREMO Brochure

5x Dislikes everything

2x Dislikes, too much information, but likes pictures

5x Did not receive it [Rongotai]

4x Not specified [Pāpāmoa Questionnaire sample]

The WREMO brochure received the least positive feedback of all the samples provided. Produced by WREMO and a team of psychologists, the "Earthquake Planning Guide" contains a section on tsunami and was mailed out to households across Wellington approximately 2-4 weeks prior to the Rongotai interviews being conducted. Surprisingly, none of the Rongotai participants reported receiving the brochure. With this being a business audience, there is a possibility that participants were out of the home during delivery times, meaning that other members of their households may have collected it and it was not passed onto or discussed within their households. The researcher has seen this brochure on display at her local library since, but is unsure whether it was delivered to any other organisations or the Rongotai library branch as well.

Of interest, the participants feedback on this brochure showed a variation based on gender, as opposed to community. When reviewing the brochure the female participants across both audiences commented that it was colourful, and they liked the pictures, but admitted that they still would not read it.

→ "I wouldn't read it, but I'm drawn to the pictures."

→ " I like the pictures, but it's just too much. Too big, too many words."

None of the male participants liked the brochure and their body language changed as soon as they looked at it. Most grimaced and shook their heads, explaining:

→ “It’s just another piece of paper to get rid of.”

→ “I think it is missing the mark.”

→ “It is poorly written.”

One of the identified ‘opinion leaders’ took considerable time to read over it and shaking his head commented:

→ “It’s too big; too cumbersome; it’s paper and there’s too much information there! It does have some useful information in amongst it ... I did learn that tsunamis are more than one wave ... I didn’t know that, but it’s not concise enough and some things aren't necessary to be on there ... it’s like they are an afterthought. In reality it would never get read.”

Two additional comments from Rongotai included:

→ “I haven't seen it before. I think there's a whole heap of information there. It's probably all good, but that's a lot of information. No! It's not for me. It's probably something that's useful, but we'd never looked at it. You'd have to be looking for something specific to read it.”

→ “I see what's trying to be done. The subject headings are good and advice should be good, but really I'm only ever going to skim read it.”

In the same vein a Pāpāmoa participant shared his feelings toward it with an analogy:

→ "This sort of stuff is like peeing in a dark suit. It leaves you with a nice warm feeling, but no-one knows you have done it!"

Pāpāmoa
Business Manuals (Hilo Bay sample used)
3x No, won't get read
2x Yes, good guidelines
1x Yes
1x Maybe, if useable
3x Yes
3x No
1x Maybe

Rongotai
Business Manuals (Hilo Bay sample used)
2x No, won't get read/too much information

1x Yes, good for guidelines

1x Yes, we already have manuals

Combined

Business Manuals (Hilo Bay sample used)

5x No, won't get read/too much information

3x Yes, good for guidelines

1x Yes

1x Yes, we already have manuals

1x Maybe, if useable

5x Yes

5 x No

1x Maybe

Business manuals were generally seen as providing some useful, practical guidelines for what is expected, however concern was raised as to whether they would actually get looked at, or simply shelved away. In the business context, participants felt that manuals would be helpful for certain managers, such as those involved in health and safety initiatives within the organisation, but it would not be suitable for everyone.

→ “Manuals would be great for the managers or office based staff such as me, particularly as I'm working on the emergency plans at the moment, it would be a good reference guide, but it’s got too much information for everyone.”

→ “It would be helpful and setting up for safety guidelines on how and what should happen in an event.”

→ “I would be open to it, as long as the information is easy to display and instruct teams on.”

Two Rongotai participants indicated that the Hilo Bay sample has some issues, but are not opposed to the idea of business manuals as such. They both recommended that if a manual is drafted that it does not need to include past case information, but should follow the researcher’s ‘Five C’s Model of Preparedness Communication’ guidelines discussed in this report.

→ “[The Hawaiian example] has too much information. Manuals should make people aware of the risk, past tsunami information is not necessary [for business manuals].”

→ “[The Hawaiian example] could be useful, but it has far too much information and it's dated. I don't need all this information about tsunami that happened in the past. If I want that information I'll look for it myself, I just need to know what to do in the future.”

Pāpāmoa

Checklists

2x Yes

2x Yes, for the wall

1x Yes, for awareness

1x No, won't get read

5x yes

1x no

Rongotai

Checklists

4x Yes, but would have to be brief and relevant

1x Yes, for the wall

Combined

Checklists

4x Yes, but would have to be brief and relevant

2x Yes

3x Yes, for the wall

1x Yes, for awareness

1x No, won't get read

10x yes

1x no

The checklist concept was well supported by the business participants in Pāpāmoa and Rongotai. Only one of the participants asked felt that it would not get read, but that participant generally had an aversion to most printed material in general. Participants noted that the checklists could be placed on the wall in shared staff areas, such as staff room notice boards or in offices. Additionally, they could also be used during staff inductions and for staff training purposes. As already noted, the researcher's 'Five C's' of emergency management communication guidelines should be used when developing tsunami preparedness checklists.

→ "I could put it on the wall."

→ "This would be good to give a guideline of what is needed and get employees thinking about the possibilities of an event."

→ "We could put something simple up on the wall.'

→ "Managers could use it as a checklist for an induction, but it would have to be brief."

The researcher had a detailed discussion with the transport/travel company participant from Rongotai to gain insight as to how and where checklists could be best displayed for mobile staff, such as drivers, that may not have regular access to a checklist in a fixed staff area, i.e. when they are 'on the road'. The participant suggested that a checklist could be made into a sticker that the drivers' could stick on their dashboards. This is a very good idea, although the researcher believes it may be best to fix it or print it into their log-books (which every driver must have on them and update regularly throughout the day), in a timesheet folder, or inside a first-aid kit, etc., as a sticker on the dashboard would likely fade or become messy overtime. The stickered checklist should be limited to five main points and include a specially designed website for mobile workers and businesses to access for further tsunami and/or general emergency information in context.

Pāpāmoa

Evacuation Mapping

3x Yes

1x Yes, for the wall

Rongotai

Evacuation Mapping

3x Yes, but they need improvements [discussed]

1x Yes, knows about the evacuation routes

1x Yes, for the wall

Combined

Evacuation Mapping

3x Yes

2x Yes, for the wall

3x Yes, but they need improvements [discussed]

1x Yes, knows about the evacuation routes

Evacuation mapping is an important aspect to explore, because it was often mentioned by the participants in both audiences as an initiative that they are most aware of, but in some cases can cause confusion and/or may need further enhancements.

In the business context, participants from both audiences supported maps being put on display in workplaces to improve the employee tsunami preparedness and an effective response. It was acknowledged that although evacuation maps may not be looked at by everyone, they are still a worthwhile and simple initiative to carry out in the workplace.

→ "You could easily put that on the wall [or] a display shelf."

→ "We could put something like this on the wall in the staff area. People might not look at it but at least it's there."

Note, Pāpāmoa and Rongotai each use a different format to present their maps. Samples from Pāpāmoa and Rongotai were shown to all participants and the Pāpāmoa map was received much more favourably. The summary that follows outlines the respective map features, as well as feedback gained from the interviews.

Pāpāmoa

The sample Pāpāmoa map was published in February 2017 and is printed in glossy, double-sided A4 brochure format. Five maps were produced to cover the Mount Maunganui and Pāpāmoa coastlines. Map number's 3 (Pāpāmoa) and 4 (Pāpāmoa East/Wairakei) cover the research area. Individual maps were delivered to residents' homes across Tauranga (based on the map that corresponded to where each home was located); however there was a problem with the initial delivery, resulting in most residents receiving the wrong map for their area.

Pāpāmoa Ward Councillor Steve Morris, explained:

→ "These got sent to all the houses in Tauranga, but there was an issue or mix up with New Zealand post delivering them, but they have been re-delivered now."

The maps were re-sent, accompanied by a letter to householders explaining postal delivery issue and credibility seems to have been restored.

There are many beneficial features on the Tauranga maps that could be well utilised in Rongotai. First, each street is easy to find and arrows are applied to streets to indicate the best walking routes to get to the tsunami safe evacuation location, which are indicated. Bridges and common landmarks, such as schools and marae are also clearly marked. The map scale indicates distance, per kilometre and indicates an approximate walking time, further reinforcing the 'best-practice' of 'on foot ' evacuations, which are mentioned several times on the map. On these maps there are also four zones, as opposed to the three used in Rongotai and the words 'evacuation' are included too: for example 'Red Evacuation Zone'. The fourth colour, green, indicates a 'tsunami safe zone'. As noted earlier, the double-sided brochure format was well-received across both audiences. It is practical to store, and hold, and most importantly, it allows space for additional tsunami and evacuation material to be included, such as information on the different zone meanings.

On the whole, this map/brochure is communicated well, although some communication improvements are still needed. For example, there is still not enough 'white space' and too many words, which deterred some participants from reading the actual information provided. The facts on the map about the tsunami arriving in approximately 50 minutes are likely to be for a tsunami generated in the Kermadec Trench, rather than the Hikurangi Trench, of which neither are mentioned. If the goal is to reduce confusion around the local, regional, and distant-source terminology, these should be used and described.

In addition, the Pāpāmoa Plaza Mall (which is perhaps the most well-known, well serviced part of Pāpāmoa) is still referred to by its former name of 'Palm Beach Shopping Centre' on the map. With the number of new residents now in Pāpāmoa, many will be unaware of this

name change, and it could cause confusion. Another familiar local building, the Pāpāmoa Surf Club, would be useful to include, as it is the only building in the red zone and could help people, especially transient people, to be more aware of the tsunami risk at the beach. From one participant:

→ "I can't find [my business] on the map! The landmarks are too difficult to find!"

These issues may reflect the belief of one participant that officials in Tauranga 'do not understand Pāpāmoa'.

Next, the coloured zones used on the maps also caused confusion for many participants. Before having looked at it, at least three participants referred to their businesses/homes being in a 'red" zone, when they were actually in the 'orange' or 'yellow' zones.

→ "We are in a red zone [it is actually in the orange zone]."

The general belief, which is also supported in the Rongotai data below, seems to be that the zones are based on how far a serious tsunami will travel inland, regardless of the source. Whereas, in actual fact the zones mostly relate to tsunami arrival times (sources?), and whether an official Civil Defence warning will be given. To further confuse the zone issue, Emergency Management Bay of Plenty and WREMO resources and definitions use different

words and descriptions to explain what each zone means. Hence, greater simplification and consistency nationwide may help to ease this confusion.

From a specific business perspective, an important issue with the Pāpāmoa maps is that they only cover a small area of approximately six kilometres. In Pāpāmoa East, for example, the area is mostly residential, so it is unlikely that people will live and work within the assigned map coverage area. Therefore, in a business context, businesses should each be allocated with all five maps to cater to the staff living outside the area the business is located.

Pāpāmoa Library Manager, Ngareta Payne explained how she already had some Pāpāmoa evacuation maps available in the Library and when she knew the researcher was coming, it gave her more awareness, so she moved the maps to a ‘spot near the returns slot’ to make the maps more visible to customers/the public.

Rongotai

The Rongotai map is colour coded, and produced in a standard A4 paper format covering the suburbs of Melrose, Lyall Bay, Kilbirnie, Houghton Bay, Strathmore Park and the Airport (as seen in the Appendices). Unlike the Pāpāmoa map, the back of the page is completely blank, whereas it could better used for additional tsunami information. The top of the page has a message:

“If you feel an earthquake that is either longer than a minute OR strong enough that it's hard to stand up THEN get to high ground, out of all zones, as soon as the shaking stops!”

The map also has a legend noting “Red Zone; Orange Zone; and Yellow Zone.

The message underneath reads:

“If you feel either a long OR strong earthquake get out of all zones. Otherwise, evacuate only the zones you are officially told to.”

These messages were perceived as being too ‘wordy’ and as emphasis is placed on the less important words, the participants only skim read the instructions. There was also concern that based on these instructions if the participants did not receive the official evacuation notice and/or the earthquake did not feel long or did not knock them down and they were in an ‘orange’ or ‘yellow’ zones that they did not have to evacuate. Having been in severe earthquakes, the researcher understands that time is difficult to judge and some people were able to stand up while others could not. Hence, participants thought it would be more sensible to encourage people to evacuate anyway, especially if they are in a ‘red’ or ‘orange’ zone.

Based on these descriptions, it appears that the ‘yellow’ zone is for evacuations of a more serious nature than the ‘orange’ zone [Actually not the case?]. And as the following key sentence applies to all zones:

“The earthquake may be the only warning of a tsunami, so do not wait for further instructions, notifications or advice, evacuate immediately after the shaking has stopped”.

This sentence could be emphasised more if noted separately. The Rongotai participants have mentioned that it is unlikely that the Police and/or Civil Defence will be in the area at the time, so official evacuation messages may not be heard. Source terminology or the names of the subduction zones are not used here either.

Some specific comments from Rongotai participants about the evacuation zones and mapping included:

→ “I like having a map, but the colours are too confusing and there are not enough red zones.”

→ “People in the orange zone might think that it's not that risky.”

→ “The red zone means that it is more dangerous, but I think it [a tsunami] will go all the way across [Rongotai].”

Many participants also questioned why the airport had different coloured zones on the map, and paused to visualise it in their minds, before concluding that some areas must be on higher ground than others. However, it did tend to reduce the credibility of the rest of the map for some.

→ “It's strange that [different areas of] the airport are a different colour.”

→ “Some of the airport is yellow, some is orange, and some is red. If there is an earthquake they should evacuate the airport regardless. It's too confusing.”

This could lead to further questioning around the mapping credibility, by a some participants:

→ "How do they really know how far in a tsunami will come?"

→ "The colours not clear enough, is it even accurate?"

None of the participants had a copy of this map in their businesses or homes, and in two cases the participants asked if they could take a copy away with them after the interview.

The researcher also asked participants to locate their businesses on the Rongotai map. This took varying amounts of time, ranging from approximately one minute to five minutes, and in one case the participant gave up and looked at *Google Maps* instead. The researcher had a lengthy discussion with one participant about the sample map. Both being new to the area, we noticed that there was no indication of the type of terrain, and that the 'Blue Lines' (or safe zones) were not indicated on the map. This is important because people may struggle to plan, and take the best route for evacuations. Some of these features are included on the Information Board outside the Kilbirnie Citizens Advice Bureau, and should be included on the paper maps as well.

The footer on the WREMO map contains the WREMO/Civil Defence, Greater Wellington Regional Council, and GNS Science logos along on the bottom section. An image from tsunami evacuation signage material and the "Long or Strong, *Be* Gone" slogan, a website link terminating at a WREMO page are also included. The GNS Science logo is obviously used to increase credibility of the map. However, as some participants expressed concern

about their previous experiences with Civil Defence following the Kaikōura Quake and an overall lack of engagement with the Council, it is recommended that GNS only allow their logo to be used on material that will enhance or support their good reputation and credibility with audiences, to maintain this reputational 'cushion' and specialise in audience-centred engagement opportunities that can continue in this manner.

Pāpāmoa

Community Signage/'Blue Lines'

5x Yes

1x Maybe

Community tsunami evacuation route signage has been erected across Pāpāmoa within the past 18 months. Most Pāpāmoa are familiar with the initiative and support the concept, although most did prefer the 'look' of the 'Blue Lines' in Wellington. Overall they felt that community visuals and signage is a worthwhile initiative because "they are easy to understand" and are "great for people planning their escape". However one issue that could be re-evaluated in Pāpāmoa, is the placement of these signs. There are many instances of poles/signs placed just a few feet apart (*see photo gallery*). The 'on foot' evacuation is well emphasised by the corresponding image though and the approximate travel distance to a 'safe zone' is noted.

Rongotai

Community Signage/‘Blue Lines’

3x Yes

Again, the ‘Blue Line’ project is well-supported by the Rongotai participants. Some participants knew that the ‘Blue Lines’ represent a safe distance to go to , but that people should keep moving up as far as possible beyond that point.

→ “I know to evacuate to the blue line and keep going, otherwise everyone would be there and the tsunami could be bigger than the blue line indicates.”

→ “ Yes, they are good, you can’t miss them.”

Only one participant was not aware of them, but was shown one in a photo and supported them.

→ “These are good, but I'm new to the area, so haven't been here much and I've never seen any of the ‘Blue Lines’, but they would be a good idea.”

One further observation made by the researcher is that the ‘Blue Lines’ do not emphasise the ‘on foot’ evacuation message, and there are no images or references used to support it.

Combined

Community Signage/‘Blue Lines’

8x Yes

1x Maybe

These community based initiatives were overwhelming accepted by the participants, as being an important and practical awareness tool. And many of the Rongotai participants referenced them directly in relation to their Kaikōura Earthquake evacuation experiences. The researcher still questions: (a) who maintains them? And (b) are there any initiatives to remind permanent residents that they are still there, to ensure they are not ‘taken for granted’? Evacuation signage is a favourable new Pāpāmoa initiative and long standing Rongotai one, so it would be useful to compare and contrast their effectiveness and any perceptual issues in greater detail through ongoing research, and in the hopes of rolling this initiative out across other coastal communities in the future.

Pāpāmoa

‘ShakeOut’ Drills

6x Yes

2x Not aware

1x Don’t know

Rongotai

‘ShakeOut’ Drills

4x Yes

Combined

‘ShakeOut’ Drills

10x Yes

2x Not aware

1x Don’t know

In Pāpāmoa and Rongotai, tsunami drills were one of the most supported workplace initiatives. Notably though, none of the Pāpāmoa businesses have previously been involved in a ‘ShakeOut’ Drill and many learned of them for the first time during this research. The researcher also observed that the participants’ body language was noticeably enthusiastic upon hearing about the initiative, but became noticeably disappointed to hear that there had already been a ‘ShakeOut’ Drill in the past and they were not a part of it.

→ “These would be a great idea. I haven't seen it before and I definitely would have been involved if I'd known about it, but no one contacted me.”

As noted, most participants could see plenty of value in conducting tsunami drills in the workplace:

→ "I believe this would be beneficial, so people would know what to expect and put it into practice."

→ "Drills keep people aware of the potential risk and what to do if it did happen."

With one participant also willing to initiate these independently:

→ "Drills could be useful and could be even be arranged annually within the organisation."

However, in Rongotai, the practicalities of including a tsunami component in the 'ShakeOut' Drill was raised by one participant, who noted that in some businesses they would not work because the business would have to completely shut down/lock up, so he would prefer to have a formalised staff briefing or discussion following the drill instead.

Two participants described their previous experience with an official MCDEM 'ShakeOut' Drill.

→ "I was at my old company when we did the 'ShakeOut' Drill and that was a really great way to get everyone involved. These are a great idea, I really like these."

→ "Yes these are good, I think we did it once for an earthquake …"

The literature review outlined some of the key findings of past 'ShakeOut' Drill events in New Zealand based on various GNS reports. In those findings, uptake for the initiative was significantly higher in Wellington than the Bay of Plenty, which is also indicated from the participants response too. None of the Pāpāmoa participants were aware of the Drill, while two Rongotai participants were involved and found the experience very beneficial. The 'real-world' practicalities of these Drills were raised by one participant, who offered an additional solution for some businesses to consider. In order for these Drills to be effective with the business audience though, significant support and ongoing engagement is recommended, and if conducted thoroughly they could prove to be highly effective in the business context.

Pāpāmoa

Organisational Workshops

3x Yes, if meaningful

1x No, transient worker barrier

1x Maybe

1x Yes

The idea of organisational workshops with the Pāpāmoa business audience, is ‘good in theory’, with a participant noting that they are good “to help them prepare and know what to do in a tsunami”. However the researcher questions whether they would actually be effective in Pāpāmoa at this time. The response rate from Pāpāmoa was very low due to people either being ‘too busy’ or having an overall sense of apathy/fatalism (*see 2.3*). Therefore, most of the direct preparedness information is likely to be perceived as a hinderance or would be too confronting for this audience. Furthermore, with the significantly aging/aged (i.e. retired) population and certain types of businesses operating in Pāpāmoa (most are small businesses) the possible turnout and subsequent impact of an organisational based workshop would be more limited than with a Wellington based audience.

Accordingly, indirect forms of communication, where people can choose how and when they access their preparedness information, or in cases where preparedness information gets accessed ‘by chance’ through mundane activities, is more likely to be received by the Pāpāmoa community. Hence, tsunami preparedness conduits from Pāpāmoa’s business audience are best utilised as facilitators for indirect community based initiatives, where they can fulfil a social role and receive a social reward in return.

Here, one participant shared concerns that:

→ “Organisational workshops would not work because transient workers would be gone again after the winter.”

In another community or under different circumstances, by aiming the workshops at senior management or specific ‘opinion leaders’, this transient workforce issue could be overcome. For instance, Ngareta Payne from Pāpāmoa Library, explained that as they do not have a high staff turnover at the Library, a workshop could be very beneficial and invited the researcher to return:

→ “These would be really beneficial if you could do it! I would like you to come and give a presentation to my staff, could you please come back?”

Another Pāpāmoa participant indicated that workshops would only be beneficial if the quality of the material was assured, as supported by the Rongotai data below.

Rongotai Organisational Workshops 3x Yes, if meaningful

Additionally, the Rongotai audience specified that they would only be beneficial if run by credible facilitators, with business knowledge.

→ “We would need involvement from like-minded people.”

→ "The workshops would be great, but it would need to be credible and have business knowledge. You could possibly also include groups like the NZTA for roading information, local councils, the fire services, and information from GNS, but consistency is most important."

Throughout the Rongotai interviews the need for ongoing engagement and collaboration among 'like-minded' business people and official agencies was expressed by many. There was also a clear preference for tsunami preparedness information to be provided directly to assigned organisational leaders/representatives (actually 'opinion leaders') who felt capable and responsible to pass this information on to employees/colleagues through their own organisational channels and guidelines.

Therefore in Rongotai, organisational workshops would be most effectively delivered in business networking groups, such as the Kilbirnie Business Network (or even more ideally) a newly established 'emergency management for business leaders group' (of 'opinion leaders'), which can be reinforced through ongoing stakeholder engagement opportunities with these leaders/representatives independently as well. The business leaders viewed GNS as the most highly credible and 'independent' expert source (with an excellent 'reputational cushion'), so if possible it is recommended that this initiative be facilitated by GNS, particularly as they also share a good rapport/working relationship with key emergency management agencies; including JCDR, MCDEM, and their regional emergency offices nationwide. If successful, this model could also be extended throughout other suitably identified New Zealand's coastal business communities.

Combined

Organisational Workshops

6x Yes, if meaningful

1x No, transient worker barrier

1x Maybe

1x Yes

7x Yes

1x No

1x Maybe

Organisational workshops could be a highly effective means to communicate with certain business audiences, if meaningful information is shared from a credible source with business experience or understanding. Based on a host of socio-cultural factors, they are likely to prove more effective with the Rongotai audience than with the Pāpāmoa one at this time, especially as the expertise provided by official groups and agencies is currently welcomed to a much greater extent there. However, as Pāpāmoa continues to grow and evolve this could change in the future. A goal of this project is to find the most suitable tools for each community and with that in mind, the researcher suggests an ‘organisational workshop model’ for the Rongotai business community.

Pāpāmoa Community Meetings and Workshops 3x Yes 1x Maybe 1x No

With the right promotion, community meetings are highly favoured by the Pāpāmoa community in general, however as most attendees are usually retired, their influence on preparedness in the business sector would be limited. Based on the data, time barriers may also prevent some business leaders from attending outside of business hours:

→ "These are not for me personally because finding the time to attend would be hard."

During the course of the research, the researcher attended a Pāpāmoa community meeting arranged by the local ward councillors, to discuss Pāpāmoa's future growth plans. The facilitators were originally expecting approximately 50 people to attend, but around 250 arrived. The meeting had a broad scope, yet the topic of tsunami seemed to generate the most discussion during the Q&A session, indicating that the community is 'thirsty' for tsunami information. A majority of these attendees were in the older aged bracket and business concerns were not mentioned. However, the turnout further illustrates the importance placed on community-led initiatives in Pāpāmoa, which should be utilised wherever possible.

Nevertheless, as business leaders are generally well-known and respected in the Pāpāmoa community, those who are 'opinion leaders' could still play a symbolic and social conduit role by helping to reinforce tsunami preparedness message as co-presenters, offering their businesses as venues, providing event sponsorship, or by generating local media promotion.

Rongotai Community Meetings and Workshops 4x Yes

Community meetings and resilience workshops are already regularly run by WREMO in Rongotai and throughout the Wellington region. One participant, from a Council-based organisation explained:

→ "I have a staff member that I send along to these types of workshops and she says they are really good."

The researcher participated in one of these WREMO community meeting during the research, which was part of a four part resilience and disaster response series, held in Rongotai. According to the host, this particular series had a much higher turnout than usual, with approximately 30 people present. Observational feedback from attendees on the night, suggests these were positively received by those in attendance and meeting participants (including the researcher) clearly enjoyed the WREMO host's knowledge and engaging

approach to emergency management. Participants were empowered and equipped to better respond to locally-specific disasters, particularly from tsunami and earthquake hazards.

However unfortunately, at least three participants from the Rongotai sample explained that they were not aware of the meetings and noted that if they had have known the workshops were being held, they would have attended.

→ "[When shown the community workshop brochure] Let me have a look at that … That was held right next door to our building! If I knew I would have gone! No one came and told us about that."

→ "I didn't know about the community meeting and would have considered going."

One participant commented that it would be better during work hours:

→ "Yes, that would be really good I'd prefer if it was in work hours than outside of work hours though."

During the previously mentioned workshop attended by the researcher, the topic for the night was "working together after a disaster". To stress, this was a very beneficial workshop overall, but one of the main workshop tasks was to identify and locate different local businesses that could provide vital supplies, such as: food and water, cooking and washing facilities, and offer shelter following a disaster scenario. The participants all collaborated well

together and a long list of businesses, such as hardware stores, motels, supermarkets, etc., was developed. While these resources could save lives in an event, greater collaboration with the identified businesses is required. It must be remembered that many of these are privately owned business that may not want to be identified in this way and/or may have their own priorities to attend to in the aftermath of a large-scale event. For example, a rest home/retirement village was identified as having showers and kitchens that the public could use; but in a rest home/retirement village the staff will be tending to the needs of their vulnerable patients/residents and members of the community arriving on their premises uninvited would inevitably cause considerable issues. In another example, 'Bunnings' was identified as being able to provide wheelbarrows and tools etc.; but if people begin taking these items without any prior consent this raises insurance issues and could be likened to looting, which was specifically noted as a concern of a business leader.

→ "When I talked to staff about [tsunami preparedness, when I knew about our interview] the only thing that came up was the security of the building with houses being looted and that could happen with the business."

This participants business had been identified during the WREMO workshop, so the researcher asked about whether their business would allow the public to use their facilities in a disaster, to which they responded:

→ "No, if there's only one staff member there we don't want them inundated with people from the community. Businesses have other responsibilities and people to look after

[following an event] not the entire community, for example, motels will have their own guests to look after."

These issues further highlight the value of stakeholder engagement and business experience, when developing emergency management initiatives in a business context.

Combined
Community Meetings and Workshops
7x Yes
1x Maybe
1x No, time barrier

Community meetings and workshops would have limited tsunami preparedness effectiveness in a business context, but are well-supported community based initiative for a general audience, of which businesses owners may attend as residents, and/or could provide a symbolic and social role to help facilitate preparedness in their communities. Nevertheless, this question raised and important point (in the Rongotai data) surrounding the need for emergency management agencies to engage with business owners directly, before automatically assuming their willingness to provide for the community in the aftermath of an event.

Pāpāmoa

Community Events

3x Yes

The Pāpāmoa community and local events were discussed at length during the interview conversations and it was clear that any event must be locally driven and also consider the local community culture. Events on the new vertical evacuation mound were discussed earlier, however Pāpāmoa Plaza's David Hill, also explained:

→ "We have the Pāpāmoa Santa Parade here, which the Mall arranges and supports. 20,000 people turn out, which is better than in Tauranga. Get people prepared, by getting them involved. It doesn't need more design, it needs well organised events within the local community. A community event organised for the community, by the community. They would need to be done properly though, with excitement and some buzz around it."

Councillor Morris, agrees noting that:

→ "The Pāpāmoa community is different to Tauranga and the Mount, so community events would need an individual community approach to work."

Ngareta Payne from Pāpāmoa Library cautions that because tsunami can be distressing for some, community events must also:

→ “Consider the children that may be in attendance.”

Rongotai Community Events 1x Yes

Only one Rongotai participant was asked about whether they could play a role in community events to enhance tsunami preparedness. This participant made reference to the success of the local Kilbirnie Santa Parade and explained that while they would be able to take on a supportive role, larger organisations such as supermarket chains and banks would be in a better position to do so.

→ “I would be happy to support a community driven initiative, but we're not big enough to do it alone. You can't just have one organisation doing it. For example, the larger organisations like Pak ‘n’ Sav, Countdown, and ANZ would have to take the lead. They do this with the Christmas parade.”

This participant’s organisation is a franchise, but the participant thinks it would be good to contact the Head Office to implement additional initiatives through there. Bearing this in mind, the researcher would welcome the opportunity to extend upon this research project, to

research tsunami preparedness initiatives in the context of large business organisations and franchises, to improve tsunami preparedness on a larger scale nationwide.

4.8 Tsunami Preparedness Barriers (RQ10)

RQ10: What are the specific barriers that you, your organisation, and your community face to being better prepared for a tsunami event?

4.8.1 Specific Personal, Organisational, and Community Barriers

This essential question was asked as part of objective three, to identify perceived obstacles that may hinder the participants' ability and motivation to be prepared, as in order for people to be motivated to prepare, potential preparedness barriers must be identified first.

Pāpāmoa

Personal Barriers

2x Text alert/warning system barrier for evacuation

1x Traffic congestion

1x Time constraints

Pāpāmoa

Organisational Barriers

4x Time constraints

2x Physical vulnerabilities/age

2x Inability to collaborate with others

2x Language barriers

1x Transient workforce

1x No reliable warning system

Pāpāmoa

Community Barriers

5x Physical vulnerabilities/age

2x Technological barriers

2x No reliable warning system

1x Desire to live near the coast

1x Language barriers

Pāpāmoa barriers (in no particular order)

- Physical vulnerabilities/age
- Financial constraints
- Transient/new workforce/population
- Language barriers
- Time/'Business-as-usual' demands
- Traffic congestion
- Ineffective text alert/warning system

Rongotai

Personal Barriers

1x Inability to access/store water

1x Traffic congestion

1x Confusion

Rongotai

Organisational Barriers

3x Mitigatory issues

2x Vulnerable customers

1x Time/Business-as-usual demands

Rongotai

Community Barriers

2x No preparedness culture

1x Traffic congestion

1x Bad experiences following Kaikōura Quake

1x Inability to access/store water

1x Financial limitations

Rongotai Barriers (in no particular order)

- Physical vulnerabilities/age
- Financial limitations
- Traffic congestion
- No culture of preparedness
- Time/'business- as-usual' constraints
- Inability to store water
- Bad experiences with/inconsistent communication from official agencies

4.8.2 Socio-Cultural Barriers: Physical and Social Vulnerabilities

Vulnerability can be present in a number of forms, and its consequences are not usually obvious until the evacuation phase is underway. In Pāpāmoa, the community vulnerabilities were mainly discussed with regards to the large number of elderly people residing there.

→ "There are a lot of elderly and retired people here."

→ "I feel very concerned about children and older people here."

Vulnerable customers in wheelchairs were also mentioned:

→ “We have people coming in [to the business] with wheelchairs, they usually have a caregiver with them though, the caregiver would have to help get them out in an evacuation.”

The above assumption that the caregivers would evacuate people in wheelchairs following an earthquake, highlights how in a tsunami scenario, many businesses will actually need to work together with one another, as well as with their staff and/or customers, to survive. Therefore businesses should be encouraged to collaborate and communicate together in tsunami preparedness initiatives, and especially with other businesses throughout their supply chain and/or local community.

Social isolation was also mentioned and discussed at length with Councillor Morris, who was presented with this issue in Pāpāmoa during his election campaign:

→ “Social isolation is a barrier because it’s difficult to reach this group. We had to do a lot of door-knocking. We also had an example recently where the mobile library got cut and there was a public outcry because people in the community needed the social contract that it provided.”

In contrast to the community-centred barriers above, the Rongotai participants tended to discuss vulnerability in organisationally-centric terms. For example, Wellington Aquatic Centre Manager, Craig Hutchings, noted that if a tsunami was to occur in Rongotai during work hours, customers could become vulnerable to the effects of hypothermia:

→ “They may come out of the pool with just their wet swimwear on, so it would be a real challenge to keep them warm and dry in an evacuation. There are also vulnerable customers in the hydrotherapy pool and we have a lot of school groups that come in.”

He also explained how business organisations often are dependent upon key infrastructure being available:

“The use of phones are part of our emergency communication setup, so the phones need to be working.”

This further illustrates that each business has its own unique demands and a purely mass communication approach would never effectively meet the preparedness needs of the business community, let alone the entire public.

4.8.3 Socio-Cultural Barriers: Financial Constraints

Financial constraints can prevent people from preparing; and especially purchasing and maintaining mitigatory items, such as first-aid kits, ‘Go-Bags’, or additional food supplies. A Rongotai participant explained:

→ “There are financial barriers in the community.”

Pāpāmoa Plaza Manager, David Hill, noted that:

→ “Seventy percent of the population in Pāpāmoa is on a fixed income and that presents a huge barrier to preparedness here.”

Another Pāpāmoa participant shared a different perspective:

→ “Unlike with overseas examples, ‘white and wealthy’ people choose to live on the beachfront in Pāpāmoa. They are probably less familiar with WINZ and maybe less willing to receive help from social agencies afterwards.”

This point also aligns with development issues discussed earlier in the literature review that highlight how capitalistically-driven decisions made by councils, developers, and policy-makers can put people’s lives at risk through ‘ill-considered’ decision-making. This type of issue is perhaps best illustrated in Pāpāmoa, where the pressure to expand and provide housing for the growing population, has led to the development of multi-million dollar, absolute beachfront subdivisions on sites that were once sand-dunes (*see photo gallery*). From a critical perspective, removing sand-dunes (which are noted as providing an ecological barrier to protect the community from tsunami inundation), sends a message to the community that ‘if the council have allowed it to go ahead, it must be ok.’, which in turn can further diminish tsunami risk perception.

4.8.4 Socio-Cultural Barriers: No 'Culture of Preparedness'

Three participants from Rongotai mentioned the term 'culture of preparedness'. From a business perspective they know the importance of organisational culture and its power to shape and influence ongoing behaviours. This is discussed in more detail in the literature review, but some comments included:

→ "They are sleeping here!"

→ "There's no culture of preparedness here."

→ "We need a 'self-preparedness culture' in the community."

Closely aligned to this, but not specifically mentioned by participants is the barrier of fatalism, as mentioned earlier. Fatalist beliefs are well-illustrated by a Rongotai participant, who despite having the most personal experience with tsunami through his family connections, admits:

→ "I'm still not prepared. The reality is, I don't think a tsunami will happen, an earthquake maybe, but not a tsunami."

According to *the situational theory of public relations*, fatalism often proves to be the major barrier preventing aware publics from becoming active publics.

4.8.5 Socio-Cultural Barriers: Language Barriers in Tsunami Preparedness Communication and Evacuation

New Zealand is an increasingly diverse and multicultural nation, with many different languages spoken throughout our communities. Pāpāmoa has typically had low cultural diversity in the past, however the population is following suit and rapidly becoming more ethnically diverse. The increased number of migrants and non-English speakers relocating to the community has presented language barriers in preparedness.

Pāpāmoa Library Manager, Ngareta Payne, explains that:

→ "There is an increased number of Chinese and Spanish speakers using the Library, so I would like to display tsunami preparedness information written those languages too."

On that note, the researcher found a general emergency preparedness brochure produced by WREMO in a Wellington branch library, which was published in Simplified Chinese. This could be adapted to a tsunami-specific brochure for both Pāpāmoa and Rongotai.

4.8.6 Socio-Cultural Barriers: Transient Workers and Visitors as a Barrier for Preparedness and Evacuation

Despite the growing Pāpāmoa population, the Bay of Plenty has always had a large transient population of workers and visitors in the community (see the Pāpāmoa case study).

→ "We get a lot of people from overseas working on the orchards."

From a business perspective this creates a barrier to tsunami preparedness because employers are reluctant to invest in, train, or educate transient employees about preparedness (only to have them leave a few weeks later).

→ "The transit workforce are a barrier, people come here to work over winter when it's too cold for kiwifruit picking and then leave."

→ "One business here has had four CEOs in a couple of months."

While this seems legitimate to rationalise in practical terms; in reality this is actually a perceptual barrier more than anything. Again, if tsunami can be viewed as a potential hazard, rather than a disaster, and if preparedness can be communicated in relation to health and safety requirements, then employers will be more likely include tsunami-specific training in staff inductions and procedures (as they are legislatively required to do). Furthermore, tsunami preparedness must also be viewed as a social investment and from a long-term perspective. For instance, when an employer trains a transient employee about tsunami risk and preparedness, the information they gain stays with them regardless of whether they remain employed in that organisation or not. As they continue to move throughout other workplaces, communities, and social networks they are still equipped with the knowledge that could save lives. In summary, if employers can understand tsunami preparedness as a long-term, social investment, that could even have an immediate 'return' if a tsunami was to occur, they would be more likely to see the benefit in it, rather than the short-term costs incurred.

4.8.7 Mitigation and Practical Barriers: Building Inspections

Interestingly, the Rongotai audience discussed many more mitigatory and practical issues than their Pāpāmoa counterparts. One frequent issue surrounded the fact that following the Kaikōura Quake, business owners/managers were required to inspect their physical buildings, but did not necessarily feel equipped or capable. Two participants explained:

→ "After the Kaikōura Quake I had to inspect the office, but I had no training to do so."

→ "The owners came in and checked the building, once they gave it the all clear we could open again. They were keen to get our one [the Rongotai site] open first, so that people from town could still come. I asked what else they had checked, and they said that they had checked for physical signs of damage in the concrete. We told the staff they could come back; some of them said that they didn't think it was going to open until lunchtime, but I said that the boss is looking just to get it open. In saying that, we did have to wait until the tsunami warning was lifted though".

Understandably, this can place a large burden of responsibility on business owners. For example, in the Christchurch Quakes many fatalities occurred in bricks and mortar businesses, which may have been previously weakened in the earlier shakes. Both of these businesses are privately owned, and one participant noted:

→ "I've been the manager here for 2 years and the only contact I've had from the Council was when they came and put a letter on the side of the building to say it was compliant."

In contrast the Council owned Wellington Aquatic Centre, had “engineers and asset managers inspect the building”. Understandably, there are a limited number of inspectors to go around, but the business leaders spoken with, would at least like some basic post-event building inspection training to be made available in advance.

4.8.8 Mitigation and Practical Barriers: Time Constraints

In business, time barriers carry additional significance because ‘time is money’ and ‘business-as-usual’ activities often take priority. This is well-illustrated in the participants comments below; however the ‘time barrier’ appeared to be a much bigger issue for the Pāpāmoa audience. The Rongotai participants seemed to understand that preparedness required a time investment and they also knew it would need to be factored it into their daily work schedule. Conversely, the Pāpāmoa audience viewed time constraints as both a barrier and more specifically a justification for not being prepared.

→ “It's hard enough getting some people to read the code of business, let alone anything else.”

→ “The business community is not prepared, more time is needed and there are too many other priorities.”

→ “We are in a major growth phase of the business. The business is booming. ‘Business-as-usual’ is always a priority and businesses are too busy to consider other aspects.”

→ “The priority is often on the bottom line.”

In line with the situational theory and diffusion studies approaches, the time constraint barrier is usually the major obstacle in determining whether an individual moves from being an 'aware' to an 'active' public and is able to be classed as an 'opinion leader'.

4.8.9 Mitigation and Practical Barriers: Traffic Congestion

With traffic issues being a 'hot topic' in Pāpāmoa and Rongotai under 'normal' circumstances, it is not surprising that traffic congestion was identified as an anticipated barrier in a tsunami event. In Pāpāmoa there is only one main road in and out of the area, which also runs parallel to the beach. (*Note: at the time of publication, it has been announced that a new road will now be opening five years earlier than planned, to help alleviate this issue*).

→ "Traffic is a barrier, what could you really do?"

And in Rongotai, narrow roads and tunnels would exacerbate the traffic congestion issues already being experienced. This barrier was put to the test in Rongotai following the Kaikōura Quake, and as a result most of the Rongotai participants have decided to evacuate 'on foot' in future events.

→ "People shouldn't be getting in their cars, there is just too much traffic."

→ "We're in a cul-de-sac and we'd get jammed in straight away."

4.8.10 Mitigation and Practical Barriers: Water/Food Storage

Water and food supplies were not considered to be a major barrier, and/or where not considered at all by the Pāpāmoa participants. In contrast, the Rongotai participants explained their concerns about the difficulties of water and food storage in a business context and feel that their community is "woefully underprepared" when it comes to this issue.

→ "We have two people permanently in the office, but most are independent workers, so how could we store and maintain it? How much water is even required? And then there's the food!"

→ "We don't have water stockpiled and there aren't many cylinders in the Wellington houses for water either."

→ "Water would be a big issue. After the Kaikōura earthquake I went into the supermarket and all the shelves were bare. It was so bad I even took photos of it. I could survive without food, but not water and cooking would be difficult I probably try and distil seawater or something if I had too."

The researcher recalls her own experiences of a lack of water following the Christchurch Quakes, where drinking water sales had to be rationed at supermarkets and there was no running water in houses. A combination of apathy and a lack of water/food storage guidelines for businesses are contributing to this barrier, which presents an opportunity for improved communication and engagement with the business sector on this issue.

The researcher discussed the social role of supermarkets in disaster scenarios with Emergency Management Bay of Plenty, who acknowledged that more could be done in advance to establish process around this issue, particularly as New Zealand only has two major supermarket chains. (*Note: a Pāpāmoa supermarket owner was scheduled for an interview, but had to cancel at the last minute due to a staff member being absent. The researcher is still in contact with this potential participant and could discuss this issue further if need be, however he is now based in Wellington, not Pāpāmoa.*)

4.8.11 Communication Barriers: Failed Text Alerts/Broadcasts

Mobile broadcast and text alerting was highly supported by those who successfully received them, but those that did not were very concerned and considered it as an important barrier.

→ "My phone is not compatible to get text alerts or warnings for tsunami."

→ "Not having a reliable warning system is the biggest barrier."

→ "Mobile notifications are not always reliable, and you don't always have your phone on you."

Failed text alerts have been covered by the media on more than one occasion, particularly in Pāpāmoa, so extra considerations should be made to ensure the trust and credibility of these highly useful technological tools is not further compromised. Social science research on public feedback in response to the new national broadcasts is currently underway, however given that some people did not receive the texts and others received them in the early hours of the morning, extra emphasis should be placed on the fact that this is a brand new approach,

which will require testing and refinement, and that it is one of a suite of initiatives required to be adequately prepared.

4.8.12 Communication Barriers: Official Communication Issues

As noted in the literature review, emergency management is a challenging task and the organisations responsible operate with good intentions and a limited budget. However emergency management communication is a specialised practice, requiring specialised knowledge and application. Interestingly, the participants that are identified as potential 'opinion leaders'/'active publics'/conduits all discussed the lack of official communication and expressed a desire for ongoing engagement with the researcher. There is clearly a desire for more engagement and effective tsunami preparedness communication, but unfortunately, this has not been catered to through the existing 'mass' approach.

In Rongotai:

→ "There is no clear voice, one organisation says to do one thing and another organisation tells us to do something else."

The above comment was supported by examples, which have been requested to remain confidential, but could have detrimental and far-reaching consequences in a 'real-life' tsunami event. Subsequently, inconsistent and contradictory information from officials was prioritised as the most important issue for this participant.

Another participant from Rongotai explained that:

→ “Preparedness material needs to be palatable and at the moment it’s not.”

In Pāpāmoa:

→ “[Official] Communication is definitely lacking.”

An example of this was made by a participant who warmly welcomed the researcher into their organisation:

→ “Someone came from the Council and did a talk on tsunami about five years ago, but never came back.”

→ “I found this online [Civil Defence tsunami material], when I knew you were coming in. I can't understand it though! There are too many words and it looks like a report, so I wouldn’t read it. I don't know what any of it means!”

It was clear that this participant valued the talk given by the Council, but because no-one returned credibility was diminished and an opportunity was missed. This participant exhibited low tsunami awareness, but showed very high willingness to learn and act as a conduit for tsunami preparedness in their community.

4.9 Behavioural Intent for Tsunami Evacuation and Response (RQ11)

RQ11: Hypothetically, if a tsunami event occurred during business hours, let's say at 11am, and you were onsite, how would you likely respond? (i.e. Where, when, and how might you evacuate?) How would this change if you were offsite at that time?

This question was asked to learn about the participants' evacuation intentions, in a business context, and to encourage them to think more deeply and practically about what a tsunami event might 'look like' to them. Intended modes of transport and specific evacuation intentions also formed part of the inquiry.

Pāpāmoa

Intended Responses

3x Go inland, general

2x Check the safety of others

1x Go to higher ground, general

1x Implement general emergency plan

1x Referenced siren, specifically

1x Referenced the earthquake, specifically

1x Get important information, lock office, and leave

1x Already discussed plan with family member

Pāpāmoa

Mode of Transport

4x Specified on foot

1x Specified vehicle

1x Specified bike

1x Evacuation route in general

1x Did not say, but showed awareness

Pāpāmoa

Evacuation Points

2x High Ground - general

2x Pāpāmoa Hills - specifically

1x Inland - general

1x Bell Road - specifically

1x Domain Road - specifically

1x Supermarket roof - across the road

A Pāpāmoa participant, identified as a potential 'opinion leader' began by acknowledging the importance of self-responsibility in preparedness, and has already discussed his intended tsunami response plans with family members (i.e. an informal communication network), noting that:

→ “It’s about self-preparedness as well. I’ve talked about this with my daughter. She knows if a tsunami comes and I’m here, I’ll be headed straight for the hills. I'm more used to her alive than dead. It's better being a living coward than a dead hero.”

Of concern and as mentioned earlier, many of the participants explicitly believed that tsunami warning sirens were installed in Pāpāmoa. In answering, RQ11, one of these Pāpāmoa participant’s described that in a tsunami event:

→ “A siren would sound. I would kick into the evacuation process and alert the staff. I’d verbally get everyone out into the carpark and head for Domain Road [the vertical evacuation mound].”

The participant was aware of the vertical evacuation mound and understood the danger of the situation, but their intended response clearly illustrates how vital it is that people (a) know to evacuate immediately in local-source events; and (b) know that no warning sirens are installed in these communities. (*Note, the researcher informed the participant that no sirens were installed after the interview concluded, and the participant was visibly shocked, but was nonetheless appreciative to find out*).

A surveyed Pāpāmoa participant explained her intended evacuation response, including some security steps she would take:

→ “I’d abandon the office, lock it up, sign off computers, grab personal belongings (my bag) and RUN!”

On that note, there was surprisingly high awareness (*compared to the examples from overseas, see 2.1.5*) of ‘on foot’ evacuations in Pāpāmoa, which the researcher believes is largely due to its emphasis on tsunami signage and maps provided by Emergency Management Bay of Plenty.

→ “If I had to go, I’d go by bike or would walk briskly.”

→ “On foot as roads will probably be blocked or busy.”

While, one participant feels that: “on foot evacuation needs to be stressed more”, only one Pāpāmoa participant planned to evacuate by vehicle. Interestingly, this participant is not in a regular ‘bricks and mortar’ type of business and is often ‘on the road’ throughout his work day, so may be more geared towards, or perceptually dependent upon vehicle use in general.

Other Pāpāmoa participants also knew to get to higher ground and away from the beach, indicating they would evacuate to the following locations:

→ “Pāpāmoa Hills.”

→ “Bell Road [the vertical evacuation mound is located here].”

→ “The Domain Road safe zone [the vertical evacuation mound is located here].”

A slightly different response was provided by a participant based across the road from a Pāpāmoa supermarket:

→ “I thought about the Pak ‘n’ Sav, it is so big and I thought it would be good in an evacuation. I wondered about the roof access. We have a ladder.”

The awareness of where to evacuate to is pleasing, however as seen in the above comments, there is limited thought given to additional ramifications that business leaders may face; for example, to quote one participant:

→ “I would do the same if I was on or off site. I'd evacuate immediately to higher ground.”

This point was also confirmed following a post the researcher made to recruit participants on a Pāpāmoa Business Group page on Facebook. None of the group members accepted the invitation to participate, but one business owner from Te Puke simply commented “evacuate to higher ground”, again with little consideration to the complexity of the situation.

Pāpāmoa Plaza’s David Hill did explain the challenges that large businesses and organisations can face in tsunami evacuations:

→ “There are 1200 staff at the mall and all the customers that I’d need evacuate.”

Bearing that scenario in mind, and with Pāpāmoa Plaza located just 700 metres from Pāpāmoa Beach, the importance of ongoing engagement and collaboration with business leaders, such as David Hill, on tsunami preparedness issues should not be overlooked.

Rongotai

Intended Responses

4x Immediately evacuate to higher ground/ up the hill, specifically

3x Implement general emergency plan, specifically

Rongotai

Mode of transport

3x Specified on foot

1x Specified vehicle

1x Did not say, but showed awareness

Rongotai

Evacuation Points

2x The Hill above Queens Drive, Lyall Bay [indicated]

1x Hill/higher ground - general

1x Mount Victoria

1x Kilbirnie Tennis Club

1x Newtown School - Welfare Centre

1x ASB Centre - Welfare Centre

In Rongotai, the responses continued in a similar vein to Pāpāmoa, with participants planning to activate their general emergency plans, and/or move to higher ground. There was no specific mention of moving inland, however as Rongotai has plenty of high ground locations, participants knew to evacuate there. The area on the hills above Queens Drive, Lyall Bay, was located across the road from where most of the interviews took place and participants gestured towards there as the area they evacuated to after the Kaikōura Quake and go to again in future events. Two participants also referred to a house on the Hill, in which its residents broadcasted video footage on social media after the 2015 Storms and Kaikōura Quake.

→ "Evacuate to high ground."

→ "Evacuate up the hill."

→ "Evacuate to higher ground [and has developed own emergency evacuation map/procedures for staff, supplied to researcher - confidential]."

One participant, took this answer one step further:

→ "We would initiate our evacuation procedures and evacuate above the Blue Line, but what do we do then?"

The 'what do we do then?' question relates more to the emergency response communication, rather than preparedness communication, however it is identified as an area that needs to be explored and communicated more thoroughly. As noted elsewhere in the report, the ability for people to survive does not end after an evacuation.

A Rongotai based travel/transport Health and Safety Manager, also explain the benefits that technology can provide in a potential tsunami event. However, it is likely that the 'control base' is located at the company depot (in an 'at risk' tsunami zone). Nevertheless, these types of initiatives are still worthwhile for businesses to explore, as they continue on their path to becoming a 'safety-focussed' organisation.

→ "We'd initiate our emergency plan. We also have a technology system where we can track where our drivers are located. It would be really useful in a tsunami."

While, not directly part of this research per see, the principles of *Tsunami Tendenko* were discussed at times with some participants and raised in a question and answer session, following a conference presentation conducted by the researcher. Those with school children,

or whose employees had school children, were interested to explore this further, and agreed that *Tsunami Tendenko* could only be possible if parents of school children were confident that the schools' leaders knew what to do and could be trusted to look after their children in a tsunami event. The consensus from participants at present is that business leaders would permit parents to leave the business immediately to get to their school children; a decision that has been shown to have detrimental consequences overseas. Therefore, the viability of these *Tsunami Tendenko* principles would be useful to apply and research in the future, as they do ultimately affect how businesses will respond in an tsunami event.

Combined

Intended Responses

5x Immediately evacuate to higher ground/ up the hill, specifically

4x Implement general emergency plan, specifically

3x Go inland, general

2x Check the safety of others, general

1x Referenced siren, specifically

1x Referenced the earthquake specifically

1x Get important information, lock and leave

1x Already discussed plan with family member

Combined

Mode of Transport

7x Specified on foot

2x Specified vehicle

2x Did not say, but showed awareness

1x Specified bike

1x Evacuation route in general

Combined

Evacuation Points

3x Hill/higher ground, general

2x The Hill above Queens Drive, Lyall Bay [indicated]

2x Pāpāmoa Hills, specifically

1x Mount Victoria

1x Kilbirnie Tennis Club

1x Newtown School, Welfare Centre

1x ASB Centre, Welfare Centre

1x Bell Road, specifically

1x Domain Road, specifically

1x Supermarket roof, across the road

1x Inland, general

RQ11 allowed participants to think more specifically about how a tsunami might impact them on a personal level. This is very important for future communication efforts, as a connection must be made between the need for tsunami preparedness and what this could look like in their own lives/business interests (i.e. What's in it for me? And why do I need to care?).

The data revealed that there is overall good awareness in Pāpāmoa and Rongotai that evacuations should be made 'on foot' due to the likelihood of considerable traffic congestion on roads. Overseas literature points to the importance of on foot evacuations to vastly improve survival outcomes, so this is very encouraging. There was also good awareness that evacuation points should be away from the coast and/or on higher ground. A variety of locally-specific, suitable evacuation locations were provided, including Pāpāmoa's new Bell Road/Domain Road vertical evacuation mound (for Pāpāmoa) and the same high ground locations that participants evacuated to after the Kaikōura Quake (in Rongotai).

4.10 Identity and Responsibilities of Business Leaders in Tsunami Preparedness (RQ12a, RQ12b)

RQ12(a): Do you feel that the business sector and its leaders has a responsibility for tsunami preparedness and response? (If yes, why? If not, why not?) Please explain. RQ12(b): Are you aware of any organisational health and safety obligations or requirements with regards to a tsunami occurring during business hours? Please explain.

This two-part question seeks to understand whether the participants view tsunami preparedness as a part of their leadership responsibilities and identity within their organisation and communities. If so, it is necessary to engage with these people, and to help

them become conduits for tsunami preparedness through targeted communication and initiatives. Regardless, of the participants response to RQ12(a), there are also legislative health and safety obligations that must be considered by business leaders in the workplace, so RQ12(b) aims to ascertain whether the participants are aware of these obligations, while drawing their attention to them.

4.10.1 Business Responsibility for Tsunami Preparedness (RQ12(a))

RQ12(a): Do you feel that the business sector and its leaders has a responsibility for tsunami preparedness and response? (If yes, why? If not, why not?) Please explain.

Pāpāmoa Business Leader Identity/Responsibility 5x Yes - strongly 2x Yes - to an extent/maybe

These Pāpāmoa participants were unequivocal in their response to RQ12(a):

→ "Business leaders should be involved, it's their responsibility."

→ "All businesses are responsible."

→ "I think businesses should help [and financially as well - with warning systems]."

→ “I'm the manager. I'm responsible for my staff and the people in the library at that time.

→ While the people are in the building, they are my responsibility.”

Rongotai Business Leader Identity/Responsibility 4x Yes - strongly

The Rongotai participants all shared the opinion that business leaders do have a responsibility for tsunami preparedness, as a potential Rongotai ‘opinion leader’ explained:

→ “Absolutely yes! We have to put morals before business. Our business is done here [with people] in the community, if there are no [people here], there is no business.”

Others agreed, but questioned where their responsibilities end?

→ “Yes. [But] I'm not sure what my responsibilities are once the customers are outside the building.”

→ “At what point do you stop being an employee and become a citizen.”

These are valid concerns, that require further investigation, and cannot be answered through generalised mass media campaigns and printed material. One striking element coming out of the data is the directness and depth of questioning exhibited (particularly) by the Rongotai participants. They take their leadership roles seriously and think well beyond the superficial. By engaging with this group we can improve tsunami preparedness in a business context; but can also better understand the implications that tsunami preparedness has on the business context, through a reciprocal two-way, mutually beneficial dialogue.

Combined

Business Leader Identity/Responsibility

9x Yes - strongly

2x Yes - to an extent/maybe

All interviewed participants strongly believed that the business sector has a responsibility for increasing tsunami preparedness and response within their organisations and communities. This is important because it shows that tsunami preparedness initiatives developed in collaboration with business audiences are likely to be supported and beneficial. The strength of some participants responses to RQ12(b) has also helped the researcher to identify potential 'opinion leaders' in each audience.

4.10.2 Workplace Health and Safety Responsibilities in Tsunami Preparedness (RQ12(b))

RQ12(b): Are you aware of any organisational health and safety obligations or requirements with regards to a tsunami occurring during business hours? Please explain.

The consequences of businesses not complying with health and safety legislation can be very severe; however as the data suggests there is currently very limited awareness of these requirements, responsibilities, and consequences among the business community. This is supported by recent high-profile New Zealand examples from the Christchurch Quakes/CTV Building Collapse and the Pike River inquiries. Aware of this potential issue, the researcher spent several months contacting various health and safety/human resource leaders/specialists (at a national and local level) to learn more, but it was to no avail. The researcher, then, contacted WorkSafeNZ and was initially provided with some basic health and safety legislation/guidelines. A few days later the researcher received another email from WorkSafeNZ offering a more detailed response. Based on the information provided (see Appendix), the legal health and safety responsibilities of businesses to prepare for natural hazards, including tsunami is clear.

As a result, it is recommended that this issue be emphasised in preparedness communication efforts with business leaders, as it provides a meaningful and compelling appeal for business leaders to prioritise tsunami preparedness in their organisations, while overcoming many of the perceptual barriers that may have previously constrained their willingness to act.

Pāpāmoa

Health and Safety Responsibilities

3x Standard obligations/non tsunami/natural disaster specific 5x No, specifically

An overwhelming number of Pāpāmoa participants admitted they knew ‘nothing’ about the health and safety requirements for tsunami preparedness, which is highly concerning considering that these participants are more active publics than those who did not participate and make up the rest of the business community. Many participants also acknowledged that they would have never considered the issue if the researcher had not enquired.

→ “You being here has made me think.”

One Pāpāmoa participant expressed a desire to learn more about the health and safety and building requirements as well.

→ “I would like to find out more about this and what the requirements are for the building too.”

Of interest, David Hill, from Pāpāmoa Plaza, was the only participant in the research to mention that failure to comply with health and safety legislation could result in a jail sentence. On a side note, the Pāpāmoa Plaza is one of the largest (if not the largest) employer in Pāpāmoa, and with that in mind the researcher would like to complete further research

comparing and contrasting the preparedness levels and behaviours of SME and large enterprises.

Rongotai

Health and Safety Responsibilities

4x Standard obligations/non tsunami/natural disaster specific

2x Employee support/wellbeing, specifically

2x First aid kits, specifically

It appears that the Rongotai participants did have some understanding of their general health and safety obligations when asked, but they did not know of any specific requirements and consequences concerning tsunami events.

→ "Just our [standard] obligations to the public."

→ "Just the standard requirements. There's an expectation around common sense you just assume that people will know [what to do], but actually people have no idea."

Two Rongotai participants, both identified as potential 'opinion leaders' wanted to learn more about this as soon as possible.

→ "I would like to learn more about this."

The researcher has since forwarded them the health and safety information provided by WorkSafeNZ. These two participants also discussed health and safety policy inconsistencies at length with the researcher, with [confidential] 'real-life' examples that confirm the confusion that exists in this area.

→ "There are basic health and safety requirements, like first aid kits excetra. As far as I know that would be regulatory, but there's no clear policy and no clear guidelines."

Another interesting finding to come from the Rongotai data was based on conversations that two participants shared about the lessons there organisations learned following the Kaikōura Quake. Most of the details are confidential, however in essence the lack of follow-up with, or concern shown for, employee's wellbeing in the aftermath left many employees feeling undervalued and further stressed. Both of these participants would like to highlight the importance that a personal follow-up gesture or phone call can make to employee wellbeing post-event, and they recommend that the business community factor this into their tsunami preparedness and advanced communication planning.

Combined

Health and Safety Responsibilities

7x Standard obligations/non tsunami/natural disaster specific

4x No, specifically

2x Employee support/wellbeing, specifically

2x First aid kits, specifically

Across both audiences, the overwhelming response to this question was either: ‘no’; or ‘no, but I would like to know more’. The business leaders all showed a keenness to comply with their legal obligations regarding tsunami preparedness; however tsunami are currently perceived as low frequency events, that do not take priority over ‘business-as-usual’ demands. Appealing to business leaders based on their legal health and safety obligations is highly recommended to gain their attention and to stimulate changes in their current perceptions and behaviours about tsunami preparedness. However, this will also require greater clarity and consistency from policy and emergency management advisors.

Regular six monthly fire drills arranged with the fire department appear to be the main legislatively based preparedness initiative carried out in both audiences’ workplaces. This could present a useful opportunity for the fire department (recently renamed/rebranded as ‘Fire and Emergency New Zealand’) to introduce tsunami preparedness checks with at risk workplaces at the time of these regular checks. For example, hotels typically have fire and evacuation information behind the guests’ doors or inside compendiums. Tsunami evacuation procedures could be added separately and discussed with hotel managers of beachfront complexes during the planned fire drills. However, if this is done, extra care would need to be taken to ensure that these are two separate hazard events, but that both require an evacuation response.

4.11 Willingness to Act as a Conduit in Tsunami Preparedness (RQ13(a); RQ13(b))

RQ13(a): As a business leader, are you willing to actively participate (i.e. as an 'opinion leader'/conduit) in future tsunami preparedness initiatives in your organisation and/or community? If so, how? RQ13(b).

This final research question, addresses one of the main overreaching goals of this research project, to determine whether those in the business community are willing to support ongoing tsunami preparedness efforts in a conduit role, and to identify the business leaders that are most active and to become potential 'opinion leaders' in tsunami preparedness initiatives. In line with a funnel approach, the questions began broadly and ended with a directive query to ascertain their motivation to act, their grasp of the situation at hand, and their ideas and suggestions for different ways they can help improve tsunami preparedness.

Note: All of the initiatives outlined below were offered by the participants themselves, with no prompting. It is important to see the collective value and variety of initiatives that the participants are offering here. And to see the reach these initiatives and business leaders could have in their relevant communities, if they were supported and invited to do so.

4.11.1 Willingness to Act as a Conduit (RQ13(a))

Pāpāmoa

Willingness to be a Conduit

4x Yes definitive

1x Yes, but currently lack of skill or knowledge

1x Maybe, time barrier

1x No, probably not

Rongotai

Willingness to be a Conduit

3x Yes

2x Yes, but lack of skill or knowledge

Combined

Willingness to be a Conduit

7x Yes definitive

3x Yes, but lack of skill or knowledge

1x Maybe, time barrier

1x No, probably not

A large majority of participants across both audiences definitely answered that they are willing to act as conduits for future tsunami preparedness initiatives in their organisations and/or communities (geographical or business communities). Some of these have also been identified as potential 'opinion leaders' who could play a significant role in preparing those within their 'circle of influence' and beyond; by leveraging diffusion theory principles to enhance the speed and spread of communication through informal communication networks existing in society. There were also other participants who showed a willingness to act as conduits, but doubted their current ability to do so, due to a perceived lack of skill and/or

knowledge in this area. Of note, all of the interviewed participants offered to be conduits. This indicates that face-to-face engagement is likely to increase the willingness of people to be conduits/'opinion leaders' and that those willing to participate in face-to-face interview conversations may be the most useful people to target [i.e. or to develop a stronger working relationship with/collaborate with] and support as future influential tsunami preparedness conduits in the business community.

Only one participant declined outright, because of time constraints One other remained undecided.

4.11.2 Type of Involvement or Initiatives (RQ13(b))

Pāpāmoa

Type of involvement or initiatives

3x Community events [preparedness/prior]

2x Industry specific initiatives [preparedness prior]

1x Community/industry specific [recovery]

2x Not specified

The numbered list below, explains the possible tsunami preparedness initiatives that each Pāpāmoa participant has indicated they may be able to help with in the near future. These numbers were assigned by the researcher for coding purpose (i.e. Pāpāmoa participant number 1 = P1; Pāpāmoa participant number 2 = P2 etc.).

1. "Community events, networking opportunities, promotion, and use of our business for a venue."
2. "We could help organise community events."
3. "The library could do displays and be a venue for community events and staff workshops."
4. -
5. "I can help with the effect on the building industry in Pāpāmoa [if I have time]."
6. "We could help reunite people with their pets [after an event]."
7. -

Pāpāmoa is a 'young' and rapidly growing beachside community. Most new residents would not have been part of community recovery examples, such as the Rena grounding or the PSA outbreak, yet the strong locally-focussed culture is expected to continue to be reinforced and should be capitalised upon when developing preparedness and resilience initiatives there. There is a clear desire for preparedness initiatives to align with Pāpāmoa's existing cultural values and for them to be delivered in collaboration with local community networks and events, in order to develop a resilient community that can overcome adverse situations together.

Rongotai

Type of involvement or initiatives

4x Industry specific initiatives

1x Community/industry specific 1x Social media and community connections

As above, with the Pāpāmoa audience, this numbered list, explains the possible tsunami preparedness initiatives that each Rongotai participant has indicated they may be able to help with in the near future. These numbers were assigned by the researcher for coding purpose (i.e. Rongotai participant number 1 = R1; Rongotai participant number 2 = R2 etc.).

1. "Events with likeminded people, for example through the Kilbirnie Business Network."
2. "I would be happy to support a community driven initiative, but we're not big enough to do it alone. Also training, collaboration, and engagement with other business leaders."
3. "Organisational health and safety/emergency management planning and involvement with like-minded individuals."
4. "Staff training and displaying preparedness information in the organisation."
5. "Through social media and other media connections and platforms."

The Kaikōura Earthquake and 2015 floods have especially left a lasting impression on the Rongotai community. The business community in Rongotai is well linked, especially with business groups, such as the Kilbirnie Business Network operating there. There is a desire: (1) for business leaders to collaborate, create, and facilitate preparedness and resilience initiatives with other likeminded business people; (2) to lobby for more consistent industry-

focussed preparedness guidelines; and (3) to develop a rich preparedness culture among the Rongotai business community (i.e. including Newtown and Miramar), as part of their role in society and within their organisations. Business leaders in Rongotai also expressed a preference to receive preparedness information and training directly, in order to equip their own staff, through ongoing organisationally run training initiatives.

Combined

Type of involvement or initiatives

6x Industry specific initiatives

3x Community events

2x Community/industry specific

1x Social media and community connections

As seen in the data above the Pāpāmoa audience would prefer, and be most suited to, conduit roles in local community-led, and community-based initiatives; whereas the Rongotai audience would prefer, and be most suited to, conduit roles in their organisations, and through collaborative business networking initiatives (locally and with the wider Wellington business community). This data also shows that collectively the participants', their businesses, and their industry expertise, can provide a valuable pool of resources and collateral, that can be 'tapped into' for advanced community resilience building opportunities.

5.0 Application of Communication Theory and Findings

5.1 Identifying 'Opinion Leaders'

Figures 8 and 9 (below) categorise each participant according to criteria provided in the situational theory of public relations and the adopter characteristics from the diffusion of innovations model, to show how the researcher identified the most suitable opinion-leaders to act as tsunami preparedness conduits among the Pāpāmoa and Rongotai business community. We see that even though some of the participants had expressed ideas of how they could contribute to preparedness, variables such as their information-seeking behaviours and certain constraints meant that they cannot be considered active opinion-leaders at this time, as they would likely be less influential and motivated than other identified conduits.

Participant	Problem Recognition	Level of Involvement	Information Seeking /Processing Behaviour	Constraint Recognition	Type of Public	Adopter Characteristic
Pāpāmoa 1	High	High	Seeking	Low	Active	Innovator
Pāpāmoa 2*	High	High	Seeking	Low	Active	Innovator
Pāpāmoa 3	Medium	Medium	Processing	Medium	Aware	Early Majority

Pāpāmoa 4	Medium	Low	Processing	High	Latent	Late Majority
Pāpāmoa 5	Medium	Low	Processing	High	Latent	Late Majority
Pāpāmoa 6	Medium	Low	Processing	High	Latent	Late Majority
Pāpāmoa 7	High	Medium	Seeking	High	Aware	Early Majority

Figure 8 Application of Situational Theory of Public Relations and Diffusion Adopter Characteristics – Pāpāmoa

Participant	Problem Recognition	Level of Involvement	Information Seeking /Processing Behaviour	Constraint Recognition	Type of Public	Adopter Characteristic
Rongotai 1	Medium	Medium	Seeking	High	Aware	Early Majority
Rongotai 2	High	High	Seeking	Low	Active	Innovator
Rongotai 3	High	High	Seeking	Low	Active	Innovator
Rongotai 4	Medium	Medium	Processing	Low	Active	Early Adopter
Rongotai 5*	Medium	Low	Processing	High	Latent	Late Majority

Figure 9 Application of Situational Theory of Public Relations and Diffusion Adopter Characteristics - Rongotai

*=Informant

Identified 'Opinion Leaders'

Pāpāmoa: Participant 1 & Participant 2*
Rongotai: Participant 2 & Participant 3

Figure 10 Identified 'Opinion Leaders' – Pāpāmoa & Rongotai

5.2 Participant Profiles, Communication Networks, and Circles of Influence

The following series of charts show each participant, their active business communication networks and circle of influence. These aim to illustrate the impact that each participant,

particularly ‘opinion leaders’, could have on the flow of preparedness information, if they were equipped with the necessary tools, resources, and engagement opportunities. In addition, the researcher has also identified opportunities for these participants to connect with other participants, to further support preparedness initiatives within their respective business audiences and communities.

5.2.1 Pāpāmoa Participants’ Communication Networks & Circle of Influence

Pāpāmoa Participant 1: Active Public & Innovator

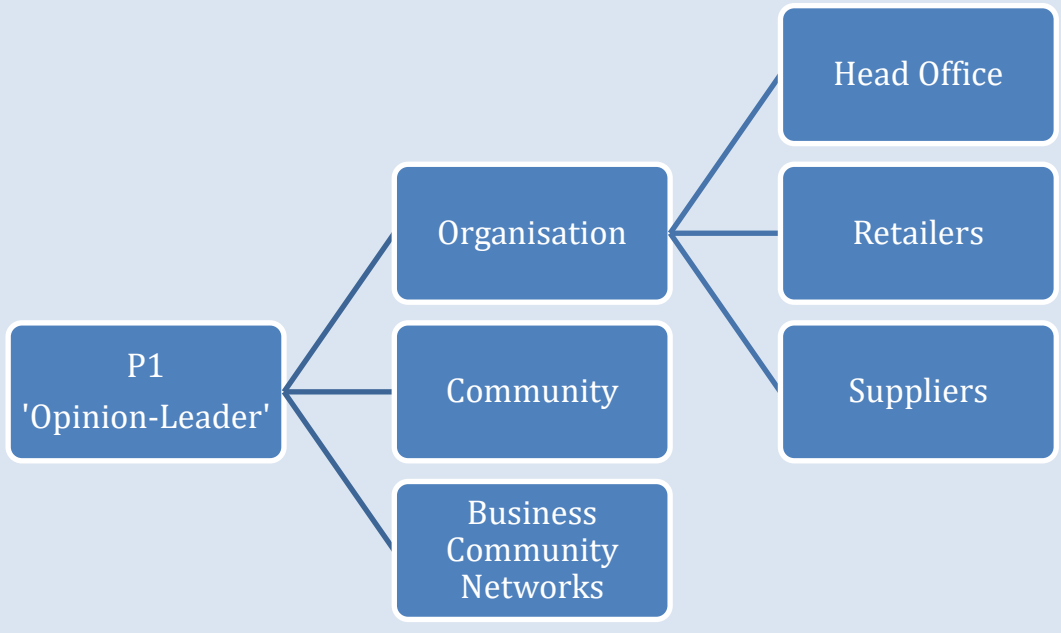


Figure 11 Profile: Pāpāmoa Participant 1

Summary

- Identified as an ‘opinion-leader’
- Business plays a vital economic, social, and symbolic role in the community
- Wants to be a conduit by providing preparedness displays and events
- Is respected in Pāpāmoa’s local and business community
- Former chairman of Pāpāmoa Progressive Association
- Active member of local business networks

- Business is located beside P3
- Is already connected to the other identified Pāpāmoa ‘opinion-leader’, P2.
- *Primary conduit role: Arranging/hosting community-led, community-based, preparedness events.*

Pāpāmoa Participant 2: Active Public & Innovator

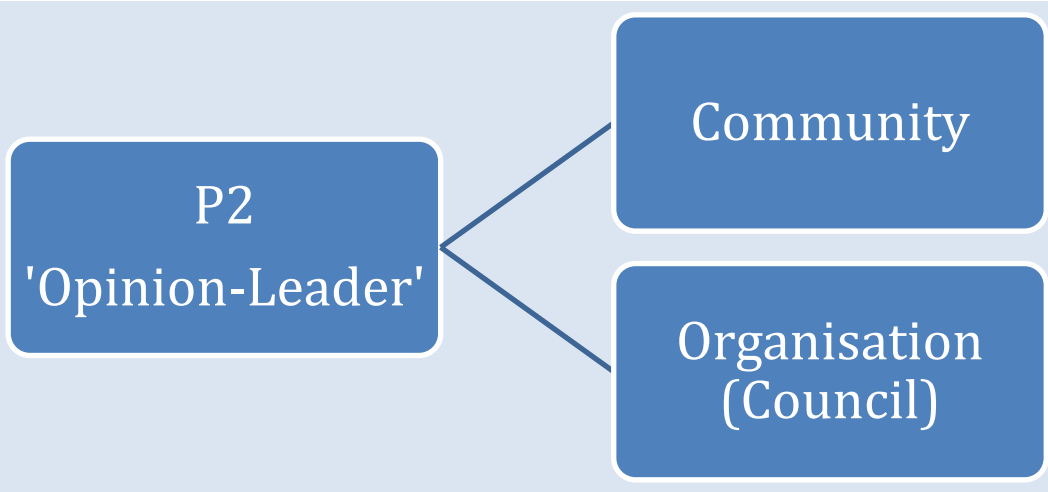


Figure 12 Profile: Pāpāmoa Participant 2

Summary

- Identified as an ‘opinion-leader’
- Highly knowledgeable about the Pāpāmoa community
- Is respected in the community
- Existing tsunami siren campaigner
- Former chairman of Pāpāmoa Progressive Association
- In a position of influence, working directly with the Pāpāmoa community
- Is already connected to the other identified Pāpāmoa ‘opinion-leader’, P1.
- *Primary conduit role: Communicating/facilitating community-led, community-based, preparedness initiatives.*

Pāpāmoa Participant 3: Aware Public & Early Majority

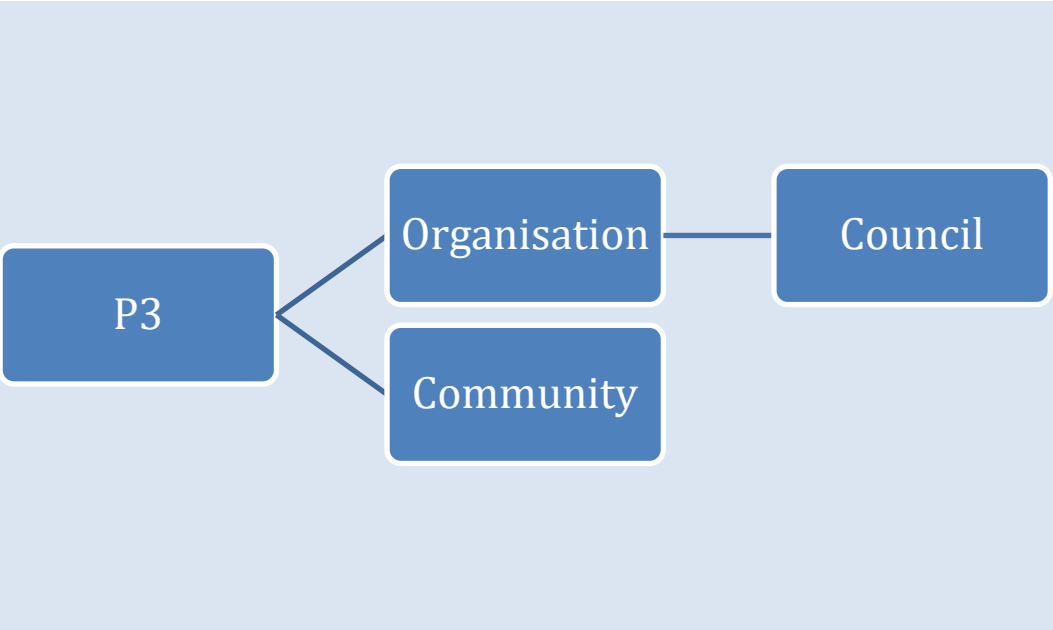


Figure 13 Profile: Pāpāmoa Participant 3

Summary

- Business plays an economic, social, and symbolic role in the community
- Wants to be a conduit by providing preparedness displays and events
- Wants to train staff in preparedness
- Would like to engage with the identified Pāpāmoa 'opinion-leaders' on tsunami preparedness initiatives
- Business is located beside P1.
- If provided with ongoing engagement opportunities and is empowered to act, could quickly become an 'Active Public'.

Pāpāmoa Participant 4: Latent & Late Majority

Summary

- Surveyed participant
- Low level of willingness to be publicly involved and high perceived inability/skill to be a conduit, reverts participant to being a general member of the Pāpāmoa community and not in the target audience.

Pāpāmoa Participant 5: Latent & Late Majority

Summary

- Surveyed participant
- Low tsunami risk perception and high time commitment barrier, reverts this participant to being a general member of the Pāpāmoa community and not in the target audience.

Pāpāmoa Participant 6: Latent & Late Majority

Summary

- Surveyed participant
- Low organisational commitment level, reverts this community informant to being a general member of the Pāpāmoa community and not in the target audience.

Pāpāmoa Participant 7: Aware & Early Majority

Summary

- Surveyed participant
- Priority is the installation of tsunami warning systems. Has suggested that businesses help fund them, however had a low level of willingness to be a conduit and views

himself as a ‘resident’, rather than ‘business leader’, which reverts this participant to being a general member of the Pāpāmoa community and not in the target audience.

Pāpāmoa Combined Summary

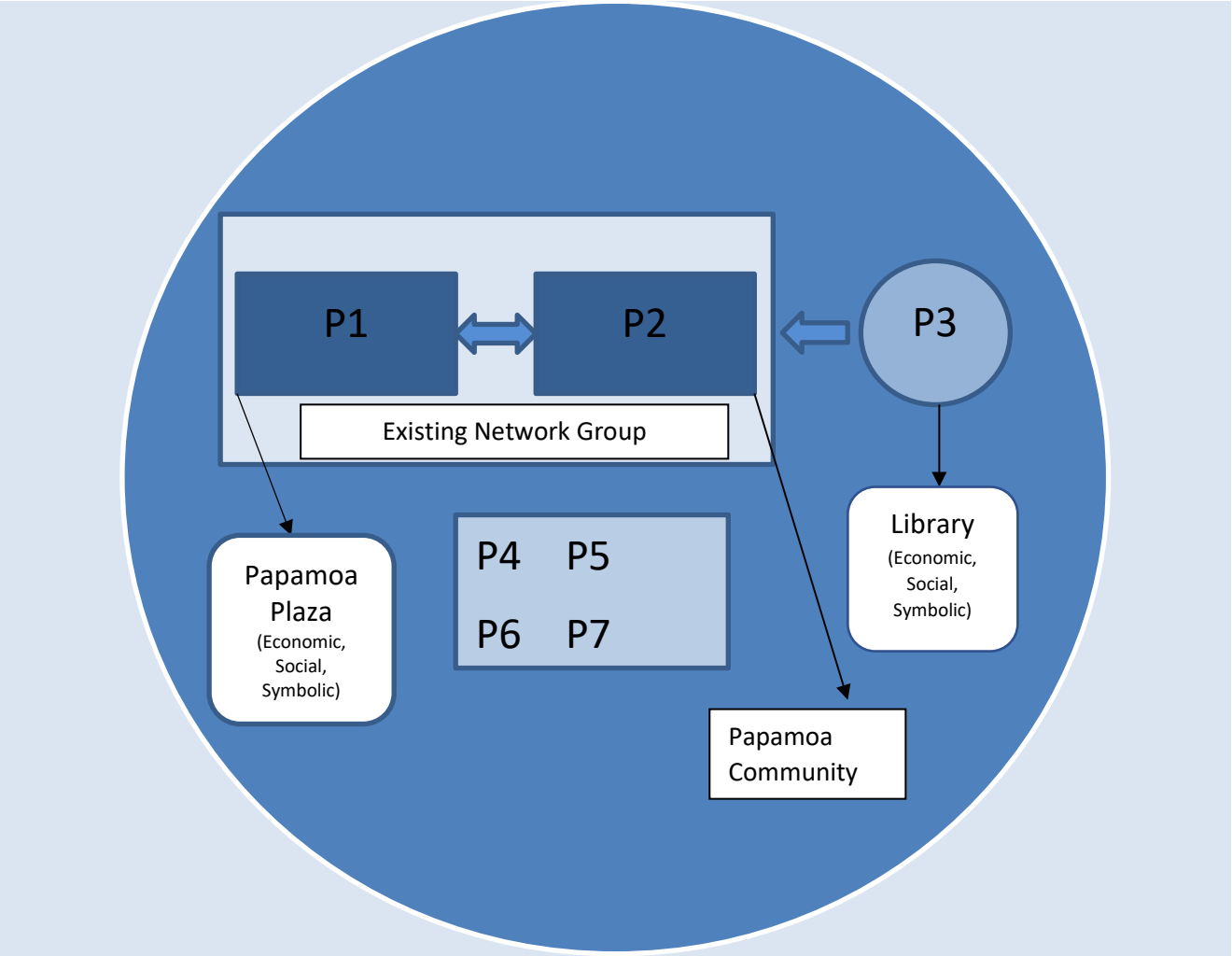


Figure 14 Pāpāmoa Summary

5.2.2 Rongotai Participants' Communication Networks & Circle of Influence

Rongotai Participant 1: Aware Public & Early Majority

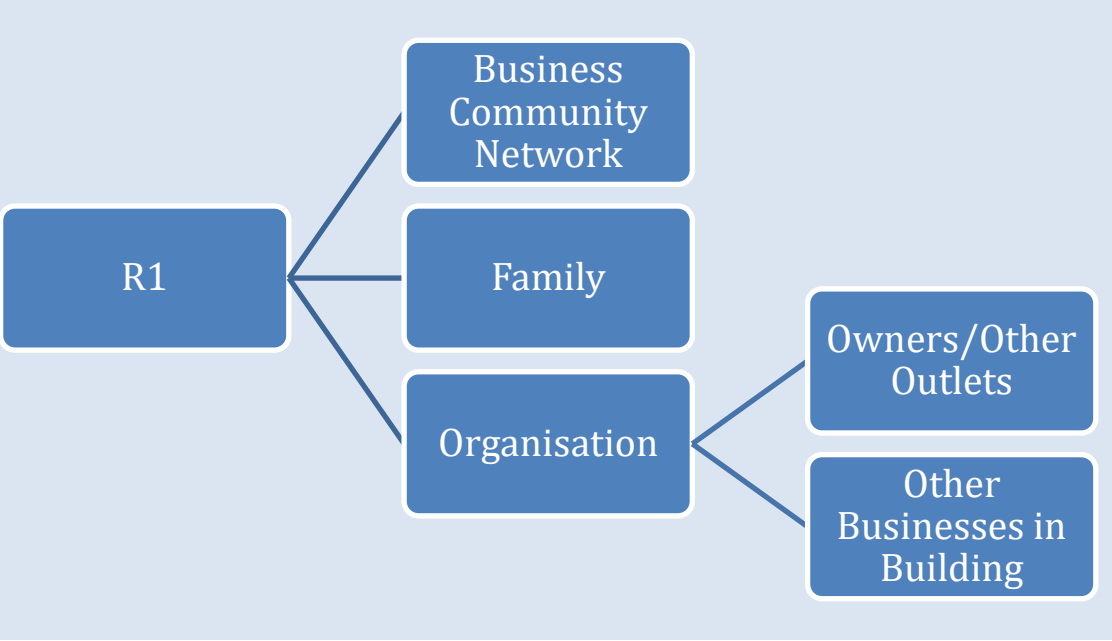


Figure 15 Profile: Rongotai Participant 1

Summary

- Current member of Kilbirnie Business Network
- Already regularly discusses preparedness within family networks
- Wants to train staff in preparedness
- In a position to influence owners of the company (four outlets) and the other businesses in the building complex
- Main Barrier is fatalism, and lack of preparedness engagement opportunities with 'like-minded' business leaders
- Regular engagement with R2 & R3 ('opinion-leaders') in the Kilbirnie Business Network or a new business preparedness network, and access to quality preparedness material and initiatives could significantly improve preparedness levels/spark a behaviour change, to become an 'Active' public.

Rongotai Participant 2: Active Public & Innovator

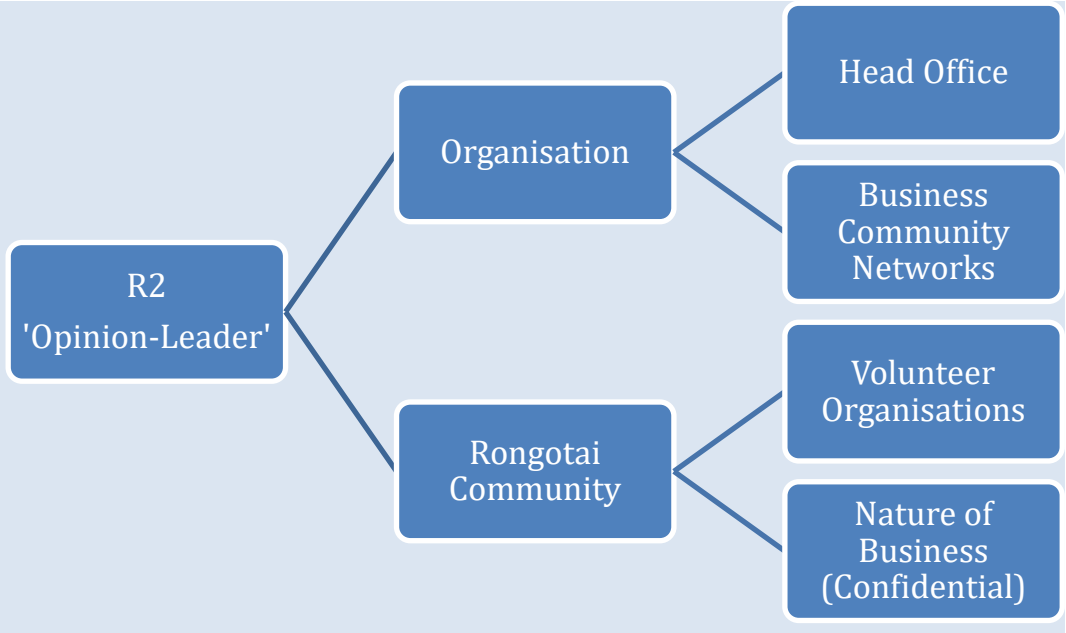


Figure 16 Profile: Rongotai Participant 2

Summary

- Identified as an 'opinion-leader'
- Current member of Kilbirnie Business Network
- Already created general emergency plans for own organisation
- Could be highly influential throughout business and local community networks
- Wants engagement with 'like-minded' business people
- Could offer excellent preparedness solutions for the business community
- Existing connection with R1, could motivate R1 to become an 'active' public.
- *Preferred conduit role: Developing/facilitating business-based preparedness networking initiatives and events*

Rongotai Participant 3: Active Public & Innovator

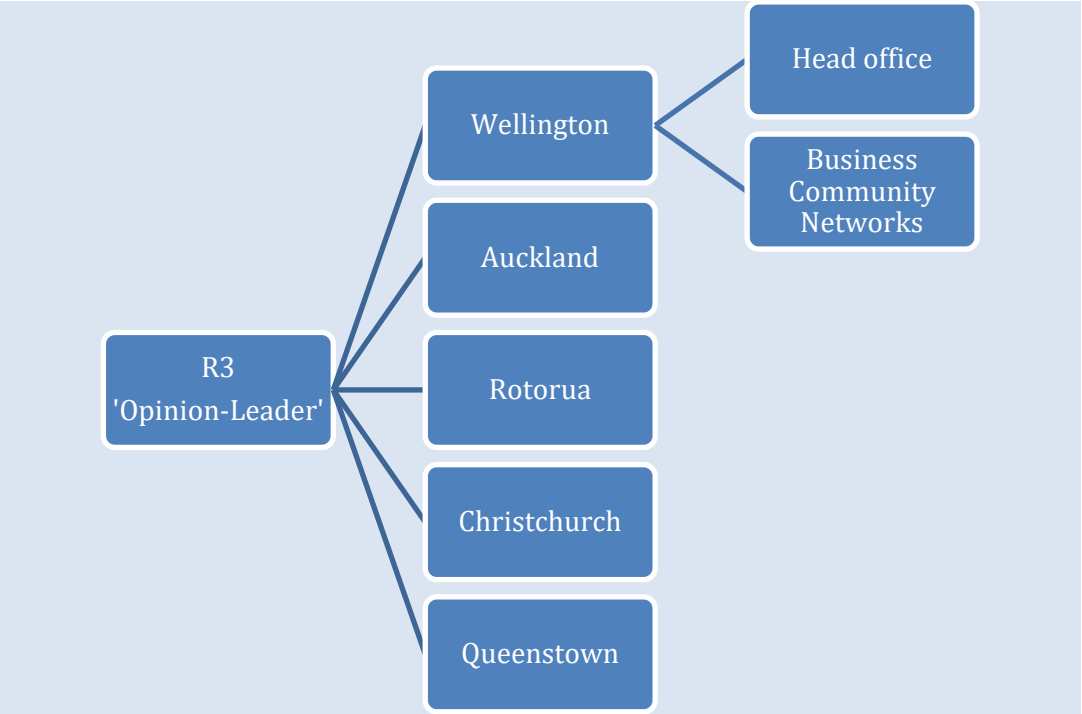


Figure 17 Profile: Rongotai Participant 3

Summary

- Identified as an 'opinion-leader'
- New to Kilbirnie and could join Kilbirnie Business Network or a new business preparedness network
- Currently completing emergency plans for own organisation
- Could offer excellent preparedness solutions for the business community
- Could be highly influential throughout own business (with other branches in Auckland, Rotorua, Christchurch and Queenstown)
- Wants engagement with 'like-minded' business people, such as the other 'opinion-leader', R2.
- *Preferred conduit role: Developing/communicating business-based preparedness guidelines*

Rongotai Participant 4: Active & Early Adopter

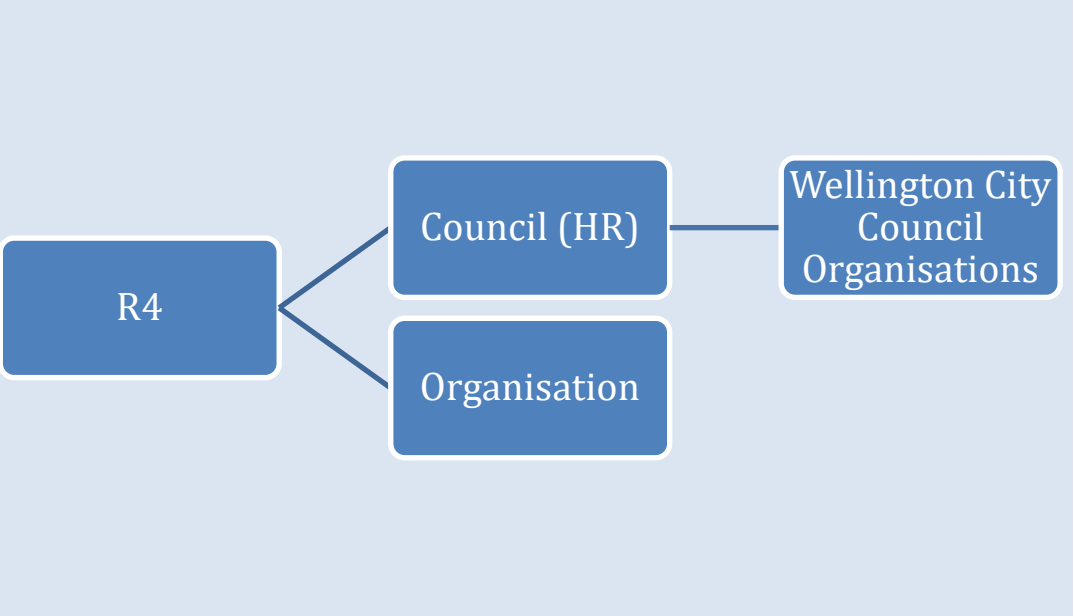


Figure 18 Profile: Rongotai Participant 4

Summary

- Already created general emergency plans for own organisation
- Indicated that could do some minor preparedness initiatives within own (council-owned) organisation, but acknowledged that most initiatives are arranged through the organisation's HR department.
- This participant is unlikely to be an 'opinion-leader', so reverts to a member of the business community.

Rongotai Participant 5: Latent & Late Majority

Summary

- Low level of willingness to be publicly involved and high level of uncertainty towards tsunami events, reverts this community informant to being a general member of the Rongotai community and not in the target audience.

Rongotai Combined Summary

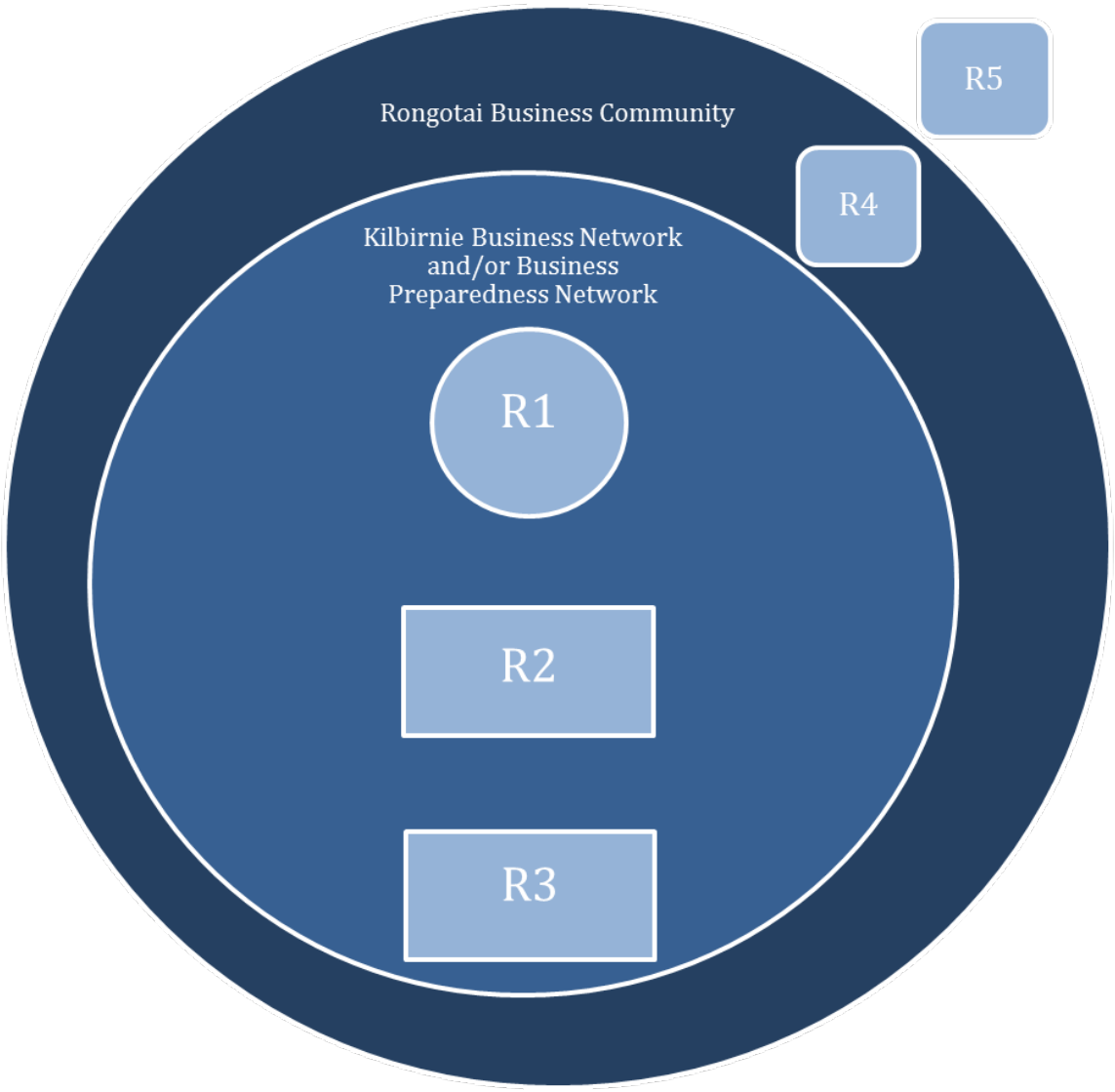


Figure 19 Rongotai Summary

5.3 Models Developed by the Researcher

5.3.1 Model of Sustained Behaviour Change

A primary goal of this research is behaviour change. It unrealistic to expect people to dramatically change their behaviour solely on the basis of a persuasive campaign or single initiative (Coppola & Maloney, 2009). However throughout the course of this research, and based on observations found in the data, the researcher has developed a model to explain the three essential components required to support sustained behaviour change. Note here, the emphasis is on the word *sustained* because behaviour change in itself is not an effective outcome. This distinction is vitally important in relation to preparedness, as it is highly likely

that at different times throughout their lives, an individual's preparedness behaviour may differ. For example; they may become better prepared after being exposed to media coverage of a hazard event; or while residing in one community, but then they fail to prepare again after relocating to a new community. Therefore, sustained behaviour change requires individuals to actively pursue and practise preparedness initiatives and regularly reassess their hazard risk and exposure in a range of constantly changing contexts. In other words, a long-term orientation of sustained behaviour change has to be acknowledged. The researcher believes that three 'active ingredients' to help this to occur are: (1) tsunami risk awareness and education; (2) community resilience and empowerment; and (3) ongoing stakeholder engagement and public consultation. These are shown in *Figure 19* and explained in greater detail below.

Sustained Behaviour Change in Preparedness Communication

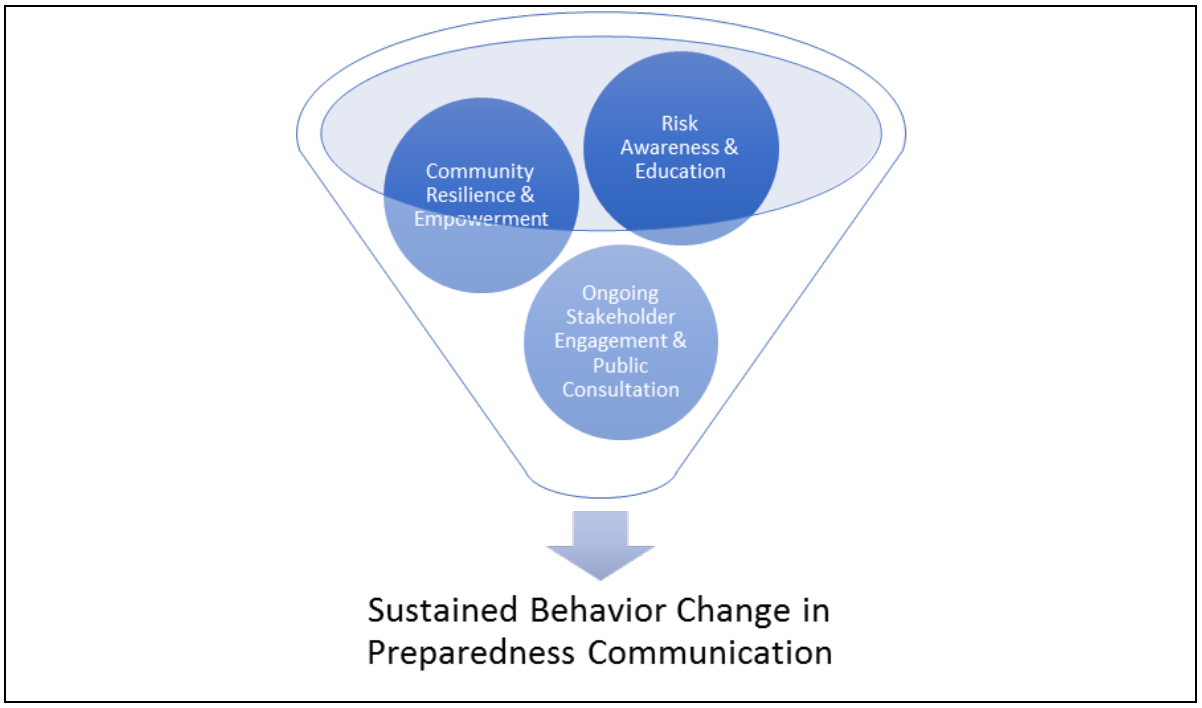


Figure 20 Ingredients of Sustained Behaviour Change (Researcher's own, 2018)

5.3.1.1 Tsunami Risk Awareness and Education

Tsunami Awareness

Research conducted by the University of Delaware and North Texas University in India and Sri Lanka, a month after the Boxing Day Tsunami, found that even when people experienced a tsunami first-hand there was still an overall lack of understanding and awareness of what a tsunami is (Currier et al., 2013; Rodriguez, Wachtendorf, Kendra, & Trainor, 2006). Prepared communities must be offered the skills and information they need to become prepared (Coppola & Maloney, 2009). However raising awareness is more than simply telling people about risks; they must be able to fully understand the risks and how they could be affected by them. Once this is done, the audience is better primed to receive and process the preparedness information that follows, which allows the messages to be more effectively absorbed, processed, and act upon (Coppola & Maloney, 2009). In terms of tsunami, it is particularly important that people are aware of natural warning signs. It is essential that people learn to evacuate to higher ground immediately after a long, or strong earthquake, because a tsunami could approach quickly, and without an official warning (Currie et al., 2013).

This important point is shown in an example provided by Liu, Lynett, Fernando, Jaffe, Fritz, Higman, Morton, Goff, & Synolakis (2005), whereby a village destroyed by the Boxing Day Tsunami only lost one resident because a local fisherman who had experienced a tsunami in Chile was aware of the natural warning signs, and urged other residents to evacuate safely to higher ground (Currie et al., 2013). Another example provided by Suppasri, Shuto, Imamura, Koshimura, Mas, & Yalciner (2013) describes how in the Japanese Sendai Plains community residents are encouraged to become more aware of tsunami by reflecting on past tsunami that have occurred in their community. Here, community-specific initiatives are utilised, with special festivals being held and ‘Tsunami Stone’ tablets have been erected with tsunami preparedness messages. These tablets are up to 600 years old and record the number of lives

lost in each tsunami, which serves as a valid reminder to future generations (Currie et al., 2013). Fortunately Pāpāmoa and Rongotai do not have 'real' examples of tsunami to draw on, but this does highlight how creative, audience-centred, community-based initiatives are needed to reinforce mass media messages and connect tsunami information to people's lived experience.

Tsunami Education

Public education is a vital component of raising the awareness of natural hazards (Fraser et al., 2013). Public education attempts to inform the target audience about specific hazards (i.e. tsunami) and its potential risks; as well as teaching hazard informed audiences about actions they can take to reduce their vulnerabilities and how best to respond in the midst of a potential disaster (Coppola & Maloney, 2009). Current public awareness and education channels include: printed advertising, community meetings, traditional and social media campaigns, and practical exercises such as MCDEM's national 'ShakeOut' Drill (Fraser et al., 2013).

5.3.1.2 Community Resilience and Empowerment

Sense of Place

'Sense of place' concerns the meanings that individuals and groups give to a certain location and the associated qualities of that setting (Jurin et al., 2010). Place meanings are then strengthened through collective everyday events that occur among the community operating there (Jurin et al., 2010). If people have a strong sense of place they will be more likely to invest their resources into socially-based preparedness initiatives. 'Place' can be defined in terms of both environmental (geophysical and location based) and social (community and

culture based) dimensions (Jurin et al., 2010). Jurin et al. (2010, p. 19-20) adapts the three basic dimensions of place, as distinguished by Steele (1981), these are:

Psychological (Place Attachment)

- *Place dependence*: Use of an area for professional or leisure activities
- *Place identity*: The understanding of self within a certain setting, including personal history and the anticipated future there

Social (Community and Culture)

- Sense of place reinforced through cultural practices
- Social networks operating with the place
- Familial connections
- Political involvement or activism within the place

Political and Economic

- Place boundaries and norms
- Opportunities for collaborative action within the place
- Political involvement or activism within the place.

Community Resilience

Literature on resilience is extensive among the social sciences (Nilakant et al., 2017) and is well understood in emergency management circles, so only needs a brief mention here. However, it is important to highlight some key features of resilience, relevant to this report. Resilience, relates to one's ability to "bounce back", or to return to what was, or used to be (Paton, 2007a). In reality this fails to capture the extent of, and the implications experienced in the aftermath of a disaster (Paton, 2007a). Even if people 'want things to return to normal', the extent of the changes in their physical, social, and psychological reality can make this

unattainable and a new reality is presented (Paton, 2007a). Resilience in this report relates to the ability of people, businesses, and local communities to adapt and grow into their changed reality (Paton, 2007a; Klein, Nicholls, & Thomalla, 2003).

Government resources in disaster management are limited; therefore the skills, knowledge, and resources of local people are essential to meet the needs of the community (Coles 2004; Ward et al., 2008). Local people will typically be required to respond to their own needs until help from outside the community arrives (Ward et al., 2008). People and businesses can bring a range of key resources to their community, each of which will influence its capacity to confront adverse events. Resilient communities can draw upon its individual and collective resources and competencies to better manage the demands, challenges, and changes experienced during and following a disaster (Paton, 2007a). Therefore, members of social groups must possess the resources and competencies required to confront issues resulting from tsunami hazards (Paton, 2007a). Communities with greater vertical and horizontal social networks and associations are typically in a stronger position to do this and maximise opportunities presented to them (Ward et al., 2008).

Empowerment

Resilience outcomes can only be achieved if there is a conscious effort on the part of people, communities, and societal institutions to develop, support, and maintain the necessary resources and processes required for resilience to occur (Paton, 2007a). This is perhaps best achieved through the sustained empowerment of communities (Paton, 2007a). Community empowerment can be defined as the increasing of skills to encourage public, private, and civil agencies to become partners in community capacity building (Ward et al., 2008; Allen, Kilvington, & Horn, 2002). Paton (2007a) also explains that empowerment relates to a

community's capacity to gain mastery over their affairs and to deal with issues and opportunities using its intrinsic resources with others in the community (Paton, 2007a). Community empowerment is never an easy task; nevertheless it is essential when aiming to create appropriate and sustainable social change (Melkote, 2006).

5.3.1.3 Ongoing Stakeholder Engagement and Public Consultation

Stakeholder Engagement and Public Consultation

An increasingly important component to consider (Ward et al., 2008), several benefits of stakeholder engagement and public consultation include:

- Greater access to various ideas, perspectives, and expertise (Coppola & Maloney, 2009)
- Better access to target audiences and related contacts (Coppola & Maloney, 2009)
- Enhance credibility (Coppola & Maloney, 2009)
- Increased message coverage (Coppola & Maloney, 2009)
- Shared workloads (Coppola & Maloney, 2009)
- Lower levels of blame and responsibility transfer onto official agencies (Leonard et al., 2004; Rogers & Kincaid, 1981).

However, stakeholder engagement and public consultation should not be viewed as a 'magic bullet', as successful outcomes in preparedness activities can never be guaranteed (Coles & Buckle, 2004; Ward et al., 2008).

5.3.2 The Five C's Model of Preparedness Communication

It was apparent during the data collection that the informants and participants wanted clear, consistent, credible, constructive, and compassionate communication from official agencies, as seen in the researcher's own '*Five C's Model of Preparedness Communication*', outlined

in the table below. These five aspects appear to be lacking in current preparedness communication initiatives and need to be applied holistically, in combination with one another to be effective.

The Five C's Model of Preparedness Communication

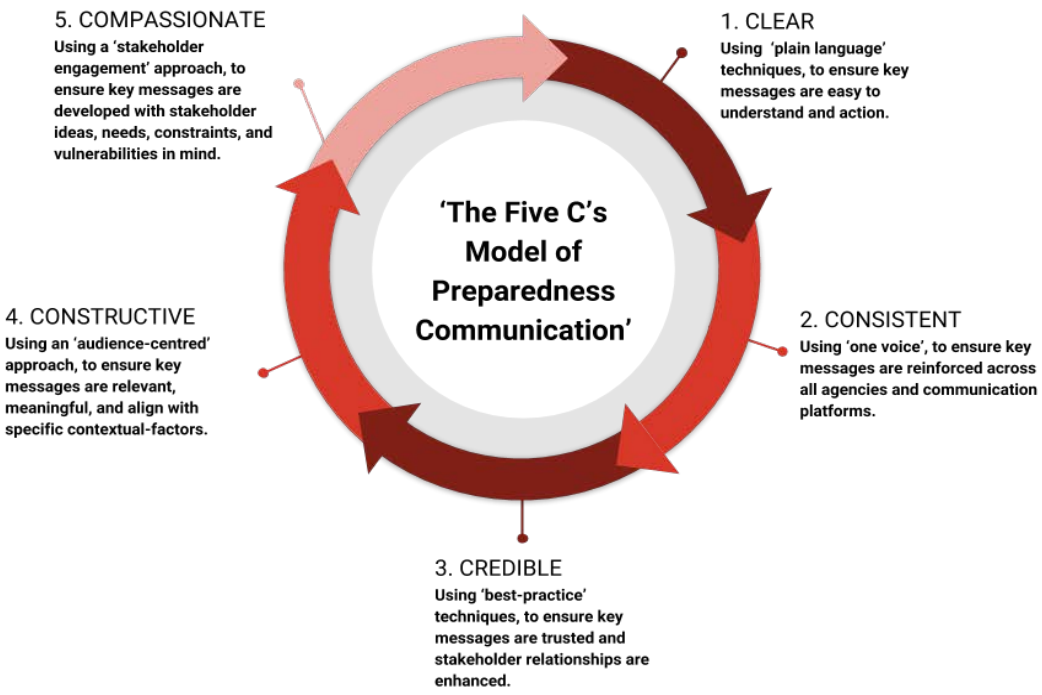


Figure 21 The Five C's Model of Preparedness Communication (Researcher's own, 2018)

5.3.3 Audience-Centred, 'Opinion Leadership' Approach to Preparedness Communication

The third model (*see Figure 22*) was developed as a result of the interview conversations with the business leaders. As noted, in addition to the researcher's communication studies, she also has a background in business and personal earthquake experiences of which to draw on. Both before and during the interview conversations, participants were able to communicate with her using specialised business terminology and quickly 'get to the heart'

of the tsunami preparedness issues at hand and in context. In light of this, the researcher identified six key sectors of society, or potential future audiences, that she believes requires a specialist preparedness communicators/advisors (i.e. with first-hand experience and/or in-depth understanding of these audiences and their preparedness needs) to directly engage with these specific groups through an audience-centred approach, applying the segmentation and diffusion tools discussed in this report. This provide a useful approach to effectively identify the most suitable 'opinion leaders' to act as tsunami preparedness conduits in future.

An Audience-Centred Opinion Leadership Approach to Preparedness Communication

Figure 22 An Audience-Centred Opinion Leadership Approach to Preparedness Communication (Researcher's own, 2018)

6.0 Conclusion

6.1 Summary

6.1.1 Interest and Motivation for Contributing in this Research

The business leaders in this sample responded to the research invitation because they were contacted by the researcher, and contributed because as business leaders they felt a responsibility to improve tsunami preparedness and awareness in their organisations and local communities. This further solidifies the importance of direct engagement and audience-centred approaches to improving tsunami preparedness communication efforts in society. It also highlights the different behaviour patterns, motivations, and perceptions of 'active publics' and potential 'opinion leaders' among targeted audiences.

6.1.2 Previous Hazard and Preparedness Experience

The Pāpāmoa community is a relatively 'young' community, which has not recently been exposed to many major geological hazards events. However, learnings can be drawn from community recovery scenarios from the past (*see 4.2*), in which Pāpāmoa's collective community response shone through and where bureaucratic decisions frustrated locals. With this in mind, it is likely that if faced with a tsunami event, the Pāpāmoa community would best respond to community-led, community-based recovery efforts. Conversely, in Rongotai, with the memory of the 2016 Kaikōura Earthquake still fresh in their minds, preparedness was seen as a formalised activity to be led by official preparedness agencies and/or through specific departments operating within their organisations. Potential 'opinion-leaders' from both Pāpāmoa and Rongotai also offered concrete examples of previous work-related hazards that they had previously been involved in, which could provide an avenue for further studies into past experiences, risk perception, and opinion leadership.

6.1.3 Tsunami Knowledge, Understanding, Awareness

Consistent with previous research undertaken by GNS, confusion still remains around tsunami source information and the terminology that surrounds it. It is clear that a majority of participants understand that an earthquake typically precedes a tsunami; however no explicit link was made to the different arrival times or responses required for each type of tsunami. Enhanced public education about how tsunami behave and how the public should to respond in, and prepare for, the tsunami aftermath, as well as to the initial evacuation response is needed.

6.1.4 Perception of Hazard Threats

Earthquakes were perceived by both samples as presenting the most significant hazard risk. Pāpāmoa participants tended to discuss tsunami, and tsunami risk objectively, as though they would 'happen to other people, but not to them'. Rongotai participants understood that a tsunami could have a devasting impact on their community, but in addition to earthquakes, they perceived weather-related hazards as a more acute risk. The short-term view of tsunami risk from these samples is consistent with previous research findings showing that people perceive higher frequency hazard events, as posing a greater risk than high consequence, lower frequency ones.

6.1.5 Existing Preparedness

Plenty of personal, organisational, and community initiatives were expressed by the participants, although there is still a feeling that more can and should be done to improve preparedness initiatives and outcomes. Preparedness is often viewed as an 'all or none' activity, but in reality it is far more complex and comes in varying degrees. Across the Pāpāmoa audience the main personal preparedness activity adopted by participants is evacuation route planning. Unfortunately none of the participants reported having actually

walked their route in advance, and some key issues exist regarding the state and practicalities of existing tsunami evacuation routes (*see 4.5*). Given that evacuation routes are the primary personal tsunami preparedness initiative noted by the participants, it is vital that these are developed and maintained effectively to ensure their credibility and trust are gained.

As with the Pāpāmoa sample, explicit tsunami-specific preparedness planning had not been undertaken by any of the Rongotai participants' businesses to date, however general emergency evacuation initiatives were mentioned by some. Business leaders each mentioned regular fire checks that they undertake with Fire and Emergency New Zealand (FENZ); which illustrates the value of both regulatory hazard specific preparedness, and the important role that FENZ could play in improved tsunami preparedness initiatives with the business audience in future, particularly following their recent re-branding.

6.1.6 Tsunami Preparedness Communication Sources

Tsunami preparedness initiatives need to be able to connect with audiences in order for behaviour change and preparedness actions to occur. These audiences have different communication needs. The Pāpāmoa business audience viewed preparedness in terms of their *geographical* community and the Rongotai business audience viewed it in terms of the *wider business* community. In line with the audience-centred, diffusion approach, advocated here, Pāpāmoa's socio-cultural context means that informal and indirect communication networks among friends and family are important communication channels that should be harnessed in future tsunami preparedness efforts. Whereas, in Rongotai a preference for official tsunami preparedness initiatives with 'like-minded' professionals working directly in collaboration with them is viewed more favourably.

6.1.7 Feedback on Existing Tsunami Preparedness Communication

A selection of existing tsunami preparedness material was presented to all interviewed participants (*see samples in 4.7 and 7.2*). Their feedback was offered freely and enthusiastically. WREMO's 'Earthquake Planning Guide' brochure received the least positive feedback. Interestingly, feedback on this brochure also showed variation based on gender, as opposed to location, with the female participants across both audiences liking the colours and pictures, but admitting they still would not read it. None of the male participants liked it, with most grimacing and shaking their heads in response.

The idea of tsunami drills being incorporated into the 'ShakeOut' Drill was considered to be of some value, but their practicalities in a business context were raised. Business manuals, checklists, and evacuation maps were generally viewed favourably in an attempt to support tsunami preparedness and response. It was acknowledged that although they may not be seen/read by everyone, they are still a simple initiative to carry out in the workplace and could also be used during staff inductions and training. In particular, existing evacuation mapping does require further communicative enhancements to avoid confusion.

Rongotai's long-running 'Blue Line' project and Pāpāmoa's new evacuation signage were overwhelmingly accepted by the participants as an important and practical awareness tool for coastal communities. Further research into their effect on hazard risk perception, and to determine whether they stimulate sustained behaviour change, would be of interest.

6.1.8 Tsunami Preparedness Barriers

Specific personal, organisational and community barriers to preparedness were discussed with participants at length and the researcher has identified the key socio-cultural, practical, and communication barriers contributing to poor tsunami preparedness outcomes among this audience to date *(as outlined in section 4.8*). This is an important task to carry out in research and practice because in order to make improvements, any perceived obstacles that have hindered the audiences' ability and motivation to prepare must first be identified.

Based on the data, Pāpāmoa's major barriers included:

- Physical vulnerabilities/age
- Financial constraints
- Transient/new workforce/population
- Language barriers
- Time/'Business-as-usual' demands
- Traffic congestion
- Ineffective text alert/warning system

While, Rongotai's major barriers included:

- Physical vulnerabilities/age
- Financial limitations
- Traffic congestion

- No culture of preparedness
- Time/‘business- as-usual’ constraints
- Inability to store water
- Bad experiences with/inconsistent communication from official agencies

6.1.9 Behavioural Intent for Tsunami Evacuation and Response

In Pāpāmoa, there was high awareness of ‘on foot’ evacuations, which the researcher believes is largely due to recently erected tsunami signage and community mapping provided by EMBOP. In Rongotai, participants planned to activate their general emergency plans and move to higher ground above one of the ‘Blue Lines’. However of great concern across both audiences, most participants explicitly believed that tsunami warning sirens were installed and in some cases were intending to wait for a siren to sound before evacuating proper. It is vital it is that people (a) know to evacuate immediately in local-source tsunami events; and (b) know that no warning sirens are currently installed.

The awareness of where to evacuate too is pleasing, however there was limited thought given to additional ramifications that business leaders may specifically face in the immediate and longer term aftermath of a devastating tsunami event. This is very important for future communication efforts, as a connection must be made between the need for tsunami preparedness and what this could look like in their own lives and businesses, including any potential ramifications stemming from workplace health and safety breaches.

The principles of *Tsunami Tendenko* were discussed by participants who felt that *Tsunami Tendenko* could only be possible if parents of school children were confident that their schools' leaders knew what to do and could be trusted to look after their children after the occurrence of a tsunami. The consensus from participants was that business leaders would permit parents to leave their business immediately to collect their children; a decision that has been shown to have detrimental consequences overseas. Therefore *Tsunami Tendenko* principles could be useful to research further, as a means to provide greater clarity around an evacuation scenario occurring during school hours, which could have ramifications for both businesses (business operators and parents) and schools (staff and children) in society.

6.1.10 Identity and Responsibilities of Business Leaders in Tsunami Preparedness

All interviewed participants strongly believed that the business sector has a responsibility for increasing tsunami preparedness and response within their organisations and communities. This is important because, in line with diffusion studies, it shows that tsunami preparedness initiatives developed in collaboration with business audiences are likely to be better supported and more meaningful. It also helped to identify potential 'opinion leaders' among the samples.

The other important aspect about responsibilities highlighted in the research concerns workplace health and safety compliance. The data suggested that there is currently very limited awareness of these requirements, responsibilities, and the possible consequences with regards to natural disasters and preparedness. Many participants acknowledged that although they had a good understanding of general health and safety requirements, they would have never considered tsunami part of this issue, if the researcher had not enquired. Therefore, it is recommended that this issue be emphasised in preparedness communication efforts with

business leaders, as it provides a meaningful and compelling appeal for business leaders to prioritise tsunami preparedness in their organisations.

6.1.11 Willingness to Act as a Conduit in Tsunami Preparedness

Most participants across both audiences expressed a definite willingness to act as conduits for future tsunami preparedness initiatives in their organisations and/or communities. Some of these participants have also been identified as potential 'opinion leaders' who could play a significant role in enhancing the speed and spread of communication through their informal communication networks. The data also highlights how collectively the participants and their organisations could offer a valuable pool of resources and collateral that could be further utilised for advanced community resilience building opportunities (*see 4.11 for specific examples*).

6.2 Limitations

6.2.1 Primary Limitation: Time Constraints

Time constraints presented the major limitation. In transdisciplinary research it is essential that deadlines and meetings are scheduled in well advance, particularly at the project outset. This is because each contributor is likely to have a different set of expectations, priorities, and project outcomes; which may be reliant upon the work of other contributors.

Time was also a key factor among the Pāpāmoa and Rongotai audiences, with a number of business owner citing it as a reason for being unable to contribute. In Rongotai, some key interviews were unable to be conducted because businesses were either too busy with the 'Christmas Rush' or were closed for the holidays. In Pāpāmoa, the existence of certain socio-cultural barriers, such as the perception of limited time because of 'business-as-usual'

demands, meant that it was challenging to recruit suitable interview participants there. Email survey options were included, but the downside is that the survey data was not as rich as data sourced from interview conversations in the field.

6.3 Recommendations

6.3.1 Overall Recommendations for both Pāpāmoa and Rongotai Audiences

Recommendations for improved overall tsunami preparedness communication include:

- Ongoing tsunami education, stakeholder engagement, and community resilience initiatives with identified 'opinion leaders' in the business community (*see Figure 20*).
- Enhanced preparedness communication through the researcher's 'Five C's Model' (*see Figure 21*).
- Further targeted audience-centred approaches to improve the spread of tsunami preparedness messages through society (*see Figure 22*).
- A revision of existing official tsunami preparedness material to better meet the needs of end users.
- Improved communication about tsunami source information and the necessary responses to natural tsunami warning signs, particularly as these communities do not currently have warning sirens, and there are flawed perceptions and understandings around siren use.
- Greater education of workplace Health and Safety guidelines and compliance requirements for large-scale hazard events.

6.3.2 Specific Recommendations for Pāpāmoa Audience

In Pāpāmoa, it is recommended that:

- Informal Pāpāmoa community networks, and community-led tsunami preparedness initiatives and events be developed with identified ‘opinion leaders’.
- Official tsunami preparedness material be revised to better engage with end users, in particular the information provided on the tsunami evacuation mound signs could be greatly improved.
- Community evacuation routes be regularly checked, reviewed, and maintained by officials for enhanced public safety and credibility.
- Communication strategies utilising indirect communication channels continue to be developed, in accordance with the demands of the burgeoning population and large number of elderly/retired residents.
- Specific evaluation of recently implemented preparedness initiatives to ascertain their effectiveness and value within the Pāpāmoa community to date.

6.3.3 Specific Recommendations for Rongotai Audience

In Rongotai, it recommended that:

- Direct, targeted business preparedness training, resources, and events be developed with identified ‘opinion leaders’ to foster increased interaction between ‘like-minded’ business leaders in the wider Rongotai business community.
- Official tsunami preparedness material be revised to better address the concerns of end users, particularly with regards to evacuation mapping and post-tsunami event information.

- Greater engagement with business leaders to obtain their consent before offering up their businesses for community use in evacuation scenarios.
- A tsunami information board be erected at Lyall Bay Beach for enhanced public safety and awareness.

6.4 Future Research Opportunities

This project achieved what it set out to do and we now have a better understanding of both the Pāpāmoa and Rongotai business audiences; their potential and willingness to act as tsunami preparedness conduits ('opinion leaders'); and the preparedness barriers these audiences face. Potential 'opinion leaders' from among these communities have also been identified and tsunami preparedness communication theories have been applied in a 'new' tsunami preparedness context. New models have been developed by the researcher to help support the practical application of enhanced tsunami preparedness communication with 'opinion-leaders' in potentially at risk communities throughout New Zealand.

In line with the findings obtained through this research and with the researcher's desire to continue improving preparedness communication among the New Zealand business community, this study could be extended in one of three ways with relative ease in the near future:

- The same research approaches and theories could be applied throughout other at-risk coastal business communities in New Zealand and a valuable 'web' of community based preparedness conduits could begin to form.

- A similar study could be conducted among the Christchurch or Kaikōura business communities, in an attempt to better understand the impact that recent large scale events have had on business leaders' risk perception and associated preparedness behaviours; while simultaneously gaining fresh insight to the 'lesson learned'.

- Research could be conducted with senior managers from large New Zealand businesses and franchises (e.g. via their head offices) to identify potential 'opinion leaders' who are willing to implement organisation-wide tsunami preparedness initiatives, particularly with a health and safety focus. By going directly to the heart of these major organisations, widespread sustained behaviour change among the business audience could occur. An example of this can be seen with the R3 participant (identified 'opinion leader') who is based in Rongotai, yet is in a position to implement nationwide change.

- Other than the mention of *Kaiakitanga* principles, aspects of Māori culture and responses were not explicitly discussed by participants, so further research with Māori business leaders could present a useful addition to the research.

- Transdisciplinary approaches are encouraged in future emergency management endeavours, and could provide New Zealand with an opportunity to lead in this area.

6.5 Concluding Comment

A major 'take home' message from this research is that official preparedness organisations are not alone in their communication of tsunami preparedness. Business and community leaders are willing to take a more active role in achieving sustained behaviour change

outcomes, if they are given the tools to do so. While enhancements need to be made, and numerous barriers exist, opportunities for improved tsunami preparedness among the business audience can still be achieved. Considering the limited financial and human resources that most emergency management organisations have, the audience-centred, opinion leadership approach advocated here, could provide a new opportunity to widen perspectives on *who* and *how* our coastal communities can be encouraged to prepare for future tsunami events. While not a 'magic bullet', the approaches gleaned in this research can be used to support and reinforce official mass tsunami preparedness messages and campaigns, through the identification of influential conduits that 'speak the same language' as specific audiences and improve our understanding of their preparedness communication needs.

7.0 Appendices

7.1 Research Summary: Responses, Channels, and Methods

7.1.1 Summary of Responses

Pāpāmoa

Number of Direct Invitations to Contribute (excluding Facebook): 40

Number of Participants: 7

Interview Response Rate: 7.5%

Total Response Rate: 17.5%

Those not contributing:

5x Agreed to contribute, but did not, no reason given

2x Return contacted, declined, no reason given

33x No return contact

(40x Total)

7.1.2 Preferred Initial Contact Channels

Pāpāmoa: Email

2x Personal Contact

5x Email

0x Tauranga Chamber of Commerce

0x Pāpāmoa Progressive Association

0x Facebook - Pāpāmoa Page

0x Facebook - Pāpāmoa Business Page

(7x Total)

Rongotai: Email and Kilbirnie Business Network

0x Personal Contact

2x Email

0x Wellington Chamber of Commerce

2x Kilbirnie Business Network

1x Facebook - Lyall Bay Page

(5x Total)

Combined: Email Contact

2x Personal Contact

8x Email

0x Tauranga Chamber of Commerce

0x Wellington Chamber of Commerce

2x Kilbirnie Business Network

0x Facebook - Pāpāmoa Page

0x Facebook - Pāpāmoa Business Page

0x Facebook - Lyall Bay Page

(12x Total)

7.1.3 Preferred Methodology

Pāpāmoa: Email Questionnaire

3x Interview Conversations

4x Email Questionnaires

(7x Total)

Rongotai: Interview Conversation

5x Interview Conversations

0x Email Questionnaires

(5x Total)

Combined: Interview Conversation

8x Interview Conversations

4x Email Questionnaires

(12x Total)

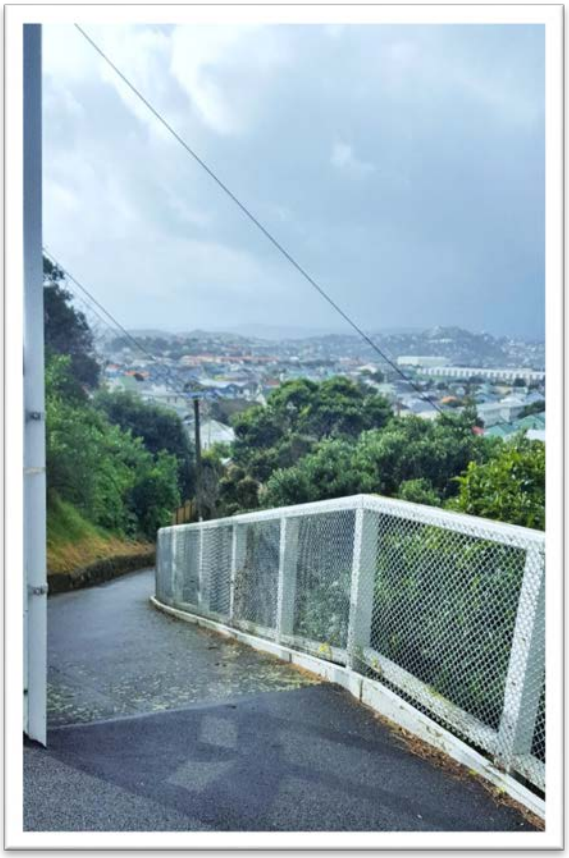
7.2 Photo Gallery

Lyall Bay

Tsunami Information Board concealed outside Kilbirnie Citizens Advice Bureau

'Blue-Lines' in Lyall Bay and Kilbirnie

One of the 'Save the Dune' signs placed along Lyall Bay



An evacuation walkway above Lyall Bay

Kilbirnie Shops

View from Café where the Rongotai interviews were conducted, overlooking Lyall Bay Beach and Surf Club

Lyall Bay, showing the hills many of the Rongotai participants evacuated too following the Kaikoura Quake

Lyall Bay Beach with Wellington Airport and retail outlets in the background

Pāpāmoa Beach Walkways

Some of the 'new' tsunami evacuation signs spread throughout Pāpāmoa. All are in very close proximity to one another (some are within metres of each other and are poorly placed), which could diminish their effectiveness, as people may perceive placement to have been 'done at random' (i.e. without careful thought or planning) and too many signs means that they do not stand out enough/ rare enough and get overlooked.

'On-foot' evacuation stressed with icon on signage in Pāpāmoa

Evacuation route alongside Pāpāmoa storm water system

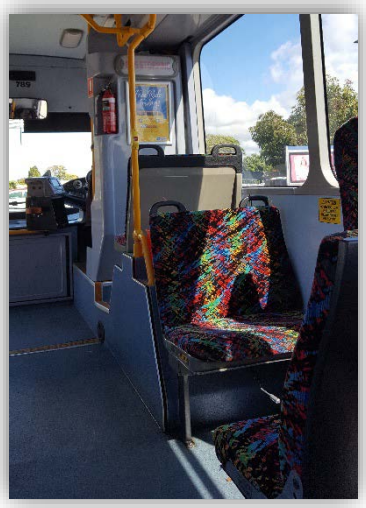
Pāpāmoa Evacuation Bridge

Tsunami signage on top of the Pāpāmoa vertical evacuation mound (Bell Road)

Pāpāmoa vertical evacuation mound (Bell Road)

Pāpāmoa vertical evacuation mound (Bell Road)

Papamoa is rapidly growing, with new coastal subdivisions currently underway. These photos show a movie theatre being built 250m from the beach and an area that had sand-dunes removed to make way for new housing developments.



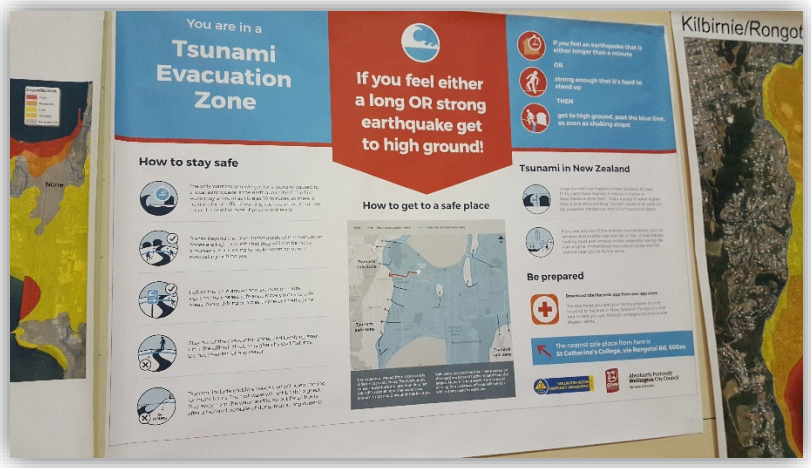
Preparedness information could be displayed in the poster area (behind bus driver's seat) on the Papamoa routes in future.

Pāpāmoa Plaza 'Nook' that could be used for a mall specific Tsunami Information Board in the future

Community events are well-received in Pāpāmoa, the Pāpāmoa Santa Parade is sponsored by the Pāpāmoa Plaza and attracts over 4000 people

Poster found in Countdown supermarket in Wellington during an 'emergency week' promotion, could be adapted for tsunami preparedness, as supermarkets play an important role in the aftermath.

This is an example of general emergency evacuation instructions displayed in a Wellington Theatre. While, not in the research area, it indicates limited tsunami awareness (i.e. single wave) and in a theatre setting there is nowhere to 'drop, cover, hold', highlighting the need for audience-centred engagement/communication rather than 'mass' communication in the business context.



WREMO poster displayed during the community workshop attended by the researcher.

7.3 Sample Information Sheets

7.3.1 Pāpāmoa Participant

Tsunami Preparedness: Understanding Business Audiences (Papamoa)

INFORMATION SHEET

Dear Papamoa business leader,

My name is Adrienne Sheridan. I am completing a Master of Communication with Massey University's School of English and Media Studies. I have a Post Graduate Certificate in Business Studies, a Bachelor of Business Studies in Communication, and a Diploma of Arts.

A Papamoa resident of six years, I'm currently seeking Papamoa business leaders (business owners, managers or industry leaders) and business focussed community leaders to participate in research that will benefit both Papamoa locals and the wider New Zealand community. It aims to improve tsunami preparedness communication in a business context and could potentially save lives.

The research is funded by a scholarship from the Joint Centre for Disaster Research (a joint venture between Massey University and GNS Science), as part of its research priorities for enhanced disaster preparedness in Aotearoa New Zealand. At present, scholars from the JCDR have identified that the public can help us to better understand tsunami risk and how to motivate people to prepare, as local people know the local issues best.

This research will explore tsunami preparedness in the Papamoa (Tauranga) and Rongotai (Wellington) business communities. The project began in November 2016, and is due for completion by February 28, 2018.

- Participants have been invited from the Papamoa and Rongotai business communities
- Selection criteria is based on the participant's organisation or interest being located in either: (1) Papamoa; or Rongotai; and (2) in a possible tsunami inundation zone
- The number of participants has not been pre-determined, however it is expected that there will be up to 100 participants in total
- Compensation/reimbursement of expenses/payments is not offered for participation

PROJECT PROCEDURES

- You are invited to participate in a one-on-one semi-structured interview conversation with the researcher (in person, via Skype, or a telephone call); or an email based questionnaire
- The interviews and questionnaires are expected to take approximately 30 minutes
- A follow-up interview may be requested by the researcher – this will be optional
- In the unlikely event of any physical or psychological discomfort during the interview, it will end and support will be offered to those affected

DATA MANAGEMENT

- Data will be used for this project only
- Data will be collected via email, researcher field notes, and/or on a dedicated recording device
- Once obtained, data will be stored securely in either a lockable filling cabinet or on a secured database
- Data will be securely disposed of no more than three years after completion of the research
- Steps will be taken to ensure that all participants' identity remains confidential (you will be anonymised, as will your organisation)
- You can email me at tsunamipreparedness@gmail.com to request a summary of the project findings

PARTICIPANT'S RIGHTS

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question
- Withdraw from the study up to the point that analysis of your data begins
- Ask any questions about the study at any time during participation
- Be given a summary of the project findings when it is concluded
- Provide information on the understanding that your name and organisation will not be identified
- If a recording device is being used by the researcher during the interview, you can request that it be turned off at any time

LOW RISK NOTIFICATION

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named below is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher or supervisor below, please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz.

COMPENSATION FOR INJURY

In the extremely unlikely event that physical injury results from your participation in this study, you should visit a treatment provider to make a claim to ACC as soon as possible. ACC

cover and entitlements are not automatic and your claim will be assessed by ACC in accordance with the Accident Compensation Act 2001. If your claim is accepted, ACC must inform you of your entitlements, and must help you access those entitlements. Entitlements may include, but not be limited to, treatment costs, travel costs for rehabilitation, loss of earnings, and/or lump sum for permanent impairment. Compensation for mental trauma may also be included, but only if this is incurred as a result of physical injury.

If your ACC claim is not accepted, you should immediately contact the researcher. The researcher will initiate processes to ensure you receive compensation equivalent to that to which you would have been entitled had ACC accepted your claim.

PROJECT CONTACTS
Please feel free to contact me (Adrienne Sheridan, Master of Communication student researcher) or my supervisor, Associate Professor Elspeth Tilley, via our contact details below, if you have any questions about this project.

Thank you for considering participating in this important research.

7.3.2 Rongotai Participant

Tsunami Preparedness: Understanding Business Audiences (Rongotai)

INFORMATION SHEET

Dear Rongotai business leader,

My name is Adrienne Sheridan. I am completing a Master of Communication with Massey University's School of English and Media Studies. I have a Post Graduate Certificate in Business Studies, a Bachelor of Business Studies in Communication, and a Diploma of Arts.

I'm currently seeking Rongotai business leaders (business owners, managers or industry leaders) and business focussed community leaders to participate in research that will benefit both Rongotai locals and the wider New Zealand community. It aims to improve tsunami preparedness communication in a business context and could potentially save lives.

The research is funded by a scholarship from the Joint Centre for Disaster Research (a joint venture between Massey University and GNS Science), as part of its research priorities for enhanced disaster preparedness in Aotearoa New Zealand. At present, scholars from the

JCDR have identified that the public can help us to better understand tsunami risk and how to motivate people to prepare, as local people know the local issues best.

This research will explore tsunami preparedness in the Papamoa (Tauranga) and Rongotai (Wellington) business communities. The project began in November 2016, and is due for completion by February 28, 2018.

- Participants have been invited from the Papamoa and Rongotai business communities
- Selection criteria is based on the participant's organisation or interest being located in either: (1) Papamoa; or Rongotai; and (2) in a possible tsunami inundation zone
- The number of participants has not been pre-determined, however it is expected that there will be up to 100 participants in total
- Compensation/reimbursement of expenses/payments is not offered for participation

PROJECT PROCEDURES

- You are invited to participate in a one-on-one semi-structured interview conversation with the researcher (in person, via Skype, or a telephone call); or an email based questionnaire
- The interviews and questionnaires are expected to take approximately 30 minutes
- A follow-up interview may be requested by the researcher – this will be optional
- In the unlikely event of any physical or psychological discomfort during the interview, it will end and support will be offered to those affected

DATA MANAGEMENT

- Data will be used for this project only
- Data will be collected via email, researcher field notes, and/or on a dedicated recording device
- Once obtained, data will be stored securely in either a lockable filling cabinet or on a secured database
- Data will be securely disposed of no more than three years after completion of the research
- Steps will be taken to ensure that all participants' identity remains confidential (you will be anonymised, as will your organisation)
- You can email me at tsunamipreparedness@gmail.com to request a summary of the project findings

PARTICIPANT'S RIGHTS

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question
- Withdraw from the study up to the point that analysis of your data begins
- Ask any questions about the study at any time during participation
- Be given a summary of the project findings when it is concluded

- Provide information on the understanding that your name and organisation will not be identified
- If a recording device is being used by the researcher during the interview, you can request that it be turned off at any time

LOW RISK NOTIFICATION
This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named below is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher or supervisor below, please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz.

COMPENSATION FOR INJURY

In the extremely unlikely event that physical injury results from your participation in this study, you should visit a treatment provider to make a claim to ACC as soon as possible. ACC cover and entitlements are not automatic and your claim will be assessed by ACC in accordance with the Accident Compensation Act 2001. If your claim is accepted, ACC must inform you of your entitlements, and must help you access those entitlements. Entitlements may include, but not be limited to, treatment costs, travel costs for rehabilitation, loss of earnings, and/or lump sum for permanent impairment. Compensation for mental trauma may also be included, but only if this is incurred as a result of physical injury.

If your ACC claim is not accepted, you should immediately contact the researcher. The researcher will initiate processes to ensure you receive compensation equivalent to that to which you would have been entitled had ACC accepted your claim.

PROJECT CONTACTS
Please feel free to contact me (Adrienne Sheridan, Master of Communication student researcher) or my supervisor, Associate Professor Elspeth Tilley, via our contact details below, if you have any questions about this project.

Thank you for considering participating in this important research.

7.3.3 Pāpāmoa Informant

Tsunami Preparedness: Understanding Business Audiences (Papamoa)

INFORMATION SHEET

Dear Papamoa community leader,

My name is Adrienne Sheridan. I am completing a Master of Communication with Massey University's School of English and Media Studies. I have a Post Graduate Certificate in Business
Studies, a Bachelor of Business Studies in Communication, and a Diploma of Arts.

A Papamoa resident of six years, I'm currently seeking Papamoa business leaders (business owners, managers or industry leaders) and business focussed community leaders to participate in research that will benefit both Papamoa locals and the wider New Zealand community. It aims to improve tsunami preparedness communication in a business context and could potentially save lives.

The research is funded by a scholarship from the Joint Centre for Disaster Research (a joint venture between Massey University and GNS Science), as part of its research priorities for enhanced disaster preparedness in Aotearoa New Zealand. At present, scholars from the JCDR have identified that the public can help us to better understand tsunami risk and how to motivate people to prepare, as local people know the local issues best.

This research will explore tsunami preparedness in the Papamoa (Tauranga) and Rongotai (Wellington) business communities. The project began in November 2016, and is due for completion by February 28, 2018.

- Participants have been invited from the Papamoa and Rongotai business communities
- Selection criteria is based on the participant's organisation or interest being located in either: (1) Papamoa; or Rongotai; and (2) in a possible tsunami inundation zone
- The number of participants has not been pre-determined, however it is expected that there will be up to 100 participants in total
- Compensation/reimbursement of expenses/payments is not offered for participation

PROJECT PROCEDURES

- You are invited to participate in a one-on-one semi-structured interview conversation with the researcher (in person, via Skype, or a telephone call); or an email based questionnaire
- The interviews and questionnaires are expected to take approximately 30 minutes
- A follow-up interview may be requested by the researcher – this will be optional
- In the unlikely event of any physical or psychological discomfort during the interview, it will end and support will be offered to those affected

DATA MANAGEMENT

- Data will be used for this project only
- Data will be collected via email, researcher field notes, and/or on a dedicated recording device

- Once obtained, data will be stored securely in either a lockable filling cabinet or on a secured database
- Data will be securely disposed of no more than three years after completion of the research
- Steps will be taken to ensure that all participants' identity remains confidential (you will be anonymised, as will your organisation)
- You can email me at tsunamipreparedness@gmail.com to request a summary of the project findings

PARTICIPANT'S RIGHTS

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question
- Withdraw from the study up to the point that analysis of your data begins
- Ask any questions about the study at any time during participation
- Be given a summary of the project findings when it is concluded
- Provide information on the understanding that your name and organisation will not be identified
- If a recording device is being used by the researcher during the interview, you can request that it be turned off at any time

LOW RISK NOTIFICATION

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named below is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher or supervisor below, please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz.

COMPENSATION FOR INJURY

In the extremely unlikely event that physical injury results from your participation in this study, you should visit a treatment provider to make a claim to ACC as soon as possible. ACC cover and entitlements are not automatic and your claim will be assessed by ACC in accordance with the Accident Compensation Act 2001. If your claim is accepted, ACC must inform you of your entitlements, and must help you access those entitlements. Entitlements may include, but not be limited to, treatment costs, travel costs for rehabilitation, loss of earnings, and/or lump sum for permanent impairment. Compensation for mental trauma may also be included, but only if this is incurred as a result of physical injury.

If your ACC claim is not accepted, you should immediately contact the researcher. The researcher will initiate processes to ensure you receive compensation equivalent to that to which you would have been entitled had ACC accepted your claim.

PROJECT CONTACTS

Please feel free to contact me (Adrienne Sheridan, Master of Communication student researcher) or my supervisor, Associate Professor Elspeth Tilley, via our contact details below, if you have any questions about this project.

Thank you for considering participating in this important research.

7.3.4 Rongotai Informant

Tsunami Preparedness: Understanding Business Audiences (Rongotai)

INFORMATION SHEET

Dear Rongotai community leader,

My name is Adrienne Sheridan. I am completing a Master of Communication with Massey University's School of English and Media Studies. I have a Post Graduate Certificate in Business Studies, a Bachelor of Business Studies in Communication, and a Diploma of Arts.

I'm currently seeking Rongotai business leaders (business owners, managers or industry leaders) and business focussed community leaders to participate in research that will benefit both Rongotai locals and the wider New Zealand community. It aims to improve tsunami preparedness communication in a business context and could potentially save lives.

The research is funded by a scholarship from the Joint Centre for Disaster Research (a joint venture between Massey University and GNS Science), as part of its research priorities for enhanced disaster preparedness in Aotearoa New Zealand. At present, scholars from the JCDR have identified that the public can help us to better understand tsunami risk and how to motivate people to prepare, as local people know the local issues best.

This research will explore tsunami preparedness in the Papamoa (Tauranga) and Rongotai (Wellington) business communities. The project began in November 2016, and is due for completion by February 28, 2018.

- Participants have been invited from the Papamoa and Rongotai business communities
- Selection criteria is based on the participant's organisation or interest being located in either: (1) Papamoa; or Rongotai; and (2) in a possible tsunami inundation zone
- The number of participants has not been pre-determined, however it is expected that there will be up to 100 participants in total
- Compensation/reimbursement of expenses/payments is not offered for participation

PROJECT PROCEDURES

- You are invited to participate in a one-on-one semi-structured interview conversation with the researcher (in person, via Skype, or a telephone call); or an email based questionnaire
- The interviews and questionnaires are expected to take approximately 30 minutes
- A follow-up interview may be requested by the researcher – this will be optional
- In the unlikely event of any physical or psychological discomfort during the interview, it will end and support will be offered to those affected

DATA MANAGEMENT

- Data will be used for this project only
- Data will be collected via email, researcher field notes, and/or on a dedicated recording device
- Once obtained, data will be stored securely in either a lockable filling cabinet or on a secured database
- Data will be securely disposed of no more than three years after completion of the research
- Steps will be taken to ensure that all participants' identity remains confidential (you will be anonymised, as will your organisation)
- You can email me at tsunamipreparedness@gmail.com to request a summary of the project findings

PARTICIPANT'S RIGHTS

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question
- Withdraw from the study up to the point that analysis of your data begins
- Ask any questions about the study at any time during participation
- Be given a summary of the project findings when it is concluded
- Provide information on the understanding that your name and organisation will not be identified
- If a recording device is being used by the researcher during the interview, you can request that it be turned off at any time

LOW RISK NOTIFICATION

This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named below is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher or supervisor below, please contact Dr Brian Finch, Director, Research Ethics, telephone 06 356 9099 x 86015, email humanethics@massey.ac.nz.

COMPENSATION FOR INJURY

In the extremely unlikely event that physical injury results from your participation in this study, you should visit a treatment provider to make a claim to ACC as soon as possible. ACC cover and entitlements are not automatic and your claim will be assessed by ACC in accordance with the Accident Compensation Act 2001. If your claim is accepted, ACC must inform you of your entitlements, and must help you access those entitlements. Entitlements may include, but not be limited to, treatment costs, travel costs for rehabilitation, loss of earnings, and/or lump sum for permanent impairment. Compensation for mental trauma may also be included, but only if this is incurred as a result of physical injury.

If your ACC claim is not accepted, you should immediately contact the researcher. The researcher will initiate processes to ensure you receive compensation equivalent to that to which you would have been entitled had ACC accepted your claim.

PROJECT CONTACTS

Please feel free to contact me (Adrienne Sheridan, Master of Communication student researcher) or my supervisor, Associate Professor Elspeth Tilley, via our contact details below, if you have any questions about this project.

Thank you for considering participating in this important research.

8.0 References

Allen, W., Kilvington, M., & Horn, C. (2002). *Using participatory and learning-based approaches for environmental management to help achieve constructive behaviour change: Landcare Research Contract Report, LC0102/057*. Wellington, NZ: Landcare Research.

Auf der Heide, E. (1989). *Disaster response: Principles of preparation and coordination*. St. Louis, MO: Mosby.

Arneson, P. (2001). The place of literature in the space of qualitative organisational communication research. In S.L. Herndon & G.L. Kreps (Eds.). *Qualitative research: Applications in organisational life (2nd ed*.), (pp. 14-15). Cresskill, NJ: Hampton Press.

Baran, S. J., & Davis, D. K. (2012). *Mass communication theory: foundations, ferment, and future (6th ed.)*. Boston, MA: Wadsworth Cengage Learning.

Becker, J. S. (2010). *Understanding disaster preparedness and resilience in Canterbury: Results of interviews, focus groups and a questionnaire survey*. Lower Hutt, NZ: GNS Science.

Beech, J. (2015). *Doing your business research project*. Thousand Oaks, CA: Sage.

Bell, J. (1993). *Doing your research project: A guide for first-time researchers in education and social science* (2nd ed.). Buckingham, UK: Open University Press.

Bowers, C. (2012) Continuity of operations planning. In M. J. Fagel (Ed.). *Principles of emergency management: Hazard specific issues and mitigation strategies*. Boca Raton, FL: CRC Press/Taylor & Francis Group.

Cohen, A. R. (1964). *Attitude change and social influence*. New York, NY: Basic Books.

Cohen, M. Z., Kahn, D. L., & Steeves, R. H. (2000). *Hermeneutic phenomenological research: A practical guide for nurse researchers*. Thousand Oaks, CA: Sage.

Coleman, J. S., Katz, E., & Menzel, H. (1966). *Medical innovation: A diffusion study*. Indianapolis, IN: Bobbs-Merrill Company.

Coles, E., & Buckle, P. (2004). Developing community resilience as a foundation for effective disaster recovery. *The Australian Journal of Emergency Management, 19*, (4), 6-15.

Coppola, D. P., & Maloney, E. K. (2009). *Communicating emergency preparedness: Strategies for creating a disaster resilient public*. Boca Raton, FL: CRC Press.

Creswell, J. W. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Los Angeles, CA: Sage.

Currie, C. S., Enjamio, J., Girardo, D. O., & Hensel, C. (2013). *Tsunami awareness and preparedness in the greater Wellington region*. Report. Wellington, NZ: GNS Science and the Wellington Regional Emergency Management Office.

Denscombe, M. (2014). *The good research guide: for small-scale social research projects*. Maidenhead, UK: McGraw-Hill Education/Open University Press.

Daymon, C., & Holloway, I. (2011). Qualitative research methods in public relations and marketing communications (2nd ed.). New York, NY: Routledge.

Dearing, J. W., & Meyer, G. (2012). Revisiting diffusion theory. In A. Singhal & J. W. Dearing (Eds.). *Communication of innovations: A Journey with Ev Rogers (6th ed.)*, (pp. 145-171). New Delhi, IN: Sage India Limited.

Du Y., Ding, Y., Li, Z., & Cao G. (2015). *The role of hazard vulnerability assessments in disaster preparedness and prevention in China*. Military Medical Research, 27 (2), 27-35.

Finsterwalder, J., & Grey, H. (2017). Customer relationships and experiences during times of disaster: A case study of Ballantynes. In C. M. Hall, S. Malinen, R. Vosslamber, and R. Wordsworth (Eds.). *Business and post-disaster management: Business, organisational and consumer resilience and the Christchurch earthquakes.* Abingdon, Oxon: Routledge.

Forsyth, P. J., & Johnston, D. M. (2005). *Survey of Te Anau and Manapouri businesses following the 2003 Fiordland earthquake*. Lower Hutt, NZ: Institute of Geological & Nuclear Sciences.

Fraser, S., Leonard, G. S., & Johnston, D. M. (2013). *Intended evacuation behaviour in a local earthquake and tsunami at Napier, New Zealand*. Lower Hutt, NZ: GNS Science.

Fraser, S., Leonard, G. S., Matsuo, I., & Murakami, H. (2012). *Tsunami evacuation: Lessons learned from the Great East Japan Earthquake of March 11th, 2011*. Lower Hutt, NZ: GNS Science.

Frey, L. R., Botan, C. H., & Kreps, G. L. (2000). *Investigating communication: An introduction to research methods* (2nd. ed.). Needham Heights, MA: Allyn & Bacon.

Gough, J. D., Johnston, D. M., & McSaveney, M. J. (1999). *Community response to natural hazard risk at Franz Josef Glacier*. Lower Hutt, NZ: Institute of Geological and Nuclear Sciences.

Graziano, A. M., & Raulin, M. L. (2013). *Research methods: A process of inquiry*. Boston: Pearson.

Green, S. E. (2004). A rhetorical theory of diffusion. *Academy of Management Review*, *29* (4), 653-669.

Grunig, J. E. (1989). Publics, audiences and market segments: Segmentation principles for campaigns. In C. T. Salmon (Ed.). *Information campaigns: Balancing social values and social change* (pp. 199-223). Beverly Hills, CA: Sage.

Grunig, J. E. (2013). Situational theory of public relations. In R. L. Heath (Ed.). *Encyclopaedia of Public Relations* (pp. 835-836). Thousand Oaks, CA: Sage.

Grunig, J., & Hunt, T. (1984). *Managing public relations*. New York, NY: Holt, Reinehart & Winston.

Hall, C. M., Malinen, S., Vosslamber, R., & Wordsworth, R. (2016). The business, organisational and destination impacts of natural disasters - the Christchurch earthquakes 2010-2011. In C. Hall, S. Malinen, R. Vosslamber, R., and R. Wordsworth (Eds.). *Business and post-disaster management: Business,*

organisational and consumer resilience and the Christchurch earthquakes. Abingdon, Oxon: Routledge.

Hamilton, P. (1992). Grunig's situational theory: A replication, application, and extension. *Journal of Public Relations Research, 4* (3), 123-149. Retrieved February 23, 2018 from http://eds.b.ebscohost.com.ezproxy.massey.ac.nz/eds/pdfviewer/pdfviewer?vid=2&sid=ecfda0bc-f653-4add-97ae-107f0d4fb466%40pdc-v-sessmgr01.

Health Communication Capacity Collaborative (HCCC), (n.d.). *Diffusion of innovations: An HC3 research primer*. Retrieved 20 February, 2018 from http://www.healthcommcapacity.org/wp-content/uploads/2014/03/diffusion_of_innovations_kim.pdf.

Holloway, W., & Biley, F. (2011). Being a qualitative researcher. *Qualitative Health Research, 21* (7), 968-975.

Illia, L., Lurati, F., & Casalaz, R. (2013). Situational theory of publics: Exploring a cultural ethnocentric bias. *Journal of Public Relations Research, 25*, (2), 93-122. Retrieved February 26, 2018 from http://www.tandfonline.com/doi/abs/10.1080/1062726X.2013.758581.

InvestAura. (2017). *The diffusion of innovations* [image]. Retrieved February 21, 2018 from http://www.business-planning-for-managers.com/main-courses/forecasting/the-diffusion-of-innovation/.

Juan, L., & Yong, C. (n.d.) Geological hazards: Earthquakes, landslides and tsunamis. *Natural and Human Induced Hazards, 1*. Beijing, CN: China Seismological Bureau. Retrieved January, 19, 2018 from http://www.eolss.net/sample-chapters/c12/E1-07-01-04.pdf.

Jurin, R. R., Roush, D. E., & Danter, K. J. (2010). *Environmental communication: Skills and principles for natural resource managers, scientists and engineers*. Dordrecht, UK: Springer.

Johnston, D. M. (1998). *The use of natural hazard research in the Bay of Plenty Region*. Whakatane, NZ: Environment B.O.P.

Johnson, J. (2014). Glossary of theories. In J. Johnson, & M. Sheehan (Eds.). *Public relations: Theory and practice (4th ed)*, (pp. 397-410). Sydney, AU: Allen & Unwin.

Johnson, J., & Sheehan, M. (2014). (Eds.). *Public relations theory and practice* (*4th ed*.). Sydney, AU: Allen & Unwin.

Jugenheimer, D. W., Kelley, L. D., Hudson, J., & Bradley, S. D. (2014). *Advertising and public relations research*. Armonk, New York: M.E. Sharpe.

Katz, E. (1957). The two-step flow of communication: An up-to-date report on an hypothesis. *Public Opinion Quarterly*, *21*, 61-78.

Katz, E., & Lazarsfeld, P. F. (2006). *Personal influence: The part played by people in the flow of mass communications*. New Brunswick, NJ: Transaction Publishers.

Kim, J. N. (2011). Public segmentation using situational theory of problem-solving: Illustrating summation method and testing segmented public profiles. *PRism 8*, (2).

Retrieved February 26, 2018 from: http://www.prismjournal.org/fileadmin/8_2/Kim.pdf.

Kim, J., & Grunig, J. E. (2011). Problem solving and communicative action: A situational theory of problem solving. *Journal of Communication, 61*(1), 120-149. Retrieved February 26, 2018, from http://onlinelibrary.wiley.com.ezaccess.libraries.psu.edu/doi/10.1111/j.1460-2466.2010.01529.x/epdf.

Kreps, G. L., & Herndon, S. L. (2001). Introduction: The power of qualitative research to address organisational issues. In S.L. Herndon & G.L. Kreps (Eds.). *Qualitative research: Applications in organisational life (2nd ed*.), (pp. 1-3). Cresskill, NJ: Hampton Press.

Kuchta, L. (2017). *The two-step flow of communication theory* [image]. Retrieved February 21, 2018 from https://study.com/academy/lesson/two-step-flow-communication-model.html.

LaMorte, W. W. (2016). *Behavioural change models* (pp. 4-5). Retrieved February 21, 2018 from http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories-TOC.html.

Lawrence, R. J., & Després, C. (2004). Futures of transdisciplinarity. *Futures, 36,* (4), 397-405.

Leonard, G., Paton, D., Johnston, D. M., & Mitchell, J. (2004). *Analysis of Canterbury Civil Defence and Emergency Management 2004 awareness and preparedness survey.* Lower Hutt, NZ: Institute of Geological & Nuclear Sciences.

Lichtman, M. (2014). *Qualitative research for the social sciences*. Thousand Oaks, CA: Sage.

Lindell, M. K., & Perry, R. W. (2002). Planning and preparedness (pp. 132-134). In W. L. Waugh & K. J. Tierney (Eds.). *Emergency management: Principles and practice for local government*. Washington, DC: ICMA Press.

Lindell, M. K., Kang, J. E., & Prater, C. (2011). The logistics of household hurricane evacuation. *Natural Hazards, 58,* (3), 1093-1109. Retrieved January 15, 2018 from https://trove.nla.gov.au/work/154653842?q&versionId=168577528.

Littlejohn, S., & Foss, K. (2004). *Theories of human communication (8th ed.).* Belmont, CA: Thomson Wadsworth.

Lester, C. (2011). *Situational theory of publics*. Retrieved February, 26, 2018 from https://sites.psu.edu/colinlester473/theory-research/.

Liu, P. L. -F., Lynett, P., Fernando, H., Jaffe, B. E., Fritz, H., Higman, B., Morton, R., Goff, J., Synolakis, C. (2005). Observations by the International Tsunami Survey Team in Sri Lanka. *Science, 308,* (5728), 1595-595.

McFadgen, B. (2007). *Hostile shores: Catastrophic events in prehistoric New Zealand and their impact on Māori coastal communities*. Auckland, NZ: Valentine Books.

McLean, P. D. (2017). *Culture in networks*. Cambridge, UK: Polity Press.

Mason, S. (2001). Communication processes in the field research interview setting. In S.L. Herndon & G.L. Kreps (Eds.). *Qualitative research: Applications in organisational life (2nd ed.),* (pp. 47-51). Cresskill, NJ: Hampton Press.

Melkote, S. (2012). Communication and social change in developing countries. In A. Singhal & J. W. Dearing (Eds.). *Communication of innovations: A Journey with Ev Rogers (6th ed.),* (pp. 145-171). New Delhi, IN: Sage India Limited.

Morgan, M. G., Fischhoff, B., Bostrom, A., & Atman, C. J. (2002). Risk communication: A mental models approach. Cambridge, NY: Cambridge University Press.

Mutch, C. (2013). *Doing educational research: A practitioner's guide to getting started (2nd ed.).* Wellington, NZ: NZCER Press.

Muto, J. (2001). "Who's in my bed?": The strange bedfellows made by the politics of applied qualitative organisational research. In S.L. Herndon & G.L. Kreps (Eds.). *Qualitative research: Applications in organisational life (2nd ed*.), (pp. 37-45). Cresskill, NJ: Hampton Press.

Nelson, R. (2006). A true department store experience. *Star Tribune*. Retrieved January 17, 2018 from http://www.deseretnews.com/article/35184420/A-true-department-store-experience.html.

Nilakant, V., Walker, B., Kuntz, J., de Vries, H. P., Malinen, S., Näswall, K., van Heugten, K. (2017). Dynamics of organisational response to a disaster: A study of organisations impacted by earthquakes. In C. M. Hall, S. Malinen, R. Vosslamber, and R. Wordsworth (Eds.). *Business and post-disaster management: Business, organisational and consumer resilience and the Christchurch earthquakes*. Abingdon, Oxon: Routledge.

NZ History. (2017). *Okato*. Retrieved January 20, 2018 from https://nzhistory.govt.nz/keyword/okato.

Oliver, C. (2011). *Catastrophic disaster planning and response*. Boca Raton, FL: CRC Press.

Paton, D. (2007a). *Measuring and monitoring resilience in Auckland*. Lower Hutt, NZ: GNS Science.

Paton, D., & McClure, J. (2013). *Preparing for disaster: Building household and community capacity*. Springfield, Illinois: Charles C Thomas Publisher Limited.

Petty, R.E., and Krosnick, J.A. (1995). *Attitude strength: Antecedents and consequences*. Mahwah, NJ: Erlbaum Associates.

Pietrobon, R., & Maldonato, M. (2010). *Research on scientific research: A transdisciplinary study*. East Sussex, UK: Sussex Academic Press.

Rodriguez, H., Wachtendorf, T., Kendra, J., & Trainor, J. (2006) A snapshot of the 2004 Indian Ocean tsunami: societal impacts and consequences. *Disaster Prevention and Management: An International Journal*, *15*, (1), 163 - 177. Retrieved January 14, 2018 from http://dx.doi.org/10.1108/09653560610654310.

Rogers, E. M., & Agarwala-Rogers, R. (1976). *Communication in organizations*. New York, NY: Free Press.

Rogers, E. M., & Kincaid, D. L. (1981). *Communication networks: Toward a new paradigm for research*. New York, NY: Free Press.

Rogers, E. M., Singhal., A., & Quinlan, M. M. (1996). Diffusion of innovations. In M. B. Salwen (Ed.), *An Integrated Approach to Communication Theory and Research (2nd ed.)*, (pp. 418-434). New York, NY: Taylor & Francis.

Seibold, D. R., Lemus, D. R., Ballard, D. I., & Myers, K. K. (2009). Organizational communication and applied communication research: Parallels, intersections, integration, and engagement. In L. W. Frey & K. N. Cissna (Eds.), *Routledge Handbook of Applied Communication Research*, (pp. 337-340). New York, NY: Routledge.

Slovic, P., Fischhoff, B., & Lichtenstein, S. (1982). Facts versus fears: Understanding perceived risk. In D. Kahneman, P. Slovic, & A. Tversky (Eds.). *Judgment under uncertainty: heuristics and biases* (pp. 463-492). Cambridge, NY: Cambridge University Press.

Suppasri, A., Shuto, N., Imamura, F., Koshimura, S., Mas, E., & Yalciner, A. C. (2013). Lessons learned from the 2011 Great East Japan Tsunami: Performance of tsunami countermeasures, coastal buildings, and tsunami evacuation in Japan. *Pure and Applied Geophysics*, *170*, (993), 1-26. Retrieved January 14, 2018 from: https://doi.org/10.1007/s00024-012-0511-7.

Tibballs, G. (2005). *Tsunami: The most terrifying disaster*. London, UK: Carlton Publishing Group.

Tilley, E. (2014). Strategy and Planning. In J. Johnston, & M. Sheehan (Eds.). *Public relations: Theory and practice (4th ed)*, (pp. 77-108). Sydney:, AU: Allen & Unwin.

Ward, J., Becker, J. S., & Johnston, D. M. (2008). *Community participation in recovery planning: A case study from the 1998 Ohura flood*. Lower Hutt, NZ: GNS Science.

Webb, G. R., Tierney, K. J., & Dahlhammer, J. M. (2000). Business and disasters: Empirical patterns and unanswered questions. *Natural Hazards Review*, *1*, 83-90.

West, R. L., & Turner, L. H. (2010). *Introducing communication theory: Analysis and application*. Boston, MA: McGraw-Hill Higher Education.

Wickson, F., Carew, A. L. and Russell, A. W. (2006). Transdisciplinary research: characteristics, quandaries and quality. *Futures*, *38* (9), 1046-1059.

9.0 Bibliography

Adams, J., Khan, H. A., & Raeside, R. (2014). *Research methods for business and social science students*. New Delhi, IN: Sage.

Ansell, J., & Wharton, F. (1992). *Risk: Analysis, assessment, and management*. Chichester, UK: John Wiley & Sons.

Baran, S. J. (2013). *Introduction to mass communication: Media literacy and culture (7th ed.).* New York, NY: McGraw-Hill.

Berelson, B. R., Lazarsfeld, P. F., McPhee, W. N. (1954). *Voting: A study of opinion formation in a presidential campaign*. Chicago, IL: University of Chicago Press.

Bochner, A. (1985). Perspectives on inquiry: Representation, conversation, and reflection. In M. L. Knapp and G. R. Miller (Eds.). *Handbook of interpersonal communication* (pp. 27-58). Beverly Hills, CA: Sage.

Coomer, M. A. (2009). *West Coast ShakeOut exercise September 18th 2009: Observation of the exercise on the West Coast, South Island, New Zealand*. Lower Hutt, N.Z: GNS Science.

Craig, R. T. (1999). Communication theory as a field. *Communication theory*, *9*, 119-161.

Denzin N. and Lincoln Y. (Eds.) (2000). *Handbook of qualitative research*. London: Sage.

Dhellemmes, A., Leonard, G. S., & Johnston, D.M. (2016). *Tsunami awareness and preparedness on the East Coast of New Zealand's North Island*. Lower Hutt, NZ: GNS Science.

Dudley, W.C., & Lee, M. (1998). *Tsunami!* Honolulu, HA: University of Hawaii Press.

Fagel, M. J., & Krill, S. J. (2012). Introduction: Why plan for disasters? In M. J. Fagel (Ed.). *Principles of emergency management: Hazard specific issues and mitigation strategies*. Boca Raton, FL: CRC Press/Taylor & Francis Group.

Fischhoff, B., Slovic, P., Lichtenstein, S. (1982). Lay foibles and expert fables in judgments about risk. *The American statistician*, *36* (3), 240-255. Retrieved February 23, 2018 from

http://eds.b.ebscohost.com.ezproxy.massey.ac.nz/eds/pdfviewer/pdfviewer?vid=6&sid=4f22cca9-12da-44ff-bec8-cb5130f602a5%40sessionmgr120.

Fitzpatrick, C., & Mileti, D. (1997). Public risk communication. In R. Dynes & K. Tierney (Eds.). *Disasters, collective behavior, and social organization* (pp. 71-84).Cranbury, NJ: Associated University Presses.

Glenny, L., & Singh, R. (2014). Research and evaluation. In J. Johnston, & M. Sheehan (Eds.). *Public relations: Theory and practice (4th ed)*. Sydney:, AU: Allen & Unwin.

Gregg, C. E., & Houghton, B. F. (2006). Natural hazards. In D. Paton and D. Johnston (Eds.) *Disaster resilience: An integrated approach* (pp. 19-39). Springfield, IL: Charles C Thomas Limited.

Grunig, J. E. (1968). *Information, entrepreneurship, and economic development: A study of the decision making processes of Colombian Latifundistas* (Unpublished doctoral dissertation). University of Wisconsin, Madison.

Grunig, J. E. (1989a). Publics, audiences and market segments: Segmentation principles for campaigns. In C. T. Salmon (Ed.). *Information campaigns: Balancing social values and social change* (pp, 199-223). Beverly Hills, CA: Sage.

Grunig, J. E. (2005). Situational theory of publics. In R.L. Heath (Ed.). *Encyclopaedia of public relations* (pp. 778-780). Thousand Oaks, CA: Sage.

Guest, G., MacQueen, K. M., & Namey, E. E. (2012). *Applied thematic analysis*. Los Angeles, CA: Sage.

Have, P. t. (2004). *Understanding qualitative research and ethnomethodology*. London, UK: Sage.

Ismail-Zadeh, A. T., Cutter, S. L., Takeuchi, K., & Paton, D. (2016). Forging a paradigm shift in disaster science. *Natural Hazards, 86*, 969-988.

Johnson, V. A. (2011) Disaster preparedness education in schools: Recommendations for New Zealand and the United States. *Public Policy*. Wellington, NZ.

Johnston, D. M., Paton, D., Saunders, W., Coomer, M. A., Frandsen, M., & Barton, D. (2009). *Community awareness and understanding of tsunami risk in Western Australia, Queensland and New South Wales: Tabulated results of a 2008-2009 survey*. Lower Hutt, NZ: GNS Science.

Johnson, R. (2001). *Organisation preparedness* (Dissertation, Massey University, Palmerston North, New Zealand).

Kim, J. N. (2014). Situational theory and communication behaviors. In T. L. Thompson (Ed.). *Encyclopaedia of Health Communication* (pp. 1254-1259). Thousand Oaks, CA: Sage.

Klenke, K. (2008). *Qualitative research in the study of leadership*. Bingley, UK: Emerald.

L'Etang, J. (2005) Critical public relations: Some reflections. *Public relations review, 31,* 521–526.

Leonard, G., Saunders, W., & Johnston, D. M. (2007). *Hazard warning systems for the Gisborne district: Assessment of options*. Lower Hutt, NZ: GNS Science.

Leong, F. L., & Austin, J. T. (Eds.). (2006). *The psychology research handbook: A guide for graduate students and research assistants (2nd ed.).* Thousand Oaks, CA: Sage.

Littlejohn, S., & Foss, K. (2008). *Theories of human communication (9th ed.).* Belmont, CA: Thomson Wadsworth.

McBride, S. D., Becker, J. M., Coomer, M. A., Tipler, K., & Johnston, D. M. (2014). *New Zealand ShakeOut observation evaluation report: A summary of initial findings.* Lower Hutt, New Zealand: GNS Science.

Menzel, H., & Katz, E. (1955). Social relations and innovation in the medical profession: The epidemiology of a new drug. *Public opinion quarterly, 19,* (4), 337–352. Retrieved Febrauary 23, 2018 from https://academic.oup.com/poq/article-abstract/19/4/337/1815847?redirectedFrom=fulltext.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.

Murakami, H., & Kashiwabara, K. (2011). *Travel means for tsunami evacuation in the 2011 Tōhoku Pacific Ocean Earthquake - questionnaire survey in Natori City,* (p. 4). Annual Conference of Institute of Social Safety Science.

Paton, D. (2003). Disaster preparedness: A social-cognitive perspective. *Disaster prevention and management, 12*, 210-216.

Paton, D. (2007b). Preparing for natural hazards: the role of community trust. *Disaster prevention and management, 16*, (3), 370-379. Retrieved January 12, 2018 from https://doi.org/10.1108/09653560710758323.

Paton, D., & Johnston, D. (1999). Disasters and communities: Vulnerability, resilience and preparedness. *Disaster prevention and management, 10*, (4), 270-277. Retrieved January 14, 2018 from http://www.emeraldinsight.com.ezproxy.massey.ac.nz/doi/pdfplus/10.1108/EUM0000000005930.

Pollock, D., & Cox, J. R. (1991). Historicizing reason: Critical theory, practice, and postmodernity. *Communication Monographs, 58*, 170-178.

Quarantelli, E.L. (1985) *What is Disaster? The need for clarification in definition and conceptualization in research*. Retrieved January 09, 2018 from http://udspace.udel.edu/handle/19716/1119.

Quarantelli, E. L. (2000). *Emergencies, disasters, and catastrophes are different phenomena*. Preliminary Paper 304. Newark, DE: University of Delaware Disaster Research Center.

Reedy, A. (1997). *Ngā Kōrero a Pita Kāpiti: The Teachings of Pita Kāpiti*. Christchurch, NZ: Canterbury University Press.

Rogers, E. M. (1982). The empirical and critical schools of communication research. In M. Burgoon (Ed.). *Communication yearbook, 5*, (pp. 125-144). New Brunswick, NJ: Transaction Books.

Rogers, E. M. (1994). *A history of communication study: A biographical approach*. New York, NY: The Free Press.

Rogers, E. M. (1995). *Diffusion of innovations (4th ed.)*. New York, NY: The Free Press.

Saw, G. l., & Harrald, J. R. (2004). Identification of the core competencies required of executive level business crisis and continuity managers. *Journal of Homeland Security and Emergency Management, 1*. Retrieved February, 22, 2018 from: http://www.disaster- resource.com/articles/06p_066.shtml.

Scott, M. (2014). *Media and development*. Chicago, IL: Zed Books.

Semin, G. R., & Fiedler, K. (1996). *Applied social psychology*. Thousand Oaks, CA: Sage.

Stacks, D. W. (2011). *Primer of public relations research*. New York: Guilford Press.

Stovall, S. (2012). The hazards among us. In M. J. Fagel (Ed.). *Principles of emergency management: Hazard specific issues and mitigation strategies*. Boca Raton, FL: CRC Press/Taylor & Francis Group.

Sperber, W. H. (2001). Hazard identification: from a quantitative to a qualitative approach. *Food Control*, *12*, 223–228. Retrieved January 18, 2018 from https://en.wikipedia.org/wiki/Hazard#cite_note-Sperber-1.

United Nations International Strategy for Disaster Reduction (UNISDR). (2017). *Terminology*. Retrieved January 17, 2018 from https://www.unisdr.org/we/inform/terminology.

Waugh, W. L. Local emergency management in the post-911 world (pp. 4-21). In W. L. Waugh & K. J. Tierney (Eds.). *Emergency management: Principles and practice for local government*. Washington, DC: ICMA Press.

Wright, K. (2011). *Filling a critical gap in end-to-end tsunami warning in the Southwest Pacific: A pilot project in Samoa to create scientifically robust, community-based evacuation maps*. Lower Hutt, N.Z: GNS Science.

Yan, N., & Hamada, M. (2012). Evacuation behaviors in the 2011 Great East Japan Earthquake. *Journal of disaster research, 7*, (7), 458-467.

Yin, R. K. (2014). *Case study research and design methods*. Newbury Park, CA: Sage.