Collaborative networks have long been at the heart of emergency management. The deliberate linking of organizations and individuals with different specialized expertise leads to a better management of disasters and crises (Nivolianitou and Synodinou, 2011). Increasingly, and in the spirit of the Hyogo Framework for Action (Larsen et al., 2011), emergency management networks include groups from civic society or industry purposefully integrated into existing frameworks (Becken and Hughey, 2013). The existence of strong social networks has also been recognized as a key indicator of community resilience (Cutter et al., 2008). Such networks can assist in recovery, mitigation or lobbying (for example to shape government action and policy) and marketing (Scott et al., 2008). Ritchie (2009) acknowledged the importance of networks and stakeholder collaboration in responding to tourism crises and disasters and identified limited research on this important topic. Research on recovery from the Indian Ocean tsunami in 2004 in Thailand found that tourism stakeholders with influential networks recovered much faster than those left to their own devices (Larsen et al., 2011).

The role of networks was equally important in the aftermath of the Christchurch (New Zealand) earthquake on 22 February 2011 (Becken, 2012). The earthquake, which was an aftershock to the 4 September 2010 earthquake, killed 185 people and caused widespread damage to infrastructure and to buildings already weakened by the previous earthquake and aftershocks. The epicentre of the February earthquake was 10 km south-east of Christchurch and 2 km west of Lyttelton. It was 5 km deep and resulted in extreme levels of ground accelerations of up to 2.2 times gravity. This resulted in the central business district (CBD) being cordoned off for almost 2 years.

* E-mail: s.becken@griffith.edu.au

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Most of the hotels and other tourism businesses operated from the inner city pre-earthquake, and as a result a large number of hospitality jobs were lost in Christchurch. The establishment of a Visitor Sector Response Group immediately after the earthquake, including national-level agencies from the public and private sectors, was a critical step in enabling an effective response and laying the foundation for recovery (Becken, 2012).

Research conducted in late 2011 examined issues faced by tourism businesses in recovering from this natural disaster. A survey collected information on key issues and challenges on the stakeholder network before the disaster and during recovery. Altogether, 64 respondents contributed via an online survey. Most respondents were accommodation providers, followed by activity operators, with the majority being small businesses. Results presented in this chapter provide insights into key business tasks required for disaster recovery, the importance of communication within the destination and the need for strong leadership, clear direction and effective stakeholder networks. The stakeholder networks before and after the earthquake are compared and a number of changes noted, with non-tourism businesses becoming more central. The importance of Christchurch Canterbury Tourism as a key agency was evident for businesses’ daily activities, whereas ‘new players’ such as insurance companies, the Earthquake Commission and even the Canterbury City Council were more prominent in dealing with businesses in the recovery from the earthquake. Having effective networks and strong partnerships in place was seen as an important measure that increases disaster resilience. This case study provides a tourism stakeholder perspective on the role of networks in disaster recovery.

13.2 Inter-organizational Networks and Disaster Management

Disaster management embodies the need for groups of people to coordinate their actions and work collaboratively to address a problem that is beyond the ability of any one individual or organization to respond to. Effective disaster management requires these stakeholders to work together, communicating to identify response priorities, assembling equipment and personnel to undertake immediate emergency rescue tasks, and developing and implementing plans for the longer-term recovery. During the initial stages of a disaster response, it is necessary to make complex decisions rapidly, without full information and where life or death is involved. In such situations, decision making is often centralized with an individual or small group representing key organizations taking responsibility.

In the Christchurch earthquake, the National Crisis Management Centre in Wellington became the centre for coordination and the Civil Defence organization became the lead agency supported by New Zealand Police, Fire Service, Defence Force and many other agencies and organizations. This organizational response provides an excellent example of a well-formulated, hierarchical management structure where decision making authority is centralized and appears to have worked very effectively in the hours and days after the earthquake. Prior to the earthquake, these organizations would have conducted joint training exercises and there were clear lines of communication and authority. Such prior experience, training, and common protocols and methods provide a cohesive structure within which to respond.
The initial emergency response task is followed by an intermediate stage where ‘the short-term needs of people have been addressed and the main focus of activity is to restore services and the community to normal’ (Faulkner and Vikulov, 2001: p. 338). The emergency is over and the immediate threat to life and property has been addressed. This stage leads into a process of long-term recovery, the repair of damaged infrastructure and the restoration of business and consumer confidence. In the later stages of long-term recovery a variety of civil organizations become involved including the local city council, insurers, business owners, and investment and promotion organizations. These organizations are not centrally coordinated, but instead constitute a loose network of players involved in more or less related tasks. This chapter examines the network of organizations involved in the longer-term recovery from the Christchurch earthquake. In particular, it examines the networks related to the recovery of the tourism sector and how these differ from networks in ‘normal’ operating conditions. An understanding of networks in a disaster situation is important not only for policy making, but also for managing information flow, which is crucial in disaster response and recovery (Becken, 2012).

Quarantelli (1988) discussed a social science perspective on crises and disaster and the importance of communication between organizations. The emphasis on the flow of information as a critical issue in crisis management leads to the idea of social network analysis as a means of analysing the structure of this ‘flow’ of information through communication channels. This is an important element of crisis recovery that needs to be further analysed. In the tourism literature, tourism crisis response has been discussed as involving a network of organizations (Scott and Laws, 2006; Scott et al., 2008), but there have been no empirical studies, a gap which this paper seeks to address using a quantitative approach as discussed below.

13.2.1 Two ways to study networks

From the sociological and anthropological points of view, networks form part of the structural tradition where researchers hypothesize that variations in the pattern of relationships surrounding social actors affect the behaviour of those actors, and correspondingly that people also consciously manipulate situations to create desired structures (Stokowski, 1992). The concept of a ‘network’ was developed by Barnes (1952) to examine ties between people in a Norwegian fishing village and to explain such key social processes as access to jobs and political activity. The network concept was then applied to social science and measures of network structure were developed (Bott, 1957). In America, ‘socio-metrists’ used network diagrams to represent interpersonal relations in small groups (Coleman, 1958), and such techniques were later used to study a variety of phenomena including communication, the diffusion of innovation and the spread of diseases.

A parallel development in the political science literature took a more ethnographic and qualitative approach (Rhodes, 1990, 2002). In this tradition, a network is more of a metaphor or ‘guiding concept’ that researchers use to examine how patterns of ties in social systems inform the allocation of resources and how problems are addressed. In this tradition, policy development in networks is considered too complex to be reduced to socio-metric diagrams. Thus, policy network research relies on
thick qualitative description of relationships, while inter-organizational network studies tend to be more numerical in nature. Dredge (2006) applied this approach to the context of local tourism organizations.

Today, these traditions combine and interact, creating opportunities for intellectual stimulation but also confusion. The term ‘network’ is used in everyday speech without precision as a definition of a particular phenomenon. The concept of a network has ‘blurry edges’ (Wellman and Berkowitz, 1988: p. 81) and may be confused with the term ‘networking’ in a business context. This problem of definition of the term ‘network’ is not unique to tourism research and has been identified as applicable to network studies in the wider management literature. This wide usage has led to a diverse literature where the term ‘network analysis’ is used as a metaphor, homology, paradigm or method (Wellman and Berkowitz, 1988) in different contexts. In this chapter the definition used is ‘a complex set of inter-relationships in a social system’ (Mitchell, 1969: p. 1).

13.2.2 Networks and crisis recovery in a tourism destination

Is network analysis suitable for the study of tourism crises? It is considered here that tourism is a network industry par excellence. Support for this claim is found in the definition of tourism as systems where interdependence is essential (Bjork and Virtanen, 2005) and collaboration and cooperation between different organizations within a tourism destination creates the tourism product (Pechlaner et al., 2002). In this way local alliances, agreements and other formal and informal governance structures help to compensate for the fragmented nature of a tourism destination. Buhalis (2000) indicated that most destinations consist of networks of tourism suppliers, and that the benefits of such networks lead to a more profitable tourism destination. A second reason for the study of crisis networks in tourism destinations is that they form a basis for collective action. In responding to a tourism crisis, many of the main resources of a tourism destination are community ‘owned’, and it is beyond the ability of an individual business to manage them. These may be natural resources, for example beaches or scenic outlooks, built resources, such as museums, art galleries and heritage buildings or intangible resources such as a destination’s reputation.

Network analysis can therefore deliver a number of useful outcomes for tourism crisis recovery studies. For example, it provides a means of visualizing complex sets of relationships and simplifying them so that they may be better understood, albeit imperfectly. This might be useful in promoting effective collaboration within a destination group, supporting critical junctures in destination networks that cross functional, hierarchical, or geographic boundaries; and ensuring integration within groups (Cross et al., 2002) following crisis recovery initiatives. The use of standard methods enables networks of relationships to be compared between destinations over time, thus allowing the study of dynamic situations as has been done here.

13.2.3 Inter-organizational networks in tourism destinations

Inter-organizational network theory helps understand the collective nature of organizational action, constraint and coordination within tourism. Indeed, tourism’s organization
in a country can be considered as a series of hierarchical organizational networks (Pearce, 1996). Alford (1998), for example, focused on how regional tourist boards seek to establish a market position, and how they benefit from networking with other sectors of the industry. In the context of sustainable tourism planning and development, Selin and Beason (1991) provided an early examination of the importance of inter-organizational relationships in tourism, focusing on alliances and collaboration. Lovelock (2001) discussed the importance of inter-organizational relationships, collaboration and cooperation. In fact a network approach to sustainability is necessary within an industry such as tourism, where a relatively large number of small actors with few resources cannot pursue sustainable development in isolation (Halme, 2001). A number of other studies of inter-organizational networks within a tourist destination are available (Selin and Chavez, 1995; Bramwell and Lane, 1999; Hall, 1999; Selin, 2000; Tinsley and Lynch, 2001; Bramwell, 2005; Buonocore and Metallo, 2005; Gibson et al., 2005; Saxena, 2005; Scott et al., 2008a; Beritelli, 2011; Zach and Racherla, 2011).

Network analysis and inter-organizational networks have not been applied in the context of recovery from a crisis, yet they are deemed to be important in a tourism context (Ritchie, 2009). Some studies have examined the need for resilience among tourist stakeholders during the recovery from SARS (Zeng et al., 2005) and the need to rebuild business after a tsunami (Sharpley, 2005). Yet, surprisingly, there has been no prior study that has looked at changes in tourism business networks after a disaster. Further, there have been no studies which have examined how issues or challenges in business recovery are inter-related through problem networks. This study attempted to examine these issues through an exploratory case study.

13.3 Case Study – February Earthquake in Christchurch

In the socio-metric approach adopted here there are three basic elements of interest: actors, relationships and resources (Knoke and Kuklinski, 1991). First, actors (called ‘nodes’ in formal network theory) perform activities in relationship with other actors and control network resources, exchanging information to facilitate this. In a tourism destination, these actors are heterogeneous in size and function, consisting of both commercial operators and coordinating organizations such as regional tourism organizations. In this study an online survey, using Qualtrics, was designed to collect information on the challenges and issues businesses face in recovery, and what their business networks were before and after the disaster. A draft questionnaire was sent to key experts from the tourism sector, including representatives from the Tourism Strategy Group at the Ministry of Economic Development, and tourism academics from other universities. The feedback on both content and wording was incorporated into the final questionnaire before it was sent out to tourism members in Christchurch and Canterbury.

The survey was distributed in partnership with the local regional tourism organization, Christchurch Canterbury Tourism (CCT). As part of a CCT electronic mail-out to its members on 14 November 2011, a hyperlink to the survey was provided, along with a cover message that explained the survey’s purpose and the benefit that knowledge about businesses’ issues would generate for everyone in the
region. A follow-up reminder was emailed on 23 November, but the response rate remained low. The CCT database comprises 2030 contacts, but only 64 members completed the survey. The last survey was completed on 10 December, and after this the survey was closed. Thus, the response rate was 3.2%, and the results cannot be considered representative of tourism businesses in Canterbury. However, since the 64 respondents provided great detail both on their networks and on other challenges they faced, the survey results can be used in an illustrative way to discuss the role of networks in disaster recovery.

Most respondents were accommodation providers, followed by activity operators and ‘other’ service providers including conference facilities, museums or tour guides. Further, 48 businesses employed fewer than five full-time staff, five reported 6–20 employees and 11 businesses employed more than 21 full-time staff. Most businesses which responded to the survey were still operating. Twelve reported some changes to their operations, and four businesses were no longer operating. Businesses were asked about their business partners or organizations with which they regularly had contact before and after the earthquake. The results were analysed with UCINET and NetDraw, which are freely available software packages that enable analysis and visualization of social networks (Borgatti et al., 2002).

Visualization helps to understand the location of actors in a network, and how they relate to each other (for more details see Scott et al., 2008b: p. 163). The elements of a social network that require visualization are the nodes, relationships, the positions of nodes and relationships in relation to one another and sub-networks or clusters. Nodes may be represented using different shapes and colours as a means of conveying information about their characteristics. Programs such as NetDraw allow node properties to be changed easily. Relationships between nodes are usually represented by line segments in a simple graph or arrows in a directed graph. The relative position of nodes and relationships are usually drawn in a two-dimensional ‘X–Y axis’ space. In this analysis, the positions are determined by the spring embedder technique (Eades, 1984). This is a heuristic for laying out arbitrary kinds of networks. The basic idea is to consider the nodes of the network to be repelling rings. Those nodes linked by relations are considered joined by a spring, and a positioning with low forces exerted on the rings is sought. The resultant diagram is then interpreted visually, as distances and directions provide useful information.

13.4 Results
13.4.1 Main issues network

By far the most important challenges for businesses is a reduction in tourism demand (mean value of 3.05, where 4 stands for major problem), with 66% of respondents considering this either a medium or a major problem (Table 13.1). All eight businesses that reported no problems with drop in demand were accommodation providers. Three of them provided additional commentary about the increase in business since the earthquake, one specifying that demand had gone up by 300%, most likely as a result of hosting clean-up crews and media representatives. Of those 24 respondents
who said that drop in demand was a major problem, half were activity providers. Another eight were accommodation businesses and five offered transport services. Comments made in writing related to the drop in demand from international visitors in particular, and the businesses’ reliance on offshore markets.

Clearly, each business could be associated with a number of problems and these are visualized in a so-called problem network. Figure 13.1 shows specific problems and businesses having that problem. The three problems (general downturn in business, marketing and cash flow) were central to the problems faced by businesses after the earthquake, with availability of information a lesser concern. The availability of public and private infrastructure and assets, government regulations and other problems were less central for the businesses in Christchurch.

There was some evidence for inter-relationships between problems. Obviously a drop in demand may cause cash flow problems for businesses. These may also be exacerbated by constraints to marketing, due to cash flow or the situation itself where operators cannot commence recovery marketing. The combination of decreased demand, limited cash flow and reduced marketing activity then can affect future cash flow. Understanding the underlying causes that may hinder long-term business recovery is therefore very important. For instance, with respect to general drop in demand, one operator suggested, ‘…trying to predict visitor patterns is difficult. Lack of accommodation is a major problem in attracting visitors from outside the region to stay and spend at an attraction.’ Another operator stated in relation to cash flow after the earthquake, ‘…insurance skyrocketed three times, which was not budgeted for, so cash flow has been an issue.’ Others noted the costs of repairing their businesses also affected their cash flow situation and ability to commit funds for marketing. As is suggested by these operators, attempting to conserve resources and maintain cash flow can be difficult when necessary costs are incurred for business continuity.

Some businesses reported that they had to reduce their marketing spend and activities due to cash flow, whereas one business had increased it. Several respondents commented that marketing was less necessary as demand was high; but these were the same businesses that did not experience reductions in tourism demand, perhaps as they were hosting clean-up crews or media representatives. Such substitution effects have also been found in other studies (Ritchie, 2009).

### Table 13.1. What are the main issues for tourism businesses?

<table>
<thead>
<tr>
<th>Issue</th>
<th>Not a problem (1)</th>
<th>Minor problem (2)</th>
<th>Medium problem (3)</th>
<th>Major problem (4)</th>
<th>Responses</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>General drop in demand</td>
<td>8</td>
<td>5</td>
<td>18</td>
<td>24</td>
<td>55</td>
<td>3.05</td>
</tr>
<tr>
<td>Information about the future</td>
<td>12</td>
<td>13</td>
<td>10</td>
<td>12</td>
<td>47</td>
<td>2.47</td>
</tr>
<tr>
<td>Cash flow</td>
<td>18</td>
<td>9</td>
<td>12</td>
<td>12</td>
<td>51</td>
<td>2.35</td>
</tr>
<tr>
<td>Marketing</td>
<td>23</td>
<td>4</td>
<td>15</td>
<td>9</td>
<td>51</td>
<td>2.20</td>
</tr>
<tr>
<td>Other infrastructure (e.g. roads)</td>
<td>23</td>
<td>11</td>
<td>10</td>
<td>6</td>
<td>50</td>
<td>1.98</td>
</tr>
<tr>
<td>Infrastructure/assets within business</td>
<td>29</td>
<td>12</td>
<td>3</td>
<td>6</td>
<td>50</td>
<td>1.72</td>
</tr>
<tr>
<td>Regulation</td>
<td>27</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>45</td>
<td>1.64</td>
</tr>
<tr>
<td>Other issue (see below)</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>16</td>
<td>2.81</td>
</tr>
</tbody>
</table>

Table 13.1. What are the main issues for tourism businesses?
13.4.2 Inter-organizational networks

The most important organizations that tourism businesses deal with on a day-to-day basis are CCT, Tourism New Zealand and accommodation businesses. The Tourism Industry Association, other business associations and transport providers are also important, with 13 nominations each (Fig. 13.2). The organizations that businesses dealt with after the earthquake were very different. CCT is still important, but insurance companies and the Earthquake Commission have also become important agencies. A large number of other organizations also emerged, notably the Christchurch City Council which appears to be relatively more important compared with daily business before the earthquake. Dealing with other tourism businesses has become relatively less important. Other organizations mentioned as relevant included: Recover Canterbury, GrabOne, Grow Mid Canterbury, Enterprise North Canterbury, Tourism Exchange and a number of individuals.

The central actors were mapped for the normal business network (Fig. 13.3) and the recovery network (Fig. 13.4). As may be expected, the key actors for normal operations are CCT, Tourism New Zealand and accommodation operators. During recovery operations a different core group of central organizations is found, including the Earthquake Commission, Christchurch Earthquake Recovery Authority (CERA) and insurance companies.
A comparison of the normal and the recovery networks in Figs 13.3 and 13.4 indicates that there are fewer actors in the recovery network. The data showed that fewer businesses reported interaction with other organizations in the recovery, and those that did indicate contact with others also named fewer organizations compared with their normal business operations. Thus, limited tourism activity after the earthquake appeared to result in a temporarily reduced network. Potentially, however, individual organizations within this reduced network became relatively more important; for example, insurance companies are likely to be essential for the recovery of some businesses participating in this research. The normal network may be resurrected once recovery is complete; however, more research on such transitions would be beneficial.

For those organizations involved in both the normal and the recovery network, such as CCT, this means that they have to manage a parallel approach for business-as-usual (including marketing activities) and ongoing recovery. This requires managing different communication flows and information material. The more centralized
Fig. 13.3. Normal actor network. ITOC, Inbound Tour Operator Council; MED, Ministry of Economic Development.
pattern of the normal network, which clearly highlights a small number of key organizations compared with the recovery network, possibly indicates the highly individualized nature of relationships following the earthquake. This is not surprising, as each business situation is likely to differ, and systems are not as streamlined as those of day-to-day activities during normal times.

While this research did not focus specifically on the qualitative nature of relationships, results of one question about the value of contact with different organizations are given in Table 13.2. Contact with accommodation providers and CCT was generally considered to be valuable in the recovery process, as well as contact with insurance companies, other tourism businesses and Tourism New Zealand. The City Owners Rebuilding Entity (CORE, a collective of nearly 200 property owners who developed, owned and managed buildings in the CBD) was seen as less useful or relevant, as were the New Zealand Trade and Enterprise and the Canterbury Development Corporation. A number of comments suggested that in terms of recovery, but also for better preparedness, partnerships with others were important or needed to be improved to reduce the impact of natural disasters. ‘Strong leadership and clear direction’ were critical, and it was suggested that ‘we need to meet more often as a local group to better promote what we have to offer as a combined local tourism industry’.

Fig. 13.4. Recovery actor network. CERA, Canterbury Earthquake Recovery Authority.
13.5 Conclusion

This chapter has explored the role of networks and network analysis in the context of disaster recovery at a tourist destination. The key issues faced by Christchurch businesses after the February earthquake were a general drop in demand, reduced cash flow and limited information about the future, including aftershocks, infrastructure development and recovery policies. An issue network analysis highlighted how some problems are more related to each other than others. For example, the challenges of reduced demand and cash flow are naturally closely related. Questions around marketing were also at the core of the issue network and in close proximity to drop in demand and cash flow. Understanding the connections between different problems, including cause and effect relationships and potential feedback effects, is important for developing support programmes and policies. The visualized issue network could serve as a basis for further in-depth research to better understand the nature of relationships.

The analysis of normal versus recovery networks has highlighted a number of important issues. First, the networks differ considerably in terms of the key organizations involved, the number of nodes (i.e. organizations) and the overall shape of a less ‘centralized’ and more ‘individualized’ network for recovery compared with business-as-usual. More research on how networks change in response to a disaster, and whether or when they return to pre-disaster networks, would be beneficial. It is possible that some relationships that were important before a disaster may disappear (e.g. if a particular company goes out of business), whereas others that were forged to respond to the disaster may persist in the longer term, because new opportunities have emerged.

The post-disaster network showed that, clearly, businesses have to work with different organizations to recover and ensure business continuity (Pacific Asia Travel Association, 2003), most notably their insurance company. The literature provides insights into a number of business continuity strategies, with the most widely adopted being the turnaround strategy. Achieving a successful business turnaround can involve any or all of the following actions: selling off assets to raise cash, launching efforts to boost revenues, reducing costs and using a combination of these efforts (Chowdhury, 2002). Two most effective strategies remain increasing revenue and reducing costs (Viljoen and Dann, 2000; Johnson et al., 2005). The analysis in this chapter highlights that both of these are challenging in an environment of reduced tourism activity and increased operational costs (e.g. as a result of insurance premiums).

Observed adjustments to improve turnaround in this case study included reducing marketing spend or increasing it, reducing staff numbers and targeting new markets. The accommodation providers, in particular, benefited from an increased demand by recovery workers, as well as displaced residents who needed short-term accommodation. More recently, attraction operators have managed to grow their domestic market customer base, for example by introducing attractive family packages, and to reduce their dependency on international tourists. The importance of leadership was highlighted, and the critical role of CCT in both networks reinforces the centrality of a regional tourism organization during normal times and those of crisis. This means that such tourism organizations should proactively include disaster preparedness and management activities into their long-term strategies, in addition to their core activities of tourism marketing. More research on how this can be achieved, or what the barriers might be, is recommended.
Using a network approach to understanding the salient issues that may constrain turnaround, their interconnectedness and the relationships between organizations is important for several reasons:

1. It indicates which issues are of most importance to stakeholders in helping to promote turnaround and recovery.

2. The inter-organizational network in particular highlights established contacts and the potential for tapping into these for an effective flow of information. For example, either the regional tourism organization or the insurance companies appear to be well placed to communicate preparedness measures for future disasters.

3. The analysis presented in this chapter can help make effective and timely decisions for resource allocation and policy development. For instance, in dealing with the Foot and Mouth Outbreak, Miller and Ritchie (2003) suggested that until the crisis was resolved and declared over, funding for recovery marketing may well have been wasted.

In this study, it appeared that traditional marketing strategies to attract international visitors would have been less effective, with resources being better allocated to rebuilding infrastructure and attractions (e.g. an earthquake museum) or developing new campaigns, for example for local residents.
References


Author Query:

[AU 1]: Please clarify the ellipsis (…) after ‘NZTE and Canterbury Development’ in the figure).