Harnessing resilience for tourism and resource-based communities

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Harnessing Resilience for Tourism and Resource-based Communities

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STATEMENT OF ORIGINALITY

I, Alexandra Rochelle Bec, declare that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

Signed ……...

Date ……5th December 2016……….
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PUBLICATIONS ARISING DURING THIS RESEARCH

Journal Articles

Conference Papers

Seminars and Invited Presentations
ABSTRACT

The tourism and resources sectors are two of Australia’s largest sectors, both significantly contributing to the national economy (Pham, Bailey, & Spurr, 2013a). Both have shaped regional development in Australia by redefining the economic and social structure of communities (Bebbington, et al., 2008; Cheer, 2013; Kumral, & Onder, 2012). Yet, the tourism and resources sectors are major forces of structural change that can dramatically impact regions, communities and the environment (Farrell, & Twining-Ward, 2004; Tonts, Plummer, & Lawrie, 2012). Although change is an inevitable process (Davoudi et al., 2012), the prominence of economic structural change within many Australian regions is shifting attention to the management of change within community systems (Connolly & Lewis, 2010).

The change management literature for regional development has presented a number of theories to deal with and respond to economic structural change, such as Asset-Based Community Development (ABCD) and Sustainable Development (Kretzmann & McKnight, 2007; So, 1990). However, such approaches have been criticised for not always considering the process of long-term structural change. Resilience is an emerging change management theory, which focuses on how change can be leveraged to achieve the most desirable outcome (Holling & Gunderson, 2002; Masten, 2001).

Resilience has been extensively applied as a change management approach within regional communities, stemming from a range of disciplinary interpretations. From a socio-ecological perspective, resilience applications often focus on crisis and disaster situations which encompass rapid forces of change. However, limited literature is available exploring resilience approaches to manage regional development and long-term structural change. The literature postulates that applications of resilience are limited, given the complexity of the term resilience and the limited availability of instruments to measure resilience to different forces of change (Holladay & Powell, 2012). Furthermore, there is minimal research that
examines regional development strategies by considering these two sectors simultaneously within a single community. By examining the dimensions of community resilience and the process of long-term structural change, this research aims to explore how resilience can be harnessed to address long-term structural change driven by the tourism and resources sectors in Australia as both sectors create opportunity and disruption.

This research employed a quantitative, sequential mixed mode approach using two case studies. Through this method, the research seeks to devise an instrument to measure community resilience to long-term structural change. Using the developed instrument, the research then seeks to measure the resilience of different community segments, as well as explore possible guidelines to build resilience within the two regions, through the use of a resident survey.

The results of this research have led to the development of instruments to measure resilience to long-term structural change. Multiple instruments were required to measure different facets of community resilience, resulting in three scales developed to measure the residents’ perceptions of change, a scale to measure the emotional stability of residents, and an index to measure resilience across the broader community system. The instruments provided insight into the resilience of specific community groups, where it was found that the level of community resilience was largely influenced by the emotional stability of individuals. It was also identified that men were found to be more resilient than women, particularly in resource-based communities, due to skills being more adaptable and transferrable in predominantly male dominated industries. Comparisons between tourism and resource-based communities are also made, revealing the resources sector to have a greater negative impact on the emotional stability of community members, resulting in lower levels of community resilience. The findings also uncovered potential guidelines to build resilience within the two regions, specifically focusing on improving economic diversification, stakeholder cooperation, and communication and planning.
This research has advanced the resilience literature as a tool for managing long-term structural change within tourism and resource-based communities. The research contributes instruments that can be used by regional planners to assess the level of resilience within the community, to identify strengths and vulnerabilities within the community system. The development of instruments to measure resilience to long-term structural change also has methodological implications for future research. The guidelines uncovered within this research also have implications for policy makers, particularly for long-term planning and change management.

**Keywords**

Resilience; structural change; tourism; resources sector; community
GLOSSARY OF ACRONYMS AND DEFINITION OF KEY CONCEPTS

**ABCD**- Asset-Based Community Development

**CDD**- Community Driven Development

**DIDO**- Drive-in-drive-out

**FIFO**- Fly-in-fly-out

**Community**\(^1\) - a geographically defined social unit

**Community Resilience**\(^2\) - the ability to take purposive and reflexive action to harness adaptive and transformative capabilities to address change or disturbance

**Complex System**\(^3\) - a system which has multiple sub-systems interacting, often forming a hierarchical structure

**Long-term Structural Change**\(^4\) - Prolonged exposure to change resulting from when the functioning of an industry, market or system changes or a new entity emerges

**Resilience**\(^5\) - a system's ability to withstand and respond to change

**Resources Sector**\(^*6\) - All activity directly and indirectly related to the exploration and mining of resources and other resource-related industries

**System**\(^7\) - an interlinked network of parts exhibiting synergistic properties, which form a complex or organised whole

**Tourism Sector**\(^*8\) - All activity directly and indirectly related to the tourism industry

\(^*\) References made to the tourism and resources sectors include both direct and indirect stakeholders, businesses and organisations of each sector.

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\(^1\) Chaskin (2008)
\(^2\) Benson and Garmestani (2011a); Folke, Carpenter, Walker, Scheffer, Chapin and Rockstrom (2010); Ruiz-Ballesteros (2011)
\(^3\) Bradshaw (2000)
\(^4\) Laitner (2000); Perez (1983)
\(^5\) Adger (2000)
\(^6\) Bishop, Kent, Plumb and Rayner (2013)
\(^7\) Flood and Jackson (1991)
\(^8\) Morrison and Teixeira (2004)
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“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change.”

Charles Darwin
1 CHAPTER ONE: INTRODUCTION TO THE RESEARCH

1.1 Introduction

Change is an inevitable process and can be incremental or abrupt, positive or negative (Davoudi et al., 2012; Parry, Arnell, Hulme, Nicholls, & Livermore, 1998). Economic structural change is becoming prominent within many Australian regions, shifting attention to the management of change within community systems (Connolly & Lewis, 2010). This thesis examines the concept of resilience and how it can be harnessed by regional communities to address long-term structural change driven by the tourism and resources sector in Australia. Harnessing community resilience is difficult to define, as it refers to the acquisition of an intangible concept. However, for the purpose of this research, harnessing resilience will refer to resilience thinking and planning, under the resilience theory framework, being adopted and embraced. Chapter One introduces the present research, firstly by presenting the background to economic structural change from a regional development perspective. Following this, the chapter details the rationale of this research and presents the research aim. Next, a summary of the research design, specifically outlining the method, are described. The significance of this research is then identified, outlining the theoretical, methodological and practical contributions. Finally, the key definitions of the research are presented, followed by an overview of the thesis structure and the conclusion of the chapter.
1.2 Background to the research

1.2.1 Regional development

The term ‘community’ can have multiple meanings and is not necessarily confined to space or place (Cox, 2000). However, the most relevant interpretation of a community for the context of this research is a geographically defined social unit (Chaskin, 2008). Communities can have multiple, overlapping groups interacting within the one setting that can cross multiple geographical, ecological and jurisdictional boundaries (Barham, 2001; Dredge, & Hales, 2012). For the present research, the community is considered to be the permanent residents of a region within the boundaries of the local government as specified by the Australian Standard Geographic Classification (ASGC), a branch of the Australian Bureau of Statistics (ABS). A community has been described as a complex system, meaning they have multiple sub-systems interacting, often forming a hierarchical structure (Bradshaw, 2000).

Regional development and community development underpin the structure and dictate the direction of regions and community systems, as they seek to inform future practices (Escobar, 1995; Szajnowska-Wysocka, 2009). Although sharing similar foundations, regional and community development have inherently different roles in the development of communities. Broadly, regional development is the provision of aid and assistance to regions that are less economically developed, to reduce economic disparities (Etzkowitz, & Klofsten, 2005; Tomaney, 2010), and as such is more associated with the long-term transformation of a region (Escobar, 1995). Regional development primarily has an economic focus, with the premise that economic drivers are required for a region to achieve social and environmental development objectives. Community development, on the other hand, looks at development at the local level, and the mechanisms which can be leveraged to strengthen civil society to achieve social, economic and environmental
objectives (Bhattacharyya, 2004). Although regional and community development are distinctly different, they are interconnected. However, community development is influenced by regional development (Pike, Rodriguez-Pose & Tomaney, 2006), thus the focus of the discussion centres on regional development.

Traditionally, regional development policy was driven by top down, supply side governance structures, with a ‘one size fits all’ approach, resulting in unbalanced policies (Barca, McCann & Rodriguez-Pose, 2012). Over the past few decades the field of regional development has undergone rapid and dynamic change, with approaches changing and adapting to migration patterns and political influences (Beer, Clower, Haughtow & Maude, 2005; Szajnowska-Wysocka, 2009). Neoliberalism underpins regional development, as designated by a core focus on the economic livelihood of local communities (Beer et al., 2005). However, more attention is being given to a concept known as ‘regionalism’ (Deas & Ward, 2000; Rainnie, & Grant, 2005). Regionalism aims to incorporate regional stakeholders into the governance of regional development, aiming to promote locally designed strategies that mobilise regional potential and stimulate local economic growth (Rainnie & Grant, 2005).

Although regional development retains an economic focus, a core priority has focused on accessing under-used economic potential to strengthen social cohesion, seeking both economic and social improvement (Tomaney, 2010). This has shifted the focus of regional development literature towards the discipline of geography, with studies exploring the spatial dynamics of the region (Barca et al., 2012; Tomaney, 2010). Place-based regional development integrates people and place into the focus of regional development, as well as the interactions between geography and institutions shaping regions, which is the formal and informal organisations (Barca et al., 2012; Walsh, 2001).
Importantly, existing literature notes that understanding the geographical context, including the social, cultural and institutional characteristics, is integral to establishing the direction of development and the capabilities of the region to achieve development objectives. Place-based approaches focus on mobilising regional assets and identifying strategies for local growth (Barca et al., 2012; Etzkowitz & Klofsten, 2005). For instance, place-based approaches tackle the underutilisation of skills, knowledge and experiences, in addition to reducing the social exclusion, by promoting the interaction of local groups and external stakeholders (Barca et al., 2012).

Within Australia, regional development retains a strong economic focus to drive strategic policy initiatives (Beer et al., 2005). In recent years, regional development has extended to focus on economic diversification (Miller, van Megen & Buys, 2012; Neffke, Henning & Boschma, 2011). Government policy has encouraged regions to diversify their industry base, enabling multiple economic sources to contribute to the region and drive development (Florida, Mellander & Stolarick, 2008; Iyer, Kitson & Toh, 2005). For many Australian regions, the tourism and resources sectors have been two sectors that have largely contributed to regional development (Bebbington, Hinojosa, Humphreys Bebbington, Burneo, & Ximena, 2008; Kumral, & Onder, 2012). The presence of these two sectors, specifically the intersection with Australian regional development, is further elaborated in Section 1.2.2.

1.2.2 The tourism and resources sectors: Intersections with regional development

The tourism and resources sectors can be major forces of structural change, having an effect on regions, communities and the environment (Farrell, & Twining-Ward, 2004; Tonts et al., 2012). As mentioned in Section 1.2.1, both the tourism and resources sectors strongly contribute to the Australian economy (Pham et al., 2013a). These two
sectors have aided in diversifying the Australian economy (Cheer, 2013; Miller, et al., 2012), have assisted to balance the fluctuations of each sector (Neil, & Tykkylainen, 1998), and have shaped regional development by redefining the economic structure of communities (Bebbington, et al., 2008; Cheer, 2013; Kumral, & Onder, 2012). Tourism is a key part of the economy for 84 regions in Australia (Tourism Research Australia, 2012), whilst the resources sector contributes to 92 Australian regions (Roarty, 2010). Furthermore, more than 70 Australian regions have both the tourism and resources sectors as part of their economic structure (Australian Bureau of Statistics; 2012; Tourism Research Australia, 2012). With approximately 350 regions across Australia (Australian Bureau of Statistics, 2012), it is evident that these sectors are prominent for Australia’s economy and across regional Australian economies. It is likely that the tourism and resources sectors will be a part of the economic structure for more Australia regions in the future. For instance, the richness of Australia’s minerals across the country has led to further resource exploration within more Australian regions (Korsch & Doublier, 2016; Prior, Guirco, Mudd, Mason & Behrisch, 2012). Tourism is a commonly explored sector for many regions when decline is experienced within another sector (Pham, Bailey & Spurr, 2013a; Vargas-Sánchez, Plaza-Mejia & Porras-Bueno, 2009). Given the challenges currently facing the resources and agricultural sectors, tourism may be viewed as a viable alternative for many regions.

When discussing the tourism and resources sectors in relation to regional development, scholarly debate has identified potentially competing objectives, thus generating conflict (Pham et al., 2013a). For example, in the past the strength of the resources sector has contributed to the strength of the Australian dollar. Consequently, this tends to decrease tourism visitation due to the heightened expense of Australia compared with other destinations (Pham et al., 2013a). The tourism and resources sectors
also compete for resources. Natural resources are the primary source of conflict, particularly in terms of the use of the natural environment (land and marine). The natural environment underpins the attractiveness of destinations within Australia, yet the protection and conservation of natural resources is in direct opposition to the manipulation of the environment created by the mining sector (Forsyth, Dwyer, & Spurr, 2014). Nevertheless, each sector makes a significant contribution, both positive and negative, to regional development (Binns, & Nel, 2002; Hall, 2007; Storey, 2001). Despite the contribution of each sector, communities within regions often have a limited capacity to control the development which takes place (Cheer, Reeves & Laing, 2013; Garvin, McGee, Smoyer-Tomic & Aubynn, 2009; Hilson, 2002).

The tourism and resources sectors have been identified as significant forces of transformational change, specifically given the changing nature of the sectors and the sensitivity of environments (Kemp, 2010; McLennan, Ritchie, Ruhanen & Moyle, 2014; Singh & Singh, 1999). Ultimately, the prolonged exposure to the changes induced by the sectors creates long-term structural change for regions and communities (Farrell & Twining-Ward, 2004; Tonts et al., 2012). Developing sustainable management approaches for each sector has been widely discussed in the development literature (Azapagic, 2004; Hilson & Murck, 2000; Sharphey, 2000; Singh, 2003). However, the conflict between the tourism and resources sectors has presented many challenges for regions to manage long-term structural change at a regional level. Structural change is defined as an economic condition that occurs when the functioning of an industry, market or system changes or a new entity emerges (Laitner, 2000; Perez, 1983). Long-term structural change is when there is prolonged exposure to these changes, evident over a period greater than ten years (Perez, 1983).
There are a number of factors that initiate structural change, such as economic development, shift in global investments, changes to resource availability, technological development, or political changes (Connolly & Lewis, 2010; Downes & Stoeckel, 2006; Perez, 1983). Whilst structural change can be both positive and negative, there are challenges which arise for regions which contend with prolonged structural change, as well as structural change within multiple sectors (Courvisanos, 2001; Laitner, 2000). Long-term exposure to structural change that is not adequately managed can have negative implications for a region and the community members. For instance, Courvisanos (2001) acknowledges community instability as a significant repercussion of long-term exposure to change. Community instability can lead to community problems associated with emotional wellbeing, lack of unity and connectivity among community members, poor use and allocation of resources, and an inability to identify and address system risks and vulnerabilities (Courvisanos, 2001; Davoudi et al., 2012). This situation is particularly evident for communities that contend with change from both the tourism and resources sectors, thus emphasising the need to explore approaches to managing long-term structural change for communities.

1.3 Rationale for this research

Change is inevitable (Davoudi et al., 2012), yet in many instances, the process of change is viewed as being problematic, due to a lack of preparedness or an inability to manage the force(s) of change (Pollard & Hotho, 2006). More specifically, long-term structural change can be difficult to address and manage due to cyclical processes that are often established in the evolution phase (Perez, 1986) and the embeddedness of sectors in regional and community development activities (Beer et al., 2005). However, positive impacts can result from changes to the structure of the community, presenting both
opportunities and challenges for the effective utilisation of the change. The difficulty in managing change is particularly evident within communities at the regional level due to the different levels of governance influencing the community's ability to address change (Courvisanos, 2001). This highlights the need for planning strategies to recognise and accommodate the inescapability of change within this context.

As the tourism and resources sectors are actively used as an economic development strategy for a significant proportion of Australian regions, there is a growing need to manage the long-term structural change these sectors create. The change management literature for regional development has presented a number of theories to deal with and respond to economic change, such as Asset-Based Community Development (ABCD), Community Driven Development (CDD) and Sustainable Development (Kretzmann & McKnight, 2007; Mansuri & Rao, 2004; So, 1990). However, such approaches have been criticised for not always considering the process of long-term structural change. Thus, they are limited in effectively addressing the force of change and managing the outcomes, both of which are crucial for building long-term resilience to economic structural change.

To overcome such limitations, the concept of resilience is growing in prominence in a regional development context (Benson & Garmestani, 2011b). Studied for decades in disciplines such as ecology, psychology, engineering and sociology, ‘resilience’ can be broadly defined as a system's ability to withstand and respond to change (Adger, 2000). Resilience has been readily and widely adopted by practitioners as it can recognise the process of change, thus enabling different systems to effectively manage change(s) (Holling & Gunderson, 2002). Regardless of change being considered positive or negative, resilience focuses on how that change can be leveraged to achieve the most desirable outcome (Masten, 2001), making it an ideal approach for regional development.
However, limited literature is available exploring resilience approaches to managing regional development and long-term structural change, with scholars identifying that further research is required in this area (Hill, Wial & Wolman, 2008; Simmie & Martin, 2010).

Not only are resilience approaches to long-term structural change limited, from a regional development perspective, research on change driven by the tourism and resources sectors often considers each sector as mutually exclusive and not a mutually linked part of the broader system (Pham et al., 2013a). Consequently, there is scant knowledge surrounding intersections between the tourism and resources sectors. A segregated approach can inhibit the sector’s ability to coexist, reducing economic cohesion within the region (Moyle, McLennan, Becken & Brown, 2014). Extensive literature has thoroughly discussed each of the tourism and resources sectors at a regional and community level, exploring potential strategies and opportunities that can be utilised to manage change induced by each sector (Andereck, 2000; Beeton, 2006; Sharma, 2004; Storey, 2001). Expanding and developing existing strategies to consider the two sectors together can progress change management approaches to be more applicable for the regional economy as a whole. Previous studies have explored strategies for managing the impacts the two sectors have on one another (Pham et al., 2013a), yet further research is needed to develop strategies which consider the two sectors together within a single community system, particularly to address long-term structural change.

1.4 Research aim

The application of resilience theory to long-term structural change has not been adequately explored within the literature, specifically in relation to change driven by the tourism and resources sectors. Therefore, the aim of this research is to examine the
resilience of regional communities in order to provide direction for building resilience to long-term structural change driven by the tourism and resources sectors. Further objectives of this research, derived from a review of gaps in extant knowledge, are presented in Section 2.5 of Chapter Two.

1.5 Research design

Section 1.5 provides an overview of the method employed within this research. A more detailed discussion of this method is presented in Chapter Three. Drawing from the dialectic philosophical paradigm, a quantitative mixed mode methodology was employed for this research. A comparative case study approach is the overarching method, as it is a highly suitable approach for empirical enquiry investigating a contemporary phenomenon within its real life context (Yin, 2009). For this research two case study regions were selected that demonstrate uniquely different dependencies on the tourism and resources sectors. The case study selection process and an overview of the selected regions are discussed in greater detail in Section 3.5 of Chapter Three.

Within this broader case study approach, a quantitative, sequential mixed mode process was adopted to achieve the aim and objectives of this research (refer to Figure 1). Stage One comprises an analysis of previous studies to select the measurement tool and identify indicators for the instrument. Following Stage One, Stage Two employs the Delphi technique to select and refine appropriate indicators for use in the measurement tool. Stage Three consists of a resident survey, used to apply the indicators developed in Stage One and Stage Two. Using the established indicators, the survey is used to measure the resilience of community segments. Stage Three sought to uncover guidelines for building resilience to long-term structural change to address vulnerable areas of the region. Finally, Stage Four involves analysis of the survey data. Through data analysis,
the scale items and the fit of the model contributes to validating the proposed index used to measure community resilience to long term structural change. Using this tool, resilience within each region was measured, with guidelines unearthed for building resilience into the regional development process.

Figure 1: Research design

1.6 Contributions to literature

This research makes a theoretical contribution to the literature within the fields of regional development and change management, with methodological and practical implications. Accordingly, the research expands the conceptual understanding of resilience as a tool for managing change within the development process of communities. A more theoretically refined holistic understanding of resilience, development and structural change is delivered within this research through the development and application of a conceptual model. This has subsequent implications for the practical
aspects of regional planning, development, and policy makers, particularly for long-term planning.

1.6.1 Theoretical contributions

The research also makes theoretical contributions to existing knowledge in the intersection between resilience and regional development, by adapting a multi-sectoral approach through exploring change driven by both the tourism and resources sectors. Extensive knowledge surrounds the benefits and concerns of both the tourism and resources sectors for regional communities. From the perspective of tourism there is an abundance of literature related to economic impacts (Mason, 2008), environmental impacts (Hardy & Beeton, 2001; Mbaiwa, 2003), socio-cultural impacts (Mbaiwa, 2003; Moyle, Weiler & Croy, 2012) and strategies for communities to achieve sustainable tourism outcomes (Byrd, 2007; Getz & Timur, 2005; Singh, 2003). There is also a parallel body of knowledge related to community perceptions of the impacts of mining, similarly to tourism, across the triple bottom line (Bec, Moyle & McLennan, 2016). Research in this area is broad, including for example, the benefits of mining to regional development and the environmental impact of the resources sector (Kitula, 2006; Tiwary, 2001). Research related to the two sectors is, however, mostly mutually exclusive with minimal studies undertaken that address the intersection between the tourism and resources sectors, often treated in policy silos. The present research synthesises two distinct, yet related, bodies of literature to provide a more comprehensive understanding for overcoming economic path dependence. Economic path dependence is the process of structural lock-in to an economic sector which occurs when regions are limited by past decisions (Liebowitz & Margolis, 1995).

Nevertheless, there are a burgeoning number of studies which recognise the intersection between the tourism and resources sectors, and the impact this has on
regional development. The conflict between the two sectors is a prominent theme of the existing studies (McLennan, Moyle & Bec, 2015; Pham, Bailey & Spurr, 2013b). Extant literature has explored the intersection by incorporating aspects of the resources sector as a means of diversifying the tourism experience and increasing tourism demand (Cole, 2004; Edwards & Coit, 1996; Vargas-Sánchez, Plaza-Mejia & Porras-Bueno, 2009; Wanhill, 2000). However, there is minimal research that examines regional development strategies by considering these two sectors simultaneously within a single community, a conversation to which the present research seeks to contribute.

Furthermore, only a limited number of existing studies examine how tourism and resource-based communities harness resilience to manage long-term structural change and achieve local development objectives (Magis, 2010; Ruiz-Ballestros, 2011). Primarily, this research contributes to the resilience literature by expanding the understanding of resilience for different system structures and for different forces of change. To achieve this unique contribution, this research draws together the literature on evolutionary economic change theories, and in doing so, will further develop the concept of resilience within the dynamic and complex processes of change at a local community level.

The study also has practical implications for building community resilience to long-term structural change. To date, the treatment of resilience, particularly within community systems, has been largely conceptual (Berkes & Ross, 2013; Cochrane, 2010; Cutter et al., 2008b; Norris, Stevens, Pfefferbaum, Wyche & Pfefferbaum, 2008). Practical applications of resilience have focused on specific types of change and specific community systems (Mayunga, 2007; Paton, Millar & Johnston, 2001; Walsh, 2007). Additionally, resilience applications have been limited to addressing one force of change, often a reactive approach applied to specific community groups who are the most affected
by change (Larsen, Calgaro & Thomalla, 2011; Ronan, Crellin, Johnston, Finnis, Paton & Becker, 2008).

The resilience framework developed within this research has further practical implications. The framework details a proactive approach to building resilience, with implementation both gradual and not reliant on the presence of a significant event or force of change to mark its implementation. Consequently, this enables resilience to be adopted as a proactive approach to change management, rather than being solely a response mechanism, common among previous practical applications (Biggs, Hall & Stoeckl, 2012; Larsen, et al., 2011). This research further expands the applications of resilience to different forces of change, with the framework enabling resilience to span beyond a single force of change. Furthermore, the instruments developed within this study to measure resilience assist in applying resilience to multiple forces of change, having methodological implications for future research.

1.7 Thesis structure

Chapter One has defined and described the background to the research, drawing attention to regional development, its intersections with the tourism and resources sectors, and change management approaches including resilience. The rationale was then highlighted, leading to the presentation of the aim of this research. Chapter One also provided an overview of the method employed within this research, as well as the study’s theoretical contributions. The introductory chapter concludes with an overview of the structure of the thesis.

Chapter Two formally introduces the concept of resilience and reviews this body of literature. The chapter commences by exploring the theoretical concepts that have shaped the understanding and interpretation of resilience. The resilience literature is then
synthesised, focusing on the early conceptualisations of the concept, followed by an overview of socio-ecological and community resilience interpretations. Specific attention is given to resilience within the tourism and resources sectors. The dimensions of community resilience are identified, followed by the presentation of a framework to further operationalise and expand applications of resilience, specifically to long-term structural change. Theoretical gaps are then highlighted, followed by a restatement of the research aim. The objectives of this research are then introduced at the conclusion of this chapter.

Chapter Three overviews the research method employed to achieve the aims and objectives of this study. The chapter commences by outlining the philosophical approach, followed by a review of previous methods used in community resilience studies. Next, the chapter details the research design, consisting of a sequential mixed mode approach. Chapter Three then presents the case study selection process, followed by a brief overview of the case study regions. Finally, the sequential stages of the research are discussed, with core steps justified based on existing approaches.

Chapter Four and Chapter Five present the results from the analysis of the survey data. Chapter Four presents the quantitative results from the survey. The chapter begins by providing an overview of the results, outlining the respondent profile and perceptions of change. Next, the results of the exploratory and confirmatory factor analysis are highlighted, followed by the cluster analysis. Chapter Four then goes on to analyse the relationships between emotional stability, perceptions of change, resident demographics, and community resilience. Chapter Five presents qualitative findings which emerged from the results of the open-ended survey questions. The chapter is structured under the key guidelines that emerged from the thematic analysis.
Chapter Six presents a discussion of the results from each of the stages of analysis. The results are discussed in relation to each of the three research objectives and linked with the wider academic literature to support the interpretation of the results and clarify contributions to knowledge. Finally, Chapter Seven concludes the thesis by highlighting the contributions of the research. The final chapter also discusses the limitations and constraints of the research, followed by recommendations for future avenues of research.

1.8 Chapter summary

Chapter One has introduced the research, firstly by describing the background to the research area, drawing on regional development and change management approaches. Regional development strategies, specifically within Australia, have predominantly been underpinned by economic drivers. The tourism and resources sectors have been large contributors to regional development throughout Australian regions. However, this has resulted in significant structural change. Managing long-term structural change for regional development has seen the adoption of various approaches. Resilience is one highly regarded change management approach which focuses on how change can be leveraged to achieve the most desirable outcome (Holling & Gunderson, 2002; Masten, 2001), making it an ideal approach for regional development. Therefore, this research aims to examine the concept of resilience and how it can be harnessed to address long-term structural change driven by the tourism and resources sectors in Australia. The research design developed to address the aim of this research consists of a quantitative, sequential mixed mode approach using two case studies.

By undertaking this research, key theoretical contributions are evident. The present research progresses the understanding of resilience theory and expands
applications to address long-term structural change, theoretically contributing to the existing body of knowledge. The present research also has practical implications by providing a framework and developing an index to measure community resilience to expand resilience applications. To achieve the outcomes of this research, inquiry into resilience theory is needed. Therefore, Chapter Two presents a review of the literature underpinning this research, specifically pertaining to resilience theory.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Chapter One established the role of the tourism and resources sector for regional development. However, both sectors have generated considerable change for many communities, causing a need for communities to better manage this change, and overcome the implications mentioned in Section 1.3. As resilience is an emerging theory for community development and change management, Chapter Two undertakes an extensive review and analysis of existing literature on resilience theory. The literature review presents a theoretical framework which underpins this research and informs the research aim and objectives.

Chapter Two commences by exploring the theoretical concepts that have shaped the understanding and interpretation of resilience. The chapter then undertakes a detailed review of the resilience theory literature. The review focuses on the early conceptualisations of resilience, its intersections with adaptive capacity and vulnerability, and provides a detailed review of socio-ecological and community resilience literature. Following this, existing applications of resilience are explored, specifically focusing on applications for the tourism and resources sectors. As the present study is specifically exploring community resilience within the context of long-term structural change, community response strategies to long-term structural change are also examined.

The chapter goes on to present the dimensions of community resilience, followed by the policy and management approaches which have emerged from the literature as mechanisms to expand applications of resilience. Building on these approaches, a resilience framework is presented highlighting the interplay between resilience dimensions and system characteristics, to facilitate applications of resilience specifically
to long-term structural change. Following the presentation of the framework, the theoretical gaps which exist in the literature are presented. The aim and objectives of the research are then introduced, followed by the conclusion of this chapter.

2.2 Evolutionary concepts that shape resilience

Various definitions of resilience have emerged within the literature, each being influenced by the process of change within specific systems and the perceived optimal state of functioning (Carpenter, Walker, Anderies & Abel, 2001; Derissen, Quaas, & Baumgartner, 2011). The incorporation of traditional resilience concepts, such as stability and control, and the emergence of adaptive management concepts have created definitional issues (Gunderson, 2000). This is primarily due to the difficulty of applying the concept of stability within an organizational or industry context (Bhamra, Dani, & Burnard, 2011). The notion of stability itself leads to broader discussions on change management drawing from stability theories, such as Lyapunov theory, further increasing the complexity of the understanding of resilience (Reggiani, De Graaff, & Nijkamp, 2002). Consequently, this has resulted in the adoption of a number of resilience definitions, each displaying subtle differences. Therefore, the concepts and applications that have shaped resilience need to be explored in greater detail. In doing so, attention must be given to the different conceptualizations that have emerged within different disciplines.

Although the background to resilience is subject to considerable scholarly debate, three evolutionary change theories have contributed to shaping the structure of resilience theory: adaptive theory, chaos theory and transformation theory (Folke, Carpenter, Walker, Scheffer, Chapin & Rockstrom, 2010; Walker, Holling, Carpenter, & Kinzig, 2004). These three theories are systems theories and underpin present frameworks to
understand and explain the process of change within complex systems, such as those reflected in communities undergoing change. A system is a complex structure consisting of an interlinked network of parts exhibiting synergistic properties (Cumming, 2011; Flood, & Jackson, 1991). Resilience theory has built upon these evolutionary change theories by incorporating characteristics such as transformation and adaptation, to emerge as a theory in its own right (Folke, et al., 2010). Although resilience theory does not necessarily explain or control change, it focuses on understanding how change can be managed within different systems (Adger, 2000; Folke, et al., 2010). The literature presents a debate as to whether change is adaptive, chaotic or transformative (Gersick, 1991; McLennan, Ruhanen, Ritchie, & Pham, 2012). The process of change for adaptive theory, chaos theory and transformation theory is different, requiring slightly varied approaches to manage each type of change. Thus, each must be examined to understand how resilience theory perceives and manages change.

Adaptive theory refers to how a system gradually evolves or adapts to change, while maintaining the current structure of the system (Parry et al., 1998; Smit & Wandel, 2006). However, adaptive theory has been criticized for relying on the premise that a system has the capacity to adapt (Parry et al., 1998) and if it is unable to adapt, then change will result in the system being untenable. Resilience theory originally emerged from adaptive theory, but has distinct differences. For instance, resilience theory views system adaptations and the ability to build adaptive capacity to be a characteristic of resilient systems (Walker et al., 2004). However, resilience theory does not postulate that system adaptations are appropriate for all types of change.

In contrast to adaptive theory, chaos theory has emerged to understand nonlinear change within complex systems (Levy, 1994). Chaos theory refers to structural change that is random, complex and uncontrollable (Thiétart & Forgues, 1995). This perspective
alludes to disequilibrium, where there is a lack of a stable state, enabling a degree of flexibility within the understanding of change and how this affects the functioning of a system (Guastello, Dooley, & Goldstein, 1995; Thiétart & Forgues, 1995). However, chaos theory has been criticized for its lack of capacity to exhibit control over a system (Bolland & Atherton, 1999). Certain characteristics of chaos theory underpin resilience theory, such as the recognition of nonlinear change. Leveraging off chaos theory, resilience theory does not necessarily control change, rather it employs a flexible approach to change management. This suggests that systems that are inherently unstable and chaotic can still be resilient (Benson & Garmestani, 2011b; Holling & Gunderson, 2002).

Transformation theory on the other hand, suggests that in some instances change cannot be clearly distinguished as either adaptive or chaotic (Gersick, 1991). Consequently, transformation theory is the synthesis of both adaptive and chaotic change concepts (McLennan, Ruhanen, Ritchie & Pham, 2012). System transformation is about structural and cyclical change through disequilibrium, where a new regime is entered (Loye & Eisler, 1987; Skyttner, 2006). Thus, transformation theory recognizes change to be occurring through a cyclical pattern, allowing a system to undertake multiple transformations to address change. Transformation theory is often considered as being on the edge of chaos (Lichtenstein, 2000), but there is an element of control, management and direction of the change that distinguishes transformative change from chaotic change.

The general premise of resilience theory aligns closely with transformation theory and its cyclical concepts. Resilience theory follows a similar cyclical process that enables the system to reorganize in the face of change (Holling & Gunderson, 2002). Resilience theory is commonly explained through an adaptive cycle, which is discussed further in Section 2.3.8. This cycle does not converge to a state of equilibrium, rather it moves...
through states of growth, conservation, collapse (creative destruction), and reorganization (Davoudi et al., 2012; Holling & Gunderson, 2002). This enables a system to harness transformative or adaptive capabilities to address change and maintain the cyclical process. Ultimately, resilience brings together key change concepts and is an attribute of a system that determines its response to the change process. Section 2.3 delves into the key premises of resilience theory.

2.3 Resilience

2.3.1 Early conceptualisations of resilience

Resilience is not a new concept, with deep roots in engineering, medicine, psychology and education (Adger, 2000; Masten & Obradovic, 2006; Tusaie, & Dyer, 2004). Resilience theory gained widespread awareness during the 1970s in the field of ecology by Holling (1973). Initially, resilience was introduced as a concept to understand and measure the capacity of ecosystems and their ability to persist in the original state when subject to change or disturbance (Holling, 1973). The term originated from the Latin *resilire*, meaning ‘to leap back’. It has since evolved from being limited and specific in nature to being a broad and widely encompassing, multidisciplinary construct.

Although interpretations of resilience differ across disciplines, the premise of contemporary resilience stems from two different perspectives, ecological and economic (Holling, 1973, 2001). Ecological systems guided the initial interpretation of resilience (Holling, 1973). However, Holling’s (2001) later work within resilience viewed resilience from a structural economic perspective, largely influenced by evolutionary economics. This work mainly focused on organisational resilience. The rate at which change occurs is the key difference between these perspectives, and influences the approach which is undertaken to manage change. Ecological change can be perceived as incremental system
adaptations, resulting in a slower rate of change. Given this perspective on change, initial conceptualisations were primarily focused on maintaining the stability of a system and its ability to return to the optimal stable state after a disturbance (Carpenter et al., 2001). Alternatively, economic change is seemingly transformative in nature, as change is generally rapid and revolutionary (Holling, 2001). Resilience from this perspective evolved to recognise the inherent uncertainty of change and the complex structure of systems in response to change (Gallopin, 2006; Marshall, 2010).

2.3.2 Disciplinary orientation of resilience

Despite an array of resilience interpretations in the literature, there is a collective understanding that resilience is the ability of a system to manage disturbance and change (Berkes & Ross, 2013). However, system approaches to change management are vastly different between contexts and disciplines, resulting in differing interpretations of resilience (Carpenter, et al., 2001). Table 1 details the resilience definitions which are commonly adopted by disciplines. Traditional approaches to resilience primarily stem from scientific disciplines, including ecology, engineering, and physics. Equilibrium, which refers to a balanced physical state for a system (Holling, 1973), underpins resilience interpretations, as systems in equilibrium are believed to be resilient (Bergen, Bolton, & Fridley, 2001; Holling, 1973). The engineering literature provides the simplest understanding of resilience, where it is defined as the ability of a system to return to a steady-state or point of equilibrium after a disturbance (Bergen et al., 2001). From this perspective, resilience is measured by the system’s ability to resist and the speed at which the system is able to return to equilibrium (Davoudi et al., 2012). Ecological resilience, on the other hand, encompasses multiple points of equilibrium (Adger, 2003; Holling, 1973). In ecology, resilience focuses on the system’s ability to persist by absorbing and adapting to change (Adger, 2003).
The concept of resilience is becoming more widely accepted throughout a range of disciplines. Additionally, applications are also expanding across a range of systems. An equilibrium-centred view of resilience is not exclusive to science-based fields. Equilibrium also underpins resilience interpretations in psychology (Seery, 2011), disaster studies (Maguire & Hagan, 2007), economic geography (Adger, 2000), and environmental planning (Saavedra & Budd, 2009), amongst others. Equilibrium-based resilience stipulates that behaviour can be explained, predicted and monitored by control systems (Davoudi et al., 2012). The threshold is also explained as a linear and mathematical function, where the limits are recognisable and can be easily defined (Holling, 1973; Prosser, & Peters, 2010, Seery, 2011). Within this perspective, notion of resisting change is considered a positive attribute and resilient systems, despite undergoing significant fluctuation, will always return to a stable state (de Weijer, 2013;
Norris, et al., 2008; Seery, 2011). This presents the idea that the system will ‘bounce back’ to its original state. Thus, resilience aims to conserve the original state, assuming this is the desired and optimal state of function (Folke, 2006).

Equilibrium-based resilience is not necessarily desirable or appropriate for all systems. Walker et al. (2004) acknowledge that there may be circumstances, particularly within social and economic systems, where it is necessary to overcome or move to a new regime. That is, change can be desirable or necessary for the long-term efficacy of a system. Consequently, resilience has gradually progressed to more dynamic interpretations of the concept that aim to understand the capacity of complex human and social systems. From this perspective, resilience is not focused on resisting change. Thus, an equilibrium centred view is essentially static and provides little insight into the transient behaviour of systems that are not near the equilibrium (Holling, 1973). Therefore the notion of equilibrium is not a determinant of resilience for complex adaptive systems, such as social and socio-ecological systems. For these complex adaptive systems, the concept of resilience has encompassed the notions of transformation, adaptation, learning, self-organisation, and an acceptance of change (Davoudi et al., 2012; Krasny, Lundholm & Plummer, 2011). Recognising the complexity of systems has prompted a theoretical shift in resilience thinking, driving the development of modern applications of resilience theory.

More recent interpretations have enabled resilience to be applied within socio-ecological, and more specifically, community systems. Before being able to discuss socio-ecological and community resilience, the key change concepts which underpin these interpretations must be understood (Bec, McLennan & Moyle, 2015). Therefore, the next section describes how vulnerability and adaptive capacity intersect with resilience.
2.3.3 **Vulnerability, adaptive capacity and resilience**

Vulnerability, adaptive capacity and resilience are three distinctively separate concepts; however, a review of the literature demonstrates that they are inherently interconnected (Cutter et al., 2008b; Gallopin, 2006). The concept of vulnerability can be broadly defined as being susceptible to a range of effects, such as the system’s exposure or sensitivity to change, or the degree to which the system is affected by change (Gallopin, 2006). Within community systems, vulnerability can stem from the physical stress on the system (such as natural disasters), or the social, economic and political marginalization of individuals or groups that cause the vulnerability (Adger, 2006). The physical stresses are typically characterized by external factors, while the social, economic and institutional aspects are characterized by internal factors (Adger, 2006; Fussel, 2007). Although the vulnerability of a community is related to its exposure or sensitivity to change, it also relates to the system’s adaptive capacity and its ability to respond to a threat (Gallopin, 2006; Smit & Wandel, 2006).

Adaptive capacity refers to the system’s ability to adapt, independent of the force of change (Alberini, Chiabai, & Muehlenbachs, 2006). Many systems view adaptive capacity as an evolutionary process. For example, in ecology, adaptive capacity is concerned with how organisms evolve to allow the system to adjust to new environmental conditions (Engle, 2011; Gallopin, 2006). In community systems, sources of adaptive capacity have been related to networks, associations, collaboration and the balance of power amongst agents that can strengthen or undermine institutions (Adger, 2003; Folke, 2006). Furthermore, adaptive capacity is drawn from two sources: community capital and individual capital. Community capital is the shared resources, expertise and networks that can be leveraged to solve collective problems or improve aspects of the community (Callaghan & Colton, 2008). The individual capital consists of the personal traits, skills...
and resources of individual community members, which are able to be utilized to address changes within the community (Smit & Wandel, 2006).

Adaptive capacity can reduce the vulnerability of a system by modifying a system’s exposure and sensitivity (Adger et al., 2007). Yohe and Tol (2002) proposed a formal model where vulnerability is not only a function of exposure and sensitivity, but is also dependent on adaptive capacity. They proposed that vulnerability will increase exponentially with exposure and sensitivity, and that the latter should decrease exponentially with adaptive capacity (Yohe & Tol, 2002). This relationship between vulnerability and adaptive capacity has been extensively discussed in the literature, as has the relationship between resilience and adaptive capacity (Brooks, Adger, & Kelly, 2005; Smit & Pilifosova, 2003). However, there is a lack of agreement when identifying its role in complex system resilience, as it has different interpretations when applied to different systems.

In the resilience literature authors have argued that adaptive capacity is the system’s capacity to respond to disturbance and its coping ability (Gallopín, 2006). Alternatively, Gupta et al. (2010) view adaptive capacity to be the characteristics and coping mechanisms that empower social actors to respond to impacts through planned measures or by allowing and encouraging creative responses from society. Many of the resilience applications within socio-ecological systems have built upon Gupta et al.’s (2010) definition, by transforming the notion of coping capacity towards a more comprehensive and adaptive approach. In this sense, the coping capacity is seen to be the short-term response, whereas adaptive capacity combines the restructuring of a system after responding to a disturbance, and the anticipatory adaptations, for long-term, sustainable adjustments (Engle, 2011; Smit & Wandel, 2006). Current frameworks of socio-ecological resilience encourage the promotion of adaptive capacity to improve the
opportunity of systems to manage varying ranges and magnitudes of disturbance, while allowing for flexibility to rework approaches if deemed at a later date to be on an undesirable trajectory. Thus, initiatives to improve a systems’ adaptive capacity will therefore reduce vulnerability.

On the other hand, the interrelationship between resilience and vulnerability can be difficult to conceptualize, as vulnerability has previously been labelled as the opposite of resilience (Gallopin, 2006). Figure 2 displays the connection between vulnerability, adaptive capacity and resilience. The conceptual similarities between vulnerability, adaptive capacity and resilience stem from system outcomes. For instance, vulnerability is considered to be the capacity to preserve the structure of a system, while adaptive capacity refers to the ability to recover from disturbances and resilience is the ability to build capacity (Gallopin, 2006). However, beyond conceptual similarities, Engle (2011) argues that it is the connection that vulnerability and resilience have with adaptive capacity that presents these links. This is enhanced through a significant proportion of the conceptual and methodological development of adaptive capacity evident in the vulnerability or resilience literature (Engle, 2011).

**Figure 2: Vulnerability and resilience framework**

![Vulnerability and resilience framework](source: Adapted from Cutter et al. (2008b))
Other theorists perceive the relationship between vulnerability, resilience and adaptive capacity differently, as exemplified by Gallopin’s (2006) model presented in Figure 3. Gallopin (2006) considers vulnerability as the overreaching concept, while resilience and adaptive capacity are considered as a conceptual subset. The same relationship is reflected by Turner et al. (2003) within the development of vulnerability analysis models for sustainability. As shown in Figure 4, vulnerability is dependent on exposure, sensitivity and resilience (Adger, 2006; Turner et al., 2003), making resilience a subset of vulnerability (Bhamra et al., 2011). However, this still encompasses the core elements of adaptive capacity, as exposure is the degree to which a system comes into contact with shocks (Smit & Wandel, 2006) and sensitivity is the degree to which a system is affected by the shocks (Turner et al., 2003). Therefore, adaptive capacity is often viewed as being between vulnerability and resilience.

Figure 3: The concept of vulnerability

Source 2: Adapted from Gallopin (2006)
Within community systems, resilience is also considered a subset or a component of a system’s capacity to respond (Gallopin, 2006). A system’s capacity to respond relates to the ability of the system to adjust to a disturbance, moderate the effects, take advantage of any available opportunities and cope with the consequences of any system transformations (Gallopin, 2006). Adaptive capacity influences communities by modulating between maintenance of the current state and transformation of the system to a new trajectory, depending on which is most ‘desirable’ (Berkes & Ross, 2013). From this perspective, resilience presents many links with vulnerability, as resilience plans cannot be implemented effectively if the underlying socio-political processes and environmental linkages of vulnerability are not understood (Cutter, Mitchell, & Scott, 2000; Turner et al., 2003). Yet, while a resilient system may be less vulnerable than a non-resilient one, a vulnerable system may also be resilient (Gallopin, 2006). A resilient system is not necessarily invulnerable to change; rather it has the capacity to manage the impacts and outcomes.
A paradigmatic shift in conceptualizations of resilience has resulted in a more integrated approach, acknowledging adaptive capacity as a key component. This shift has seen a progression in the change management literature, which has changed the focus of resilience literature away from stability and control of environmental systems, towards the revolutionary transformation of social and organizational systems. The model proposed by Allison and Hobbs (2004) presents adaptive capacity as embedded within resilience (Figure 5).

**Figure 5: Heuristic model of the adaptive cycle**

![Heuristic model of the adaptive cycle](image)

*Source 4: Adapted from Allison and Hobbs (2004)*

The model demonstrates the fluidity of resilience, adaptive capacity and vulnerability, which accounts for movement and change within a system. This highlights the instability of a system’s capacity to adapt, placing emphasis on the connectedness of the system variables to build adaptive capacity and, ultimately, resilience (Allison & Hobbs, 2004). Nonetheless, vulnerable points in the system are not viewed negatively, but as an opportunity to reorganize system variables. Fundamentally, resilience is a function of both the vulnerability of a system and its adaptive capacity (Dalziell & McManus 2004). Socio-ecological resilience is a resilience interpretation that has effectively
incorporated the concepts of adaptive capacity and vulnerability (Folke, 2006; Gallopin, 2006). Socio-ecological resilience has also encompassed purposive and reflexive action within resilience thinking, with a key focus on the interplay between system vulnerability, adaptive capacity and resilience (Colding, Elmqvist, & Olsson, 2003; Folke, 2006). The following section discusses further the concept of socio-ecological resilience.

2.3.4 Socio-ecological resilience

Recent events, including natural disasters, acts of terrorism, climate change and environmental degradation, are bringing the threat of undesirable change and disturbance to the fore (Bec, McLennan & Moyle, 2015). Consequently, the extensive impact that these forces of change can bring, has resulted in resilience becoming more readily adopted within different types of systems. An emerging area is the application of resilience to social systems. Social systems are frequently one of the last to recover or adapt to the disturbance. This is frequently a result of their reliance on environmental and economic systems (Cote & Nightingale, 2012). Additionally, social systems are complex, making them vulnerable to change and disturbance (Adger, 2006). The interrelated position of social systems has stimulated the acquisition of resilience thinking and planning within community development initiatives, as a mechanism to address the growing threat of change and disturbance. However, mechanisms which are characteristic of traditional resilience theory, such as stability, cannot necessarily be established within social systems. One reason for this is that the actions of humans cannot accurately be predicted or controlled (Ungar, 2011). As a result, the core elements of traditional resilience are difficult to conceptualise, monitor and measure (Adger, 2000; Cote & Nightingale, 2012).

There are a number of studies applying social resilience to communities, particularly within the realm of disasters and crises. For instance, Maguire and Hagan
(2007) apply social resilience address health, welfare and development issues resulting from disaster or crisis situations. Resilience from this perspective is demonstrated as being clear, measurable processes that can be managed through planning and monitoring. This strongly links with ecological resilience, where the notion of controlling change is evident. Extending the use of traditional resilience interpretations to social systems can limited the ability of systems to manage change, whilst also having theoretical implications (Cote & Nightingale, 2012). Therefore, the dimensions of resilience need to be reconceptualised when applying resilience thinking to social systems.

Within social systems, resilience is a broad conceptual phenomenon, covering many concepts related to positive patterns of adaptation, in the context of adversity (Benson, & Garmestani, 2011b). Social resilience is viewed as the capability of communities or groups to adapt or cope with external stresses and disturbances, caused by social, political, and environmental change, often determined by institutions (Adger, 2000). To address change, social resilience relies on the notion of social capital. Social capital refers to the collective value of social networks and resources, largely stemming from the shared values, knowledge and cooperation of the community (Adger, 2000). More recent literature (Manzo & Perkins, 2006; DeFilippis, 2001) has also placed emphasis on the notion of place attachment within social capital, from both the individual and collective perspective. It has been argued that an individual’s connection to the region can influence how they perceive the community resources, the extent of their knowledge and their connection to the drivers of change, whilst also providing insight into the social capital and the community’s capacity to respond to change (DeFilippis, 2001; Kearns & Parkinson, 2001; Zautra et al., 2008). DeFilippis (2001) further argues that understanding connections to place can aid in uncovering strengths and vulnerabilities in the community.
Social resilience largely stems from the economic perspective of resilience, where the focus tends to be on the different structures of the system. However, research into social systems demands a socio-ecological approach. Social systems are frequently dependent on their surrounding ecosystems. Therefore the social system cannot be resilient if the environmental system that they are a part of is not resilient (Ruiz-Ballesteros, 2011). Moreover, social systems can impact on the environmental system, such as through the human exploitation of the environment, creating a two way relationship between the social and environmental systems. For regional development, attention is drawn to socio-ecological resilience, which gives specific attention to people and nature as independent systems, in addition to how they interact (Folke et al., 2010). The ecological concepts of resilience are not entirely interchangeable with the social resilience concepts, as human and social systems act differently to ecosystems. Thus, the socio-ecological literature, while drawing from both ecological and social resilience, has a unique conceptualisation of resilience theory (Bec, McLennan & Moyle, 2015).

Socio-ecological resilience incorporates the theoretical underpinnings of social, ecological and economic resilience (Adger, 2000). It is a transdisciplinary concept integrating both the physical and natural environment (Coaffee, 2013). Research conducted by the Stockholm Resilience Centre supports this interpretation of resilience. Folke, Biggs, Nordstrom, Reyers and Rockstrom (2016) acknowledge the shift from environment as an externality to a precondition for social and economic sustainability, thereby highlighting the intertwined nature of socio-ecological systems resilience. Resilience within socio-ecological systems cannot be categorised by a standard set of traits or actions, as the diverse and context specific application creates multiple interpretations.
Early studies of socio-ecological resilience defined resilience in terms of the successful adaptation to the environment (Masten & Obradovic, 2006). While to some extent this remains true, in the current understanding of resilience this concept has been further developed, and expands beyond the physical and systematic perspective of resilience. Despite multiple interpretations of socio-ecological resilience, it is essentially the growth and adaptation of systems when exposed to significant stressors (Hegney et al., 2007). Socio-ecological resilience recognises the inevitability of change and does not focus on maintaining stability or controlling the system or force of change (Bec, McLennan & Moyle, 2015). The characteristics of socio-ecological resilience are driven by a focus on addressing uncertainty and the unknown by building capacity (of people and nature) to cope with change, in flexible and innovative ways (Davoudi et al., 2012; Welsh, 2014). It is also characterised by trying to understand and manage systematic feedback processes, where knowledge is gained from experience (Maguire & Hagan, 2007). Traditional interpretations viewed resilience as a survival discourse. Alternatively, socio-ecological resilience presents an optimistic view which looks to the future and focuses on how to renew, transform and progress complex systems, to move past the disturbance or force of change (Davoudi et al., 2012).

2.3.5 Community resilience

Socio-ecological resilience can directly contribute to community development, as it focuses on change, improvement and vitality of a current situation (Bhattacharyya, 2004). There is a significant body of literature emerging around the understanding of creating resilient communities. Community resilience is a contextual application of socio-ecological resilience that recognises the complexity of the community system, acknowledges multiple interacting and uncontrollable scales, and considers all aspects of the community: economic, social, ecological, and institutional (Bec, McLennan & Moyle,
2016). However, ambiguity exists in the literature, as two competing bodies of knowledge were found to be emerging under the concept of community resilience. The first body of literature focuses on creating resilient communities and has emerged from community development theories such as empowerment theory (Mathie & Cunningham, 2005), asset-based community development (Kretzmann & McKnight, 2007) and sustainable community development (Lawson, 2005). This body of knowledge has been focused on responding and managing change instigated by hazards, disasters and crises by developing frameworks related to post-disaster recovery and emergency planning (Callaghan & Colton, 2008; Paton & Johnson, 2001). This perspective, although important, is geared towards understanding sudden, rapid and extreme change for communities.

The second body of literature focuses on applying a socio-ecological perspective of community resilience. This approach is gaining popularity as a change management strategy for its ability to acknowledge and deal with changes and disturbances that are beyond the control of communities and governing organisations (Frazier, Thompson, & Dezzani, 2013; Paton & Johnson, 2001). It is also gaining recognition for its ability to overcome some of the limitations of other development theories. Most notably, community resilience acknowledges the inescapability of change, recognising that change is inevitable (Bernstein, 1971). Additionally, community resilience does not assume growth to be the product of community development (Krapp, 2005). Growth, often defined by economic measures such as increases in jobs, investment and GDP, does not always increase choices, networks or the ability to manage change, nor equate to a fundamentally ‘better’ system (Banerjee, & Duflo, 2005). Resilience theory emphasises that community development can occur with or without economic growth, and instead
aims to build a stronger community, focusing on the objectives of the broader community (Bhattacharyya, 2004).

Resilience is essential for a community’s well-being and the capacity to deliver an appropriate quality of life for residents and a level of sustainability for community development (Derrett, 2008; Espiner & Becken, 2013; Espiner, Orchiston & Higham, 2015). For the purpose of this research, the socio-ecological interpretation of community resilience is adopted. Community resilience can be defined as the existence, development and engagement of community resources by community members to thrive in an environment faced with change, uncertainty or unpredictability (Magis, 2010). Magis (2010) stipulates that community members have the intention of developing personal and collective capacity to sustain, influence and adapt to change, ultimately creating new trajectories for the future of the community. A community’s resilience is dynamic, changing with internal conditions, external forces, and its ability to respond and develop. Communities remain viable through constant adaptive responses (Magis, 2010).

Studies of community resilience have emphasised how to live within a community, as opposed to how to control the community to be liveable (Colten, Kates, & Laska, 2008; Saavedra, & Budd, 2009). This is often criticised as moving blindly forward, with insufficient strategies to address potential threats. However, community resilience has a strong focus on anticipating and preparing for potential change or disturbance. It involves analysing all components of the community system to determine weaknesses, potentially vulnerable points, and significant threats facing the community (Gotham, & Campanella, 2011; Smit, & Wandel, 2006). Identifying the vulnerabilities of a community can be difficult as vulnerabilities are complex; changing or altering at different scales (Gallopin, 2006). A vulnerability assessment should first look at the main weaknesses of the systems as a whole. Then, the susceptibilities at each scale of the
system should be analysed to determine the smaller weaknesses that are contributing to the overall system vulnerability (Adger, 2006). Building smaller and individual resilience by reducing the vulnerability at each scale can enhance the overall resilience of the system. However, the individual resilience of community members does not necessarily result in community resilience.

The focus on system vulnerabilities within community resilience presents an interesting view of resilience, drawing from the field of physics. Physics defines resilience as systems or objects that are invulnerable to the impact of external forces (Prosser, & Peters, 2010). However, this perspective of resilience simply determines resilience based on whether the system is vulnerable or not, and does not delve into the complexities of socio-ecological systems, where areas of the community may have varying levels of vulnerability which frequently change. Community resilience, with its ability to accommodate system complexities, is able to recognise the vulnerabilities of a system, and a resilient community will learn how to manage those vulnerabilities (Moghal, 2011; Smit, & Wandel, 2006).

2.3.6 Applications of resilience

Limited literature is available that moves beyond the conceptual study of resilience towards more empirical and applied considerations of the theory. Nevertheless, there is growing understanding of the ways in which resilience can be practically applied to different systems to address forces of change (Benard, 2002). Resilience applications in the literature span numerous disciplines, and address different forces of change. However, many of the applications lie within the realm of hazards or risk. More specifically, there is a strong focus on applying resilience to respond to or prepare for different types of crisis or disaster situations. Disciplines have adopted various resilience interpretations to apply resilience to address to disaster situations within a system, such as ecological (Klein,
Nicholls, & Thomalla, 2003), economic (Rose, 2004), social (Pelling, 2003), socio-ecological (Adger, Hughed, Folke, Carpenter & Johan, 2005), organisational (Boin, & McConnell, 2007), engineering (Bosher, Dainty, Carrillo, & Glass, 2007), and psychological resilience (Bonanno, Galea, Bucciarelli, & Vlahov, 2006), among others. For instance, Adger et al. (2005) explore the application of socio-ecological resilience to coastal regions following the aftermath of a natural disaster, whilst Bonanno et al. (2006) aim to build psychological resilience within individuals affected by terrorist attacks. Indeed, disaster resilience is emerging as a contextual type of resilience, combining different resilience interpretations, including ecological, economic, social, and organisational resilience (Paton, 2006).

There are also a number of resilience applications outside of the area of disaster and crisis. Within these applications, specific disciplines follow common trends. For example, psychological resilience is mainly applied to manage life traumas, with a growing application of this concept within studies of children (Bonanno, 2004; Masten, 2001). For instance, Masten (2001) explores the resilience of disadvantaged children and the psychological capabilities they develop to be resilient. Additionally, numerous applications of ecological resilience are evident, predominantly situated around addressing the impact of humans on the environment (Janssen, Schoon, Ke & Borner, 2006; Nystrom, Folke & Moberg, 2000). This trend it clearly illustrated in Nystrom et al.’s (2000) study, which explores the resilience of a coral reef to human impacts.

Alternatively, engineering resilience has diverse applications across multiple industries, such as transportation, mining, agriculture, and construction. Engineering resilience has been commonly applied to ecosystems, presenting correlations with ecological resilience (Folke, 2006; Folke et al., 2004). Holling (1996) argues that ecological resilience encompasses similar scientific principles to that of engineering
resilience, with the main distinction being their different views on stability. However, applications of resilience have not been limited to ecosystems. The focus on behavioural and structural aspects of a system’s performance has proven that engineering resilience is a dynamic and dialectic form of resilience, with applications spanning various types of system and organisational structures (Wreathall, 2011). A common focus of more recent applications has been centred on the process of using resilience as a means of improving safety, and ultimately mitigating risk, within systems, particularly those exposed to hazards (Coaffee, & Rogers, 2008; Costella, Saurin, & Guimaraes, 2009; Leveson, Dulac, Zipkin, Cutcher-Gershenfeld, Carroll, & Barrett, 2006). Despite the focus on safety strategies, the literature suggests a movement towards engineering resilience to manage community change to hazards, where the system structures are being re-examined (Paries, 2011).

Similar to other bodies of resilience literature, knowledge surrounding socio-ecological and community resilience is largely conceptual. One key issue is the limitation of perceived cyclical process of change which underpins community resilience interpretations. The cyclical process, which is further discussed in Section 2.3.8, does not acknowledge or allow for humans to break cycles through their ingenuity, technology and foresight (Davoudi et al., 2012). Additionally, defining the boundaries of a system and the points of equilibrium can be complex (Davoudi et al., 2012; Folke et al., 2010).

Power and politics are also critical to the concept of resilience within these types of resilience. The origins of resilience stem from systems that are almost ‘power blind’ (Cai, 2008; Cote & Nightingale, 2012; Pickett, Cadenasso, & Grove, 2004), therefore power relations have hardly been considered within current applications of the theory. Yet, multiple scales of power are evident within social systems, and frameworks must...
recognise these relationships and understand how they interfere with the operation of the system.

Given the complexity of socio-ecological resilience, applications require a careful conceptual and operational definition, as well as the construction of boundaries within the specific systematic setting in which it is being applied (Davoudi et al., 2012; Masten & Obradovic, 2006). Socio-ecological resilience with its emphasis on inherent uncertainty and discontinuities, and dynamic insight into the interplay of adaptability and transformability, is appealing for the context and theoretical understanding of community development because it provides a useful framework for conceptualising how complex interdependencies work. This provides a foundation to analyse and assess the resilience of a diverse and complex social system at the community level. Studies of socio-ecological systems have found engaging with resilience thinking delivers more attention to deeper issues such as justice, fairness and legitimacy. These are issues which are often assumed or afforded minimal acknowledgement within other community development strategies (Adger et al., 2005; Davoudi et al., 2012).

It has been established that applications of resilience are diverse. However, unlike other change management approaches, resilience theory is not necessarily dictated by the rate at which change occurs. Adger et al. (2005) states that the rate at which change occurs can influence the response strategies and short-term resilience of a system. By way of contrast, Foxon, Reed and Stringer (2009) and Lew (2014) argue that long-term community resilience is only marginally affected by the rate of change. This is due to the focus on assessing all system vulnerabilities and placing emphasis on resources management and allocation. Nevertheless, extended periods of rapid change can significantly affect community resilience (Gallopin, 2006).
There are also a growing number of studies specifically adopting a community resilience perspective. Applications of community resilience span many facets of community development, such as community health and wellbeing (Maybery, Pope, Hodgins, Hitchenor, & Shephard, 2009) and proactive resilience building to constant change (Skerratt, 2013). However, attempts at applying community resilience in a practical sense are often limited in their effectiveness. This is predominantly a result of the complexity of community systems. This often presents management difficulties for dealing with changes or disruptions, as the ability to meaningfully forecast the future and determine vulnerable areas of the community is limited. Walker et al. (2002) also consider this be a result of the unpredictability of key drivers and indicators, which frequently change non-linearly. Human action is also reflexive, with change often happening faster than the forecasting models can be recalibrated (Walker, et al., 2002).

Consequently, applications of community resilience are found to adopt a form of ‘general’ or ‘specified’ resilience (Larsen et al., 2011; Maguire & Hagan, 2007; Marshall & Marshall, 2007; Pimm, 1984).

General resilience refers to an approach where systems attempt to cope with uncertainty in multiple ways, by looking at the system as one dimensional (Folke et al., 2010). However, this is does not give much emphasis to the complexity of systems, and can be difficult to achieve. As a result of these challenges, much of the existing literature tends to focus on specified or sub-system resilience in specific community groups (Larsen, et al., 2011; Maguire & Hagan, 2007). Specified resilience focuses on the groups that are most affected, with minimal consideration given to the community as a whole (Zautra et al., 2008). By applying specified resilience, the options for dealing with disturbances are narrowed. In some cases, specified resilience intensifies the possibility of increasing new kinds of instability (Folke et al., 2010). There is also risk of the separate
systems becoming less resilient when functioning and interacting within larger regional, national and global systems, causing resilient systems to become vulnerable. More recent literature, however, is taking a proactive approach to resilience applications, where attempts at building resilience is evident within communities that are highly susceptible to natural disasters (Larsen, et al., 2011; Smith et al., 2011). This remains an exclusionary approach to resilience applications, as communities that are not classified as being highly vulnerable to natural disasters are frequently overlooked.

Furthermore, it could be argued that many of these ‘community’ resilience approaches are more directly related to organisational, social or economic resilience, rather than community resilience. Community resilience is an integration of the social, organisational, environmental and economic systems, not simply looking at one system within the context of a community. In many instances, studies discussing community resilience applications have not adopted the theoretical underpinnings of community resilience stemming from a socio-ecological perspective. The adoption of specified resilience for applications also perpetuates the misuse of the term community resilience. Nevertheless, resilience thinking has applications for diverse community and social changes (Mancini, & Bowen, 2009) and may offer new routes into framing these deeper, structural issues. Thus, it needs to be more broadly applied.

To expand resilience applications across broader socio-ecological system constructs and to address different forms of change, studies are now placing emphasis on devising instruments to measure resilience. Carpenter et al. (2001) place strong emphasis on the need to assess and measure a system’s current level of resilience. Understanding the current level of resilience allows vulnerabilities to be identified, enabling the formation of accurate guidelines which are appropriate to the current context. Additionally, measurement tools must understand residents’ perceptions of change to
provide insight into how individuals or groups may be affected and their openness to future, in order to facilitate change management (Brody, Zahran & Vedlitz, 2008; Buys, Miller & van Megen, 2012; Lorenzoni & Pidgeon, 2006). A growing number of resilience studies are focusing on developing indicators to assessing the level of resilience within community systems (Ghapar, Othman & Jamal, 2014; Strickland-Munro, Allison & Moore, 2010). Particularly within the disaster literature, indicators often combine sustainability assessment tools and risk mitigation tools (Holladay & Powell, 2013; Jordan & Javernick-Will, 2013).

Despite the growing number of measurement tools, these instruments are still limited in being able to measure resilience across different system structures and to different forces of change. The indicators devised within these instruments are often context specific and are not adequate measures of resilience to other forces of change. Consequently, further research is needed to devise an instrument to effectively measure community resilience to long-term structural change in order to apply resilience within this context.

2.3.6.1 Resilience in tourism communities

Tourism adds a level of complexity to a community, and is a force of change that can make communities highly vulnerable. For example, community vulnerability can stem from the instability and fluctuations in seasonal visitation that are characteristic of the tourism sector (Lafferty & Fossen, 2001), as well as tourism’s transformative nature, particularly in the context of mass tourism (Poon, 1994). In recognition of tourism being a significant force of change, the communities of such regions are beginning to adopt resilience as a strategy to manage change. Appendix A presents an overview of the key resilience studies within a tourism context.
The tourism sector, as well as the tourism focused academic literature, has been relatively slow to adopt the concept of resilience, particularly when compared to other disciplines such as ecology. The slow assimilation has been attributed to the definitional issues with the concept of resilience which were discussed in Section 2.3.1. Consequently, adaptive theory and adaptive capacity are more commonly discussed in the context of tourism systems, rather than resilience (Horn, & Simmons, 2002; Shone, Horn, Moran, & Simmons, 2005). Regardless, there is a growing body of knowledge that recognises the value of resilience within a tourism context (see for example Becken, 2013; Farrell, & Twining-Ward, 2004). Greater recognition of system vulnerabilities are also being incorporated into these studies, which highlights the progression towards proactive resilience applications in tourism (Calgaro & Lloyd, 2008; Espiner & Becken, 2013).

Existing studies in the literature have introduced a number of conceptual models and frameworks that guide the formation of resilience within complex tourism systems (Becken, 2013; Lambert, Hunter, Pierce, MacLeod, 2010; Stickland-Munro, Allison & Moore, 2010). These models and frameworks derive from the lessons learned from resilience studies in other disciplines and have been adapted to suit the context of tourism (Cochrane, 2010). Tourism systems are diverse, with multiple structure formations. Thus, multiple frameworks are evident to enable resilience to be applied within multiple types of tourism systems. One such model is Cochrane’s (2010) ‘sphere of tourism resilience’ (refer to Figure 6). The model identifies how assessments of vulnerability and adaptive capacity are integral to resilience and the sustainable management of resources within a tourism system. However, this model only gives a broad representation of resilience within tourism systems, requiring modifications for the characteristics of specific socio-ecological systems and specific forces of change.
Empirical resilience applications for tourism systems are becoming increasingly evident within the literature. Although limited in number, applications have predominantly focused on building resilience in the face of potential or previous crisis or disaster situations (Becken, & Hughey, 2013; Eakin, Benessaiah, Barrera, Cruz-Bello, & Morales, 2012). Consequently, it is common for studies to focus on post-system collapse or systems that are highly vulnerable. Recent events in history, including extreme weather and terrorism, and the impact these events have on the tourism sector, largely make up this body of literature (Biggs, 2011; Coaffee, & Rogers, 2006; Larsen et al., 2011). For example, Larsen et al. (2011) explored the application of socio-ecological resilience in tourism-dependent coastal communities, following a tsunami. This has shifted the focus of resilience towards reactive applications, limiting the attention given to resilience as a form of community capacity building. As mentioned, resilience in tourism needs to be framed proactively as a means of strengthening the adaptive capacity of a community,
and not simply as a reactive coping mechanism. Furthermore, reactive applications have also predominantly adopted specified resilience approaches (refer to Section 2.3.6), with applications to an entire community setting limited.

2.3.6.2 Resilience in resource-based communities

Theoretical considerations of resilience within the context of the resources sector have predominantly been linked to engineering resilience, enterprise or economic resilience, and ecological resilience. Engineering resilience interpretations have predominantly underpinned applications within the context of the resources sector. Applications of resilience within this capacity are largely situated around the structural components of the mines and resource equipment. For instance, Kennedy and Foster’s (2006) study applied engineering resilience to explore ways to improve the safety of underground mining environments. Resilience from this perspective is a transformational tool which changes the focus of mine safety and risk, increases the efficiency of production and aides in establishing realistic limits for mining operations (Costella, et al., 2009; Kennedy, & Foster, 2006).

Enterprise and economic resilience have also been actively associated with the resources sector. The resources sector is a major economic driver for many countries (Gibson, & Klinick, 2005), and has commonly adopted and applied economic resilience strategies to maintain its position within society (Auty, 1993). Economic resilience has aided companies and organisations to deal with economic and enterprise challenges such as fluctuations in the market value of minerals, high employee turnover, the changing role of technology, and the ability to manage the complex structure of the resources sector working conditions (Auty, 1993; Halseth, 1999; McGlade, Murray, Baldwin, Ridgway, & Winder, 2006). However, recently the mining industry has been giving more attention to ecological resilience, as opposed to economic resilience.
Ecological resilience is not an entirely new focus for the resources sector. However, it is currently receiving significant attention due to the current state of the sector, as well as societal trends which are placing emphasis on ecological awareness (Cooke & Johnson, 2002; Gibson, & Klinick, 2005). Cooke and Johnson’s (2002) study is one such example, where building ecological resilience was in response to social concerns over the impacts created from the mining of metals and minerals. Within this body of literature, there is significant interchangeability between resilience and sustainability concepts (Azapagic, 2004; Bridge, 2000; Bridge, & McManus, 2000; Hilson, & Basu, 2003; Hilson, & Murck, 2000). Gibson and Klinick (2005) have also discussed the notion of resilience within social systems for the resources sector, primarily through the relationship with the environment. However, these studies have not adopted a socio-ecological perspective of resilience.

Nevertheless, socio-ecological applications of resilience are evident within the context of the resources sector. However, previous studies have focused on using the resources sector as a mechanism to build community resilience (Esteves, 2008; Measham, McKenzie, Moffat, & Franks, 2013). Although being discussed within the context of community socio-ecological resilience, this more accurately reflects business resilience stemming from a strong economic perspective. Business resilience is the ability of a business or company to positively adapt to change or other circumstances which inhibit the ability to continue normal business operations (Avery, & Bergsteiner, 2011). Therefore, socio-ecological resilience in resources based communities has not been adequately addressed in the academic literature.

2.3.7 Community responses to long-term structural change

As the present study is specifically exploring community resilience within the context of long-term structural change, community response strategies to long-term
structural change need to be examined. Existing strategies provide a foundation and for which resilience applications can be leveraged. Community responses to structural change are often driven by organizations and local government actors (Comfort et al., 2012). The capacity of a community to respond to structural change is associated with its ability to adapt to disturbances, minimize damage, take advantage of opportunities and cope with the transformation that occurs (Gallopín, 2006; Linnenluecke et al., 2012).

Although core concepts have been identified, there are limited empirical studies on community responses to structural change. However, much can be gained from exploring core concepts in studies on community response to short-term change, such as natural disasters (Berkes & Jolly, 2001; Steinglass & Gerrity, 1990).

Short-term community responses to change are predominantly positioned within the literature on crises and disasters. They are primarily reflexive, focusing on recovering from immediate effects. Response strategies include establishing rescue centres and creating support networks (Berke, Kartz, & Wegner, 1993; Bolin & Stanford, 1991). Providing access to credit, loans and other sources of funding has also been shown to be successful for responding to short-term change for disaster or crisis-ridden communities (Bolin & Stanford, 1991). Although structural change tends to be a gradual process, there are events, such as severe weather, that can suddenly impact the economic structure of a community requiring a short-term response (Connolly & Lewis, 2010). In such instances, access to support networks, including access to funding, can be an appropriate way for the community to respond. However, these responses may not be applicable as a response mechanism for long-term structural change and their relevance to such situations warrants further consideration (Connolly & Lewis, 2010).

Long-term community responses to change are also largely situated within the literature on crises and disasters (Linnenluecke et al., 2012; O’Brien, O’Keefe, Rose, &
Wisner, 2006). Response to crises and disasters can either be purposive or reflexive and may include resource factors, organizational institutions, emergency relief activities and attempts to rebuild infrastructure (Linnenluecke et al., 2012). However, such decisions are often not driven by a single crisis or disaster, but rather the decision is influenced by ongoing social, economic, political or environmental conditions (McLeman & Smit, 2006).

Response strategies, such as mitigation plans, can be sought from the literature on crises and disasters to provide insights into different community responses for long-term structural change (Cutter et al., 2008b; O’Brien et al., 2006). Mitigation plans assist communities and organizations to prepare for change and reduce risk, through mechanisms such as long-term planning, building up cash reserves, diversifying assets and investigating strategies for debt reduction (Cutter et al., 2008b; Deoreo, 2006). For communities to respond to long-term structural change, mitigation and preparedness present a framework that can aid in managing the impacts of change and take anticipatory action. However, as long-term structural change is a gradual process which can impact all areas of the community system (Connolly & Lewis, 2010), the ability to develop mitigation strategies that address the complexity of the community system may be limited.

Alternatively, recovery strategies are evident within the literature as a prominent response to economic structural changes within a community. Recovery strategies were central to managing the economic changes that occurred following the impact of the 2004 Indian Ocean Tsunami in Sri Lanka. This event resulted in an economic imbalance, a sharp increase in construction costs and later, a re-emergence of economic issues such as inflation and a reduction in foreign aid (Chang, Wilkinson, Seville & Potangaroa, 2010; Jayasuriya & McCawley, 2008). Calgaro, Pongponrat and Naruchaikusol (2009) applied
community resilience to prepare and plan for future changes to the structure of the economy following the Tsunami in 2004. The focus of response strategies was to build on existing strengths and reduce vulnerabilities, with a strong focus on community capacity building (Calgaro et al., 2009). While the recommendations that were proposed within this study are specific to this context, they can be implemented into communities as a response to long-term structural change.

Nevertheless, the literature also provided strategies for communities to proactively address change. Scenario planning is one tool that can be used to investigate, anticipate and prepare communities for possible future events, or circumstances, despite the future being unpredictable (McLennan, Pham, Ruhanen, Ritchie & Moyle, 2012). Furthermore, scenario planning is emerging as an increasingly popular strategy within resilience applications, as it encourages better management of resources, leading to more sustainable practices. Although scenario planning applications for long-term structural change to the tourism and resources sectors are limited, it can be useful tool for building community resilience.

A review of existing knowledge on community resilience has identified a gap in the literature surrounding community response to long-term structural change driven by the tourism and resources sectors. Potentially, resilience theory can add considerable value to understanding how communities can be best equipped to respond to long-term structural change. Essentially, this is because resilience theory considers both purposive and reflexive responses to change. This is established through forecasting and planning for short and long-term impacts, focusing on the interplay between aspects of the entire community system, and maintaining capacity building at the local level (Berkes & Ross, 2013; Zautra et al., 2008).
2.3.8 Dimensions of community resilience

Applying resilience theory to address long-term structural change within communities requires the identification of the dimensions (or measurable components) of community resilience (Goodman et al., 1998). Due to the dialecticism of the term resilience, numerous dimensions are recognized within the literature (Berkes & Ross, 2013; McLennan, et al., 2013). However, the dimensions of community resilience can be difficult to identify, let alone measure (Norris et al., 2008).

Previous literature has predominantly explored the different components of socio-ecological resilience, with distinct components often being contextually driven (Adger et al., 2005; Carpenter et al., 2001). Regardless, common components of resilience, such as capacity building, collaboration, experience and knowledge sharing, have relevance for studies seeking to explore community response to long-term structural change (Berkes & Ross, 2013; Buikstra et al., 2010; Nkhata, Breen & Freimund, 2008). Table 2 presents the key internal system dimensions of socio-ecological and community resilience that are evident within the literature. These dimensions are the internal properties of resilient systems, with characteristics largely focusing on social and institutional system properties.
<table>
<thead>
<tr>
<th>Characteristic/Dimension</th>
<th>Source</th>
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<tbody>
<tr>
<td>Communication/knowledge sharing</td>
<td>Paton and Johnson (2001), Zautra et al. (2008)</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Folke, Hahn, Olsson and Norberg (2005), Nkhata et al. (2008)</td>
</tr>
<tr>
<td>Leadership</td>
<td>Buikstra et al. (2010), Holladay and Powell (2013)</td>
</tr>
<tr>
<td>Partnerships/networks</td>
<td>Holladay and Powell (2013)</td>
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<tr>
<td>Planning</td>
<td>Davoudi et al. (2012); Newman and Dale (2005), Norris et al. (2008)</td>
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<tr>
<td>Diversification</td>
<td>Newman and Dale (2005)</td>
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<td>Support</td>
<td>Norris et al. (2008)</td>
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<tr>
<td>Transformability/Adaptability</td>
<td>Folke et al. (2005), Olsson, Folke, and Berkes (2004)</td>
</tr>
<tr>
<td>Access to resources</td>
<td>Lebel et al. (2006)</td>
</tr>
<tr>
<td>Structural stability</td>
<td>Berkes and Ross (2013), Olsson et al. (2004)</td>
</tr>
<tr>
<td>Capacity building</td>
<td>Colding et al. (2003), Graugaard (2012)</td>
</tr>
<tr>
<td>Identify opportunities/positive outlook</td>
<td>Folke et al. (2005)</td>
</tr>
</tbody>
</table>

Importantly, components of socio-ecological resilience recognize that resilience is a continuously changing process, embracing adaptation, transformation and even chaos (Walker et al., 2004). Transformability and adaptability are considered to be two key dimensions of socio-ecological resilience, frequently used when discussing how socio-ecological systems respond to change or disturbance (Folke et al., 2005; Olsson et al., 2004). Transformability is the capacity, either deliberate or forced, to create a fundamentally new system, when the existing system is untenable (Folke, et al., 2010; Walker, et al., 2004). However, transformation within resilience thinking is predominantly deliberate, and can be initiated at multiple scales (Folke, et al., 2010). The intention is to move the system into a new or more positive regime. This is often a gradual process, undertaken as a longitudinal strategy to progress beyond the impacts resulting from a disruption to the system.

Adaptability is the capacity of socio-ecological systems to learn to adjust its responses to changing external drivers and internal processes, whilst continuing within
the current regime (Folke et al., 2010). Specifically within community systems, Schluter, Biggs, Schoon and Anderies (2015) argue that fostering complex adaptive systems thinking affords communities the ability to manage connectivity, encourage learning and promote polycentric governance, all of which contribute to the system’s capacity to adjust to change. At first glance, the idea that resilience can, and should, embrace both adaptation and transformation may seem counterintuitive, as they are concepts which embrace change as a requisite to persist. However, it is the dynamics and capacity to either adapt or transform that lie at the core of socio-ecological resilience. Social change, to a certain extent, is necessary for social progression, growth, and learning, making it essential for socio-ecological resilience (Folke et al., 2010). Therefore, to allow social change to occur, adaptability and transformability are key dimensions of resilience.

To embrace transformation and adaptation, it has been suggested that the process of building resilience within socio-ecological systems is captured through the concept of ‘panarchy’ (Davoudi et al., 2012; Walker et al., 2004). Panarchy stems from conceptualizations of adaptive cycles, which reflect the process of system change (Figure 7). The adaptive cycle is depicted as being similar to a Mobius strip. Thus, an adaptive cycle suggests that change is a cyclical process, yet the system will never return to its original position (Thornes, 2009). The adaptive cycle structure implies that as a system moves through the cycle, the level of resilience will eventually decrease. However, the continuity of the structure allows opportunities to emerge if the system was to collapse or become untenable (Davoudi et al., 2012). Adaptive cycles build upon concepts developed by Thom (1972) in relation to catastrophe theory and Lyapunov functions, which are important premises used to understand how a system can maintain structural stability despite the impact of abrupt or dramatic change (Gallopin, 2006). Panarchy is a nested set
of adaptive cycles, capturing the idea that systems are interlinked in a continual adaptive cycle (Figure 7).

Figure 7: Adaptive cycles and Panarchy model

As demonstrated in Figure 7, although the system may repeat the dynamics of each stage, it does not necessarily repeat the same characteristics, as they develop, learn and improve upon each stage (Cochrane, 2010; Folke, 2006). The human element is a large component of community resilience, which predominantly stems from psychological resilience. As mentioned in Section 2.3.1, psychological resilience refers to an individual’s ability to cope with stress and adversity (Bonanno, 2004). Individual and human capital factors, often referred to as social capital, are central to change management approaches (Hatzakis, Lycett, Macredie & Martin, 2005). Social capital is particularly important for building psychological resilience and can ultimately contribute to building community resilience (Adger, 2006; Hegney et al., 2007; Norris et al., 2008). Bonanno, Galea, Bucciarelli and Vlahov (2007) and Pretty (2003) argue that individual well-being is a key characteristic for individuals to manage change. More specifically, emotional stability at an individual level needs to be considered as it affects the collective
capacity of the community to be resilient (Adger, 2006; Norris et al., 2008). Table 3 presents a number of factors which influence a system’s ability to be resilient. Drawing from the literature, specific factors of individual emotional stability include attachment, values, lifestyle, demographics, personality and exposure to adverse events (Bonanno, 2004; Manzo & Perkins, 2006; Seery, 2011).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beliefs/values</td>
<td>Connor, Davidson and Lee (2003), Jackson, Firtko and Edenborough (2007)</td>
</tr>
<tr>
<td>Place attachment</td>
<td>Manzo and Perkins (2006)</td>
</tr>
<tr>
<td>Exposure/frequency/severity of change</td>
<td>Bonanno (2004), Bonanno et al. (2007), Seery (2011)</td>
</tr>
<tr>
<td>Demographics</td>
<td>Bonanno (2004), Waugh et al. (2008)</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>Bonanno et al. (2007)</td>
</tr>
</tbody>
</table>

Resilience researchers have also identified institutions as central to building a community’s capacity to adapt (Berkes & Ross, 2013; McLennan, Moyle, Ruhanen & Ritchie, 2013). Such studies have explored the link between communities, regional institutions and government agencies designed to facilitate collective adaptation (Berkes & Ross, 2013). Additionally, institutions can hinder structural development and the ability to build resilience within regional communities (McLennan et al., 2013). Therefore, it is important for the dimensions of institutions to be incorporated into resilience frameworks for long-term structural change. Table 4 outlines the dimensions of institutions evident within the literature.
Table 4: Structural dimensions of institutions

<table>
<thead>
<tr>
<th>Institutional Dimensions</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competition</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Learning</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Agility/adaptability</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Performance management</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Data and research</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Arum (2000); McLennan et al. (2013)</td>
</tr>
<tr>
<td>Management processes</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Benchmarking processes</td>
<td>McLennan et al. (2013)</td>
</tr>
<tr>
<td>Interplay between scales</td>
<td>Young (2002)</td>
</tr>
<tr>
<td>Networks</td>
<td>Arum (2000)</td>
</tr>
<tr>
<td>Decision making</td>
<td>Arum (2000)</td>
</tr>
<tr>
<td>Control systems</td>
<td>Arum (2000)</td>
</tr>
<tr>
<td>Forecasting</td>
<td>Wilson (1977); Young (2002)</td>
</tr>
</tbody>
</table>

The dimensions of institutions present significant overlap with specific components of socio-ecological resilience, most notably the notion of forecasting and forward thinking. Walker et al. (2002) highlight the importance of forward thinking to prepare for the impacts of change. This is often gained through experimentation and scenario planning by analysing comparative case studies and scenario approaches. This reinforces the cyclical process of resilience, where knowledge is continually reworked into plans, and ideas and strategies are frequently tested in anticipation for different events and different forces of change that the community may face (McLennan, Pham, Ruhanen, Ritchie & Moyle, 2012). The potential impact on different community groups, resulting from these events and forces of change are also analysed and incorporated into the response and recovery strategies for strategic action (Walker, et al., 2004).

Additionally, adaptive capacity was a key dimension of institutions, which provides substantial overlap with socio-ecological resilience dimensions. Adaptive capacity is a central component of resilience, which can be assessed across, time, space and scale (Adger, Brooks, Bentham, Agnew, & Eriksen, 2004; Alberini et al., 2006). The notion of time is argued to be critical for providing a true representation of the dynamics
and multidimensionality of adaptive capacity (Adger & Vincent, 2005). Time is also central to the vulnerability of the system, as system exposure and sensitivity can vary, making time integral to assessing adaptive capacity. As adaptive capacity is evident across scales and is embedded within the operations of a variety of processes, it is difficult to capture the interrelationships between determinants when using a particular temporal or spatial scale of analysis (Vincent, 2007; Wilbanks & Kates, 1999). Predicting adaptive capacity in the future is even more fraught with difficulties, as a single change, such as a change in government, can dramatically change the determinants of adaptive capacity resulting in projections with little practical application that are either unrealistic or too broad (Vincent, 2007). Thus, some authors have argued that using the present as a proxy for the future is acceptable (Adger & Kelly, 1999; Adger, 2003).

Furthermore, adaptive capacity is scale dependent and can be identified and measured at different hierarchical levels, such as from the individual to the collective level or from the local to the national level (Adger et al., 2004; Adger & Vincent, 2005; Vincent, 2007) or within different structures, such as environmental, social or economic systems (Adger, 2003). However, different indicators of adaptive capacity are needed, as vulnerability and the capacity to adapt vary between scales (Adger et al., 2004; Adger & Vincent, 2005). Some studies have attempted to develop generic and specific adaptive capacities at different scales (Brooks et al., 2005; Leichenko & O’Brien, 2002), but these have often had data or conceptual issues (Vincent, 2007; Yohe & Tol, 2002). The scales or boundaries used by decision-makers are generally different from boundaries of a system, particularly socio-ecological systems (Cumming, Cumming, & Redman, 2006).

Consequently, a large number of studies have focused on assessments of adaptive capacity at a national scale (Vincent, 2007). These studies have generally used secondary data from national accounts to compare nations (Adger & Vincent, 2005; Brooks et al.,
2.3.9 Expanding applications of community resilience

To enhance the ability of resilience to be applied to whole community systems, studies are exploring adaptive management and adaptive governance strategies to increase the theory’s practical application with complex community systems (Cosens, 2013; Folke,
et al., 2005; Reed, Fraser, & Dougill, 2006). Adaptive management and adaptive governance are crucial to resilience thinking, and are vehicles for putting resilience theory into practice (Garmestani, & Benson, 2013). Adaptive management describes the process of learning through monitoring system responses to a particular action. This is followed by incremental changes based on what is learned through the monitoring process (Cosens 2013; Folke et al., 2005). It is a strategy that attempts to reduce the inherent uncertainty in systems, incorporating evolving knowledge into responses (Garmestani, & Benson, 2013). Adaptive governance includes the process of adaptive management, but also reflects cooperation across different levels of government agencies, informal groups, individuals, and overlapping authority of complex systems (Folke et al., 2005). Adaptive governance draws attention to the multiple power relations, and the actions of multiple jurisdictions. It also incorporates the process of involving multiple nongovernmental actors in decision making processes.

Policy restructuring is a focus of adaptive management, primarily aiming to prioritise resources, incorporate different power structures in decision-making, and establish policy that supports long-term, collaborative strategies (Garmestani & Benson, 2013; Folke et al., 2010). Current adaptation policy for socio-ecological systems is largely framed as risk management (Davoudi et al., 2012; Vis, Klijn, De Bruijn & Van Buuren, 2003). Although risk management policy has proven successful for rapid forces of change (Nelson & French, 2002; Thomalla, Downing, Spanger-Siegfried, Han & Rockstrom, 2006), risk-based approaches to resilience largely ignore that socio-ecological systems are always in flux (Ruiz-Ballesteros, 2011). Thus, this can have implications for policy to address long-term structural change. Consequently, there is a need for adaptive management within socio-ecological systems to draw on the resilience dimensions
discussed in Section 2.3.6, to establish policy which supports adaptation and builds adaptive capacity.

### 2.3.10 Resilience framework for long-term structural change

From the review of the literature, it is evident a number of limitations are inhibiting applications of community resilience, specifically to long-term structural change. To expand practical applications, a conceptual model was developed providing a framework to understand the relationship between key resilience dimensions and building resilience within community systems. As seen in Figure 8, the force of change is the initial factor that needs to be considered for building resilience within a community. The arrows reflect the direction of the impact, whilst the dotted lines represent sub factors and components of the key concepts. Drawing on the literature, adaptive capacity and vulnerability are components that contribute to and affect community resilience (Gallopin, 2006). The vulnerability of a community system can stem from internal factors, such as conflict between community groups or high unemployment. Vulnerability can also stem from factors external to the community system, such as political instability and exposure to severe weather events (Adger, 2006; Fussel, 2007). Adaptive capacity is sourced from community and individual capital, which can be leveraged to respond to forces of change.
Figure 8: Resilience framework for long-term structural change
A number of individual factors are evident in previous literature, including the emotional stability of community members (Hegney et al., 2007; Norris et al., 2008). Emotional stability at an individual level needs to be considered as it affects the collective capacity of the community to be resilient (Adger, 2006; Norris et al., 2008). Specific factors of individual emotional stability include attachment, values, lifestyle, demographics, personality and exposure to adverse events (Bonanno, 2004; Manzo & Perkins, 2006; Seery, 2011). Finally, the community response to a force of change is an outcome of community resilience. That is, the community’s level of resilience influences its capacity to respond to the specific force of change and the different response strategies that are available. Community responses to structural change are either positive or negative and can be a short or long-term focus (Berkes & Jolly, 2001; Linnenluecke et al., 2012). Therefore, building resilience within a community has the potential to influence the response options available to the community (Cutter et al., 2008b).

2.4 Gaps in knowledge

Resilience is an emerging concept within different disciplines. Multiple interpretations of resilience are evident, and the dialecticism of the term has created definitional problems (Carpenter, et al., 2001). The literature has predominantly focused on attempting to understand the multiple interpretations of resilience, and consequently this has presented practical limitations, causing resilience to be a largely theoretical concept (Adger, 2000; Norris, et al., 2008; Pickett, et al., 2004). Applications of resilience are evident; however they are mainly situated within the area of hazards and disasters (Maguire, & Hagan, 2010; Paton, 2006; Prosser, & Peters, 2010). One of the most prominent gaps within this body of knowledge is that resilience in practice is not widely applied to different forms of change. Additionally, applying resilience within the context of disaster or crisis is a
reactive, short-term approach to resilience. Resilience from this perspective does not encompass the key characteristics of resilience theory, such as anticipation and preparedness. Thus there is a need for more long-term, proactive applications of resilience which draw upon the key dimensions of socio-ecological resilience.

Studies pertaining to socio-ecological and community resilience are expanding, providing insightful contributions to knowledge in this area. However, a large proportion of studies have applied specific approaches to resilience (Larsen et al., 2011; Maguire & Hagan, 2007). That is, resilience has frequently been explored for specific community groups, generally groups that are most affected by the force of change. Further research is required to explore how community-wide capacity can be leveraged to address different forces of change, whilst recognising all groups and aspects of the community system, including environmental, economic, social and institutional.

More specifically, the tourism and resources sectors are gaining increased attention within regional development strategies for the change each sector creates for the community. However, studies exploring resilience to structural change are limited, with existing studies predominantly drawing on economic interpretations of resilience. Further research is needed to build on existing studies of resilience to structural change and adopt a community resilience perspective to address the impacts of structural change across all community systems.

There is much support in the literature for the need to expand applications of resilience (Holladay & Powell, 2013; Zautra et al., 2008). The development of instruments to measure resilience has aided research in this area (Holladay & Powell, 2013; Quinlan, Berbes-Blazquez, Haider & Peterson, 2016). Yet, this is an emerging area of literature, with only a limited number of tools to measure resilience available. The context specific nature of indicators within existing instruments means these instruments cannot accurately measure
resilience across different system structures and to different forces of change. The development of standardised tools does not enable resilience within complex adaptive systems to be measured easily (Quinlan et al., 2015). The literature is currently void of an instrument to measure resilience to long-term structural change. Nevertheless, existing instruments provide fundamental insights into properties of resilience within community systems. Further research is required to build upon existing instruments to devise an instrument to effectively measure community resilience to long-term structural change.

2.5 Research objectives

As mentioned in Section 1.4, the aim of this research is to examine the resilience of regional communities in order to provide direction for building resilience to long-term structural change driven by the tourism and resources sectors. The overarching aim of this research is achieved through three key research objectives:

1. Develop an instrument to measure community resilience to long-term structural change driven by the tourism and resources sectors
2. Determine levels of resilience among different segments within communities undergoing long-term structural change driven by the tourism and resources sectors
3. Identify guidelines for harnessing community resilience to address long-term structural change driven by the tourism and resources sectors

2.6 Chapter summary

Chapter Two has presented a detailed review of the resilience literature to develop a theoretical framework to guide this research. The chapter began by presenting the origins and concepts which have shaped resilience theory. Resilience theory has emerged from a
synthesis of different change theories, including adaptive theory, transformation theory and chaos theory.

The chapter then undertook a detailed review of the resilience theory literature. Although resilience theory has expanded and is now widely adopted by a range of disciplines, this has caused definitional problems. Examining the intersection between resilience, vulnerability and adaptive capacity aided in establishing clarity with regard to the resilience interpretation adopted for this research. A socio-ecological perspective of resilience was deemed most appropriate for the context of this research, and a review of resilience from this perspective was undertaken in Section 2.3.4. The review then focused more specifically on community resilience interpretations in Section 2.3.5, highlighting applications in the context of the tourism and resources sectors. This body of literature was found to be largely conceptual, with limited applications adopting a community resilience perspective.

As the present study is specifically focusing on applying community resilience to long-term structural change, the existing community response strategies to long-term structural change were examined. Both long and short-term responses were identified within existing strategies; however, responses were not able to effectively address the complexity of the community system. To understand how resilience can be applied as a response strategy to long-term structural change, the dimensions of community resilience were then explored in Section 2.3.8. This literature review has revealed the key dimensions of community resilience, including collaboration, communication and planning. Additional dimensions of resilience were also uncovered such as the emotional stability of individuals, as well as system characteristics, such as adaptive capacity and the notion of panarchy. Section 2.3.9 also found adaptive management and policy restructuring to be attributes which could expand the concept of resilience.
From the review, a resilience framework was presented in Section 2.3.10, to understand the relationship between key resilience dimensions and building resilience within community systems. Following this, Section 2.4 presents the current gaps in the resilience literature. Although the review highlights that resilience is a broad concept, community resilience studies in the context of long-term structural change are limited. Additionally, existing tools to measure community resilience are also context specific, limiting the ability of these instruments to measure community resilience to long-term structural change. Section 2.5 then presented the research aim and objectives. Chapter Three details the methodology employed in this study to achieve the aim and objectives of this research.
3 CHAPTER THREE: METHODOLOGY

3.1 Introduction

Chapter Three identifies and discusses the research method selected to achieve the aim and objectives of this study. This research was undertaken with ethical clearance obtained from the Southern Cross University’s Human Ethics Committee and was carried out as outlined in the conditions of approval (approval number ECN-15-125). The chapter commences by outlining the philosophical approach in Section 3.2, followed by a review of previous methods used in community resilience studies (refer to Section 3.3). Next, the chapter details the research design in Section 3.4, consisting of a sequential mixed mode approach across four stages, to collect the data required for this research. The case study selection process is then explained in Section 3.5, followed by a brief overview of the case study regions in Section 3.6. The sequential stages are then discussed at length in Sections 3.7 to 3.10. Stage One involves an analysis of previous studies to establish preliminary indicators for the instrument to measure community resilience to structural change. Stage Two employs the Delphi technique to select and refine indicators for use in the scale. Stage Three consists of a resident survey which tests the instrument, whilst also providing an assessment of the levels of resilience of different segments within each region. Finally Stage Four focuses on the analysis of data from the resident survey.

3.2 Philosophical approach

The philosophical approach refers to the theoretical underpinnings which inform the research undertakings (Pearse, 1983). It is determined by the perspective on truth and reality, the position within the phenomenon being studied, and the approach to gathering the required knowledge (Greene & Caracelli, 1997). This constitutes the ontological,
epistemological and methodological stance, forming the basic system of beliefs (Guba & Lincoln, 1994; Pearse, 1983). Understanding the philosophical approach also influences the interpretation and communication of findings, contributing to the knowledge being generated (Mertens, 1998). Long-term economic structural change is a complex area of study (Connolly & Lewis, 2010). Additionally, the complexity of this research is heightened as it draws together diverse bodies of literature, including evolutionary change theories, complex systems theories, management and development approaches. These bodies of literature cross various disciplines including sociology, economics, geography, and psychology, among others (Linnenluecke et al., 2012; Nelson & Winter, 1982; Zautra et al., 2008). Consequently, selecting a single research paradigm to underpin the research presents challenges and can restrict the ability to address the research problem. Thus, it is necessary for the researcher to draw from multiple paradigms (Gladwin, Kennelly & Krause, 1995).

A dialectic philosophical stance underpins this research as it draws upon multiple world views and philosophical perspectives (Greene & Caracelli, 1997). The dialectical paradigm is subject to multiple interpretations, as it is influenced by different contextual applications. However, debate exists as to whether dialectic can be considered a paradigm in its own right (Greene & Caracelli, 1997; Rocco, Bliss, Gallagher & Perez-Prado, 2003). The premise of the dialectic philosophical approach emerged from philosophers such as Marx, Hegel, and Engels, each of whom viewed the ‘dialectic’ paradigm differently. For example, Marx associated dialectic with the view that everything changes and is finite, while Engels perceived dialectic as a process (Knapp, 1999). More contemporary interpretations of the dialectic philosophical stance stem from the research question itself, where the complexity of the problem or question can only be perceived thoroughly from multiple philosophical stances, allowing the researcher to balance idealism and practicality to find the best solution (Rocco et al., 2003). There is much support for this interpretation in existing literature which
uses multiple techniques and combines philosophies in a rationalistic way (Creswell, 2003; Creswell, Plano Clark, Guttmann & Hanson, 2003; Greene & Caracelli, 1997; Loye & Eisler, 1987).

The current research has built on this understanding of the dialectic stance deliberately using multiple paradigms to expose contradictions and differing viewpoints (Knapp, 1999). A dialectic stance argues that a greater understanding of the research area can be provided by using multiple paradigms as different perspectives can provide unique insights in the area of study (Creswell et al., 2003; Rocco et al., 2003). This perspective of the dialectic paradigm draws upon pragmatist philosophical underpinnings, where the research question or aim is central to the methodological approach and is not tied to one specific philosophical perspective (Hanson, Creswell, Plano Clark, Petska & Creswell, 2005; Pansiri, 2005). Although closely linked to the pragmatist paradigm, this interpretation differs by exploring all options to establish the most appropriate approach (Knapp, 1999). Within the dialectic philosophical stance, qualitative and quantitative methods are therefore accepted, with the selection of methods dependent on what is the most appropriate for the particular purpose. Seo and Creed (2002) also argue the suitability of the dialectic paradigm when researching change in complex system structures for its flexibility and ability to adopt different perspectives. Subsequently, a dialectic research paradigm underpinned the design and methodological approach in this research.

Although all paradigms were considered and influence the research approach, this research predominantly draws upon the positivist, interpretivist and constructivist paradigms. The interdisciplinary nature of resilience theory has meant that each of these paradigms has been adopted by different researchers to explore the concept of resilience within various systems (Gonzales, Chronister, Linville & Naomi, 2012; Miller et al., 2010; Plummer & Armitage, 2007; Sterling, 2010). However, resilience research has
predominantly been influenced by the positivist paradigm, stemming from the scientific origins of resilience and its strong correlation with vulnerability (Berkes, 2010; Davoudi et al., 2012; Miller et al., 2010; Zebrowski, 2013). This research too draws from the positivist philosophical stance. Given the primary focus of this research is to measure resilience within a community setting to determine how it can best be harnessed, this aligns with the epistemology of positivism that phenomena can be defined and measured (Krauss, 2005; Schrag, 1992). Furthermore, specific stages of this research aim to quantify variables for statistical and comparative analysis, developing inferences from a representative sample of the population (Krauss, 2005).

The interpretive paradigm also influenced the research design, as resilience is largely a social and subjective construct (Ungar, 2004, 2011). Within the interpretive paradigm, reality can be socially constructed. In contrast to positivism, it allows for multiple perceptions or explanations of the phenomenon to be presented (Mertens, 1998; Ponterotto, 2005). In order to understand the resilience of community members, individual perceptions were explored within this research to give meaning to the perceived reality of community resilience. This further draws upon constructivism, which is emergent in the interpretive paradigm, where knowledge is constructed through the available access to information and the existing knowledge that has been developed through experiences (Ponterotto, 2005; Ungar, 2004). Thus, in order to measure and harness resilience, approaches were underpinned by community perceptions.

3.3 Previous methods used in resilience studies

To determine an appropriate method for this research, resilience studies stemming from various disciplinary perspectives were reviewed, specifically focusing on a community
perspective (refer to Appendix B). The review consisted of 27 studies with similar aims and objectives to this research, all of which had explored resilience within a community context.

3.3.1 Collection of previous studies

The studies acquired for this review were selected through a systematic and analytical approach, adopting a process successfully applied by Bec et al. (2016) and Moyle et al. (2014) in other studies. This process involved conducting an online search, collating articles in a reference manager, and then selecting articles based on developed criteria. A Google Scholar database search was conducted from which possible articles were imported into a reference manager. The search for studies in the Google Scholar database was guided by four key words including ‘resilience’, ‘resilience application’, ‘community’, and ‘resilience building’. These words were used in combination with one another or with other key community resilience terms such as ‘socio-ecological’, refining the search results, making them more specific to the selection criteria of the review.

Criteria were then developed and used to assess the suitability of studies for the review. The criteria consisted of three main points: 1) studies must have applied resilience (from any perspective) within a community setting, with the parameters of the community clearly defined; 2) studies must consist of empirical research; 3) the research presented in the study must be community-based research, with community members, representatives or stakeholders as central research participants. This selection process was designed to ensure that the articles collected captured a broad and representative pool of community resilience applications, yet studies still retained the community focus for which resilience was being explored.

This search strategy resulted in an initial pool of 106 potential articles. These studies were then assessed more critically against the selection criteria. From the 106 identified articles, 71 were excluded on the basis that they were theoretical studies which proposed
frameworks for applying resilience, yet did not conduct empirical research. It was also found that 8 of the publications were completed using the same data sets of other studies. These studies were also excluded from the review to avoid bias reporting. Consequently, a total of 27 studies were found to be suitable for the review. Please refer to Appendix B for more information on the specific studies selected for this review. The key findings from this review of previous methods are presented in the following sections and have implications for the research design.

3.3.2 Assessment of methods

The review of previous resilience studies uncovered a number of similarities and differences in the methods applied. Studies were analysed according to four key factors that characterise the research method. These included the method employed, the data collection instruments, sampling, and the data analysis (Bryman, 2016). The method refers to the implementation of qualitative, quantitative or mixed research methods, which provided insight into how resilience is being measured and assessed in existing studies. The data collection instrument referred to the specific methods that were employed, such as surveys or interviews, including any scales or measurement tools that were developed or adopted within these instruments. Sampling techniques were analysed to explore the most appropriate method to approach and recruit participants, thus it was also important to review the population that was sampled and sample size. Finally, reviewing the data analysis techniques informed how the data were analysed and interpreted to produce findings (Bryman, 2016).

A review of existing methods revealed that all of the 27 articles reviewed employed a case study approach, where one or multiple communities formed the context and parameters of the research. Consequently, the case study context often dictated the methods employed. The review presented a number of similarities within the methodologies
employed across the studies. Of the 27 articles collected, only 5 studies employed a purely quantitative approach. The majority of studies adopted either a qualitative or mixed methods design, with mixed method approaches being employed by 11 studies. For the qualitative methods, interviews were clearly the most common method. From the 27 studies, 18 adopted the interview method. However, interviews were adopted in various formats, many of which differed from a traditional qualitative interview technique. Frequently, studies did not disclose this information, thus its use as a qualitative method was determined if it produced qualitative data for the study. Additional popular methods in mixed method research included the use of focus groups (8) and observation (7).

For the quantitative methods, surveys/questionnaires were the most commonly used data collection method. These methods were used in a total of 8 studies each. It is important to note that several studies administered the surveys and questionnaires as structured interviews. The studies identified additional qualitative data as being produced by this approach, however these data remained separate from the survey or questionnaire data, unless specifically relevant to research questions. The scales or attributes of the measurement tools used within these instruments were disclosed within only 7 of the articles. Of the articles which did present this information, 4 adapted existing scales and indexes for their study. Measurement systems used to gauge resilience within the community consisted of indicators ranging between 15 and 74 items. On average, 35 items were used to measure resilience, with 4 of the 7 studies grouping items under categories, generally from a system perspective (e.g. social, ecological, economic or institutional).

Further similarities between studies were identified within the sampling strategies. Aligning with the selection criteria for the articles, community members or stakeholders were the central research participants across all studies. The sampling technique used to recruit participants was stated by 23 of the studies and these approaches were generally
classified as either random or non-random. Given that 11 studies employed a mixed methods design and a further 7 studies employed a mixed mode approach (the use of multiple data collection tools), multiple sampling techniques were often used for each study. Random sampling was conducted by 7 studies, many of which highlighted the desire of attaining a representative sample. However, the systematic approach that was employed to ensure a random sample was only disclosed in 2 studies. On the other hand, non-random sampling was more commonly utilised. From the available information, 17 studies used a non-random sampling technique. Purposive sampling was the most common technique (13), which was commonly used in conjunction with snowball sampling (6). The overwhelming number of non-random sampling techniques aligns well with qualitative studies (given that 22 studies had a qualitative component), as the focus is often selecting the most appropriate participants for the particular study, with studies rarely making generalisations of the findings to be representative of the entire community (Onwuegbuzie & Leech, 2007; Patton, 2002).

In contrast, a key dissimilarity between studies uncovered from the review was the significant differences in sample size. This sizeable variation was largely dependent on the research itself, including the project size, the method employed, the purpose of the data collection stage, and the size and type of the community context. Studies which employed either surveys or questionnaires as the primary data collection method had a sample between 90 and 1000, with the average being 250 participants. As mentioned, this large variation was greatly influenced by the size and breadth of the study, as some examined large communities across several countries, whilst others focused on one small rural community. For studies which employed interviews as a primary data collection method, participant numbers ranged between 10 and 82. Specific numbers for focus groups were rarely expressed.
Finally, among the reviewed studies, descriptive statistics were the most common (9) forms of analysis for quantitative data where the quantitative component was not the primary collection method. For studies with a substantial quantitative component, a number of specific statistical tests were also identified including t-tests, chi-square test, correlation and regression analysis and factor analysis. Studies which undertook multivariate analysis generally used the results to make inferences about resilience within these communities. Qualitative data were often described as being subjected to comparative analysis and thematic analysis methods, yet minimal description was provided. The results obtained from these types of analysis often used the data to explain the resilience of individuals or groups, or to identify vulnerable areas of the community.

The types of analysis presented here are limited and may not be an accurate summary of the existing study methods. Nevertheless, they still serve as guide to data analysis approaches that have been adopted within similar studies.

3.3.3 Implications of previous studies for research design

By undertaking a review of existing research methods for exploring resilience within a community context, two key points were identified. Firstly, it was clear that research in this area has been largely conceptual, with fewer than 30 empirical studies identified. This supports the argument arising in Chapter Two, which highlighted the need for more long-term empirical applications. Secondly, this review examined the methods previously employed in community resilience studies, informing the most suitable methodological approach for this research. Although qualitative methods were the most common within previous studies, quantitative methods were also suitably implemented within studies attempting to measure resilience. The qualitative methods provided detailed insight into the specific experiences and perceptions influencing resilience within the community, from different social, economic and environmental viewpoints. Thus, both methods were equally
important for exploring resilience within a community context. As a result of this review and in alignment with the research objectives of this study, a quantitative mixed mode approach was selected for the present research. Previous studies argue that a qualitative approach exploring key stakeholder perceptions, community networks and social capital, is valuable to supplement quantitative data and direct community resilience guidelines (Kulig et al., 2008; Wyche et al., 2011). However, in-depth interviews with stakeholders are beyond the scope of this research. The objectives of this research seek to devise an instrument to measure resilience, whilst also assessing the resilience levels of community segments. Aligning with studies which have sought to achieve similar objectives (Holladay & Powell, 2013; Miller, 2001), a quantitative approach was the most suitable. It is also evident that a case study approach was a dominant method in past studies, due to the contextual parameters which tend to constrict resilience applications (Benard, 2002; Davoudi et al., 2012). Consequently this research adopts a case study approach to provide a context for community resilience to be examined and harnessed. The case study approach within the overarching research design is presented in the following section. Efforts have been made to select the most appropriate method for this research and mitigate the weaknesses of the methodological approach. However, limitations are still evident and are discussed in Chapter Seven (refer to Section 7.5 on page 209).

### 3.4 Research design

Considering the approaches undertaken by previous community resilience studies, Section 3.4 outlines the overall design for this research and discusses how this approach achieves the research aim and objectives. As stated in Section 3.3.3, this research adopts a quantitative mixed mode approach. A mixed mode research design applies multiple quantitative methods at several stages of a study (Creswell et al., 2003). The dialectical
paradigm supports the use of multiple techniques, recognising the merits of combining methods particularly when the research takes place in complex system structures and overlaps multiple areas of study (Knapp, 1999; Seo & Creed, 2002).

A comparative case study approach is the overarching method for this research. A comparative case study approach is acknowledged as highly suitable for empirical enquiry that investigates a contemporary phenomenon within its real life context, enhancing the practical contribution of the research (Yin, 2009). For this research two case study regions were selected that demonstrate distinctly different dependencies on the tourism and resources sectors. Understanding how different sectors and a region’s level of dependence on each sector affect the resilience of the community will enable change to be better managed. The case study selection process and further background information on the selected regions are discussed in detail in Section 3.5.

Within this broader case study approach, a sequential mixed mode process was adopted that employed the most appropriate methods for answering the research questions. As displayed in Figure 9, each case study is subjected to the sequential mixed mode process that consists of four key stages. To achieve the aim and objectives of this research, each stage contributes to satisfying a Research Objective. Each stage is discussed in-depth in the following sections.
3.5 Case study selection process

The aim of this research is to examine the resilience of regional communities in order to provide direction for building resilience to long-term structural change driven by the tourism and resources sectors. To successfully achieve this aim, community resilience is studied within two regions with different levels of tourism and resources sector dependency. Case studies were selected through a detailed process that utilised a set of specific criteria to identify two regions which were the most appropriate for this research. As this research aims to explore community resilience in regard to the forces of change stimulated by the tourism and resources sectors, the presence of each sector within a region is an integral factor to the selection of the case studies. A sector’s presence is assessed based on the significance and level of dependency the sector has within a region. The resources sector is a broad and
widely encompassing sector, whose economic contribution to a region can be difficult to measure. The resources sector is interrelated with the mining industry and Tonts et al. (2012) acknowledges that resource-based communities tend to be situated within or near large mining regions. Thus, assessing Australian states and regions for presence of the mining industry would be a valid means of identifying strong resource-based communities. 

The selection of appropriate case studies consisted of a three phase process:

1. To determine the significance and level of dependency on the tourism and mining industry within each Australian state and territory, according to the economic importance and industry size
2. To determine regions with a strong presence of the tourism and mining industries, and determine the size and region’s level of dependency on each industry (based on industry size by number of businesses)
3. To select comparative case study communities with economic structures representing High Tourism/Low Mining and Low Tourism/High Mining industries.

Please refer to Appendix C for more detail on the three phase process.

3.6 Research setting

The tourism and resources sectors are two of Queensland’s most active sectors and largest exports (Thomas, & Mickel, 2013), with both sectors displaying a clear presence within the Mackay and Whitsunday regions. The Mackay and Whitsunday regions are adjacent regions on the east coast of central Queensland, functioning within the same state government legislative jurisdiction. The parameters of the two regions are defined according to 2014 classification of the Local Government Area (LGA) boundaries (Queensland Government, 2015). The LGA classifications clearly define the community parameters and structures, such as local governance and policy structures, making boundaries easily
recognisable. Data from the Australian Bureau of Statistics also coincide with LGA boundaries, making data easily accessible for these communities. Given that these regions are geographically and contextually similar, they were deemed highly appropriate to achieve the research objectives. The following sections provide an overview of the Mackay and Whitsunday regions and specific background related to their resources and tourism sectors. For a more detailed contextual overview of the Mackay and Whitsunday regions, please refer to Appendix D and Appendix E respectively.

3.6.1 Mackay

Mackay is located on the eastern coast of Queensland, approximately 970km north of Brisbane, on the Pioneer River (Tourism Queensland, 2012a). There are three sectors which underpin the economy: resources, agriculture and tourism. The region has diverse natural resources and is within close proximity to the mines (Mackay Regional Council, 2011). At June 2013, the population of Mackay was approximately 121,900 (Australian Bureau of Statistics, 2013a).

The resources sector is Mackay’s most dominant economic sector, employing more than 17% of the population (13,000) (Australian Bureau of Statistics, 2013b). The region also has a high Drive-In-Drive-Out (DIDO) and Fly-In-Fly-Out (FIFO) population. Mackay is not regarded as being a central area for mining production. However, its strategic proximity to large mining areas, major highways, and train lines ensures its participation in the mining and resource-based activities of the surrounding regions. Mackay’s large port makes it a central location for mining exports. The region also has the capacity to manage the influx of people as a result of the resources sector growth, through infrastructure and development (Mackay Regional Council, 2011). The downturn in the resources sector has severely impacted Mackay’s economy, given its reliance on the sector, presenting long and short-term challenges (Warren, McDonald & McAuliffe, 2015).
The tourism sector, in comparison to other tourist destinations near Mackay and around Queensland, is small and still developing. However, the sector employs approximately 4% of Mackay’s workforce (Tourism Queensland, 2012a). The total number of visitors to the Mackay region was 692,000 for the year ending December 2013 (Tourism and Events Queensland, 2013b). Mackay has the potential for a strong tourism industry given its coastal location, warm weather and close proximity to the world renowned Great Barrier Reef and to Eungella National Park. However, the strong resources sector presents an ongoing challenge for fostering a vibrant tourism sector, as industrial activity dominates the landscape. Business travellers currently dominate the market (more than 41%), driven by the growth of the resources sector and other industries, yet this creates challenges for attracting other tourist markets. In particular, during boom periods for the resources sector, Mackay can be considered an expensive destination for most leisure travellers and cannot compete with destinations whose pricing strategies are targeted towards leisure travellers (Mackay Regional Council, 2014).

The pace of structural change within Mackay frequently fluctuates, yet rapid change mainly occurred during the boom and bust periods of the resources sector. At present, the region is experiencing slow change. However, the community is still trying to manage the continued decline in the resources sector.

3.6.2 Whitsunday

The Whitsunday region is located on Queensland’s central coast, approximately 1,100km north of Brisbane and 100km northeast of Mackay. The region comprises 74 islands in the Whitsunday passage and also includes the adjacent mainland coast of Australia. The mainland area encompasses the rural town of Proserpine, the mining town of Collinsville, and the coastal towns of Airlie Beach, Cannonvale and Bowen. The local economy is driven by the tourism, resources and agriculture sectors (Queensland
The residential population of the region at the end of 2012 was estimated to be 36,000 (Australian Bureau of Statistics, 2013a), most of whom reside in Airlie Beach, Proserpine and Cannonvale.

The tourism sector in the Whitsunday region makes a significant contribution to the development of the regional economy, directly employing more than 34% of the workforce in the region (Tourism Queensland, 2012b). Tourism is estimated to contribute more than $300 million in revenue, the equivalent of approximately 6.5% of the region’s GRP for the year ending December 2011 (Tourism Queensland, 2012b). The Whitsunday Islands are in the heart of the World Heritage Listed Great Barrier Reef (GBR). This distinctively characterises the region’s tourism attractions, with resorts operating off 5 islands. The tourism market is driven by leisure travellers, receiving approximately 687,000 visitors for the year ending December 2013. Its reputation also spans the national and international market (Tourism and Events Queensland, 2013c).

Like Mackay, the Whitsunday region is not considered to be a mining town. However, the region is easily accessible to large coal mines and the effects and impacts of the industry can be felt within the region. The Whitsunday region has also had involvement with the resources sector through the FIFO and DIDO workers (Queensland Government, 2012). However, the presence of the resources sector is expected to increase and become more prominent within the Whitsunday region through increased resource activity within the Collinsville and Bowen areas, due to the opening of new mines and the potential expansion of the Abbot Point coal terminal. This is expected to greatly stimulate the presence of the resources sector, and increase the sector’s contribution to the economy (Queensland Government, 2012; Whitsunday Regional Council, 2011).

The speed at which structural change occurs in the Whitsunday region is often determined by the external economic conditions. The tourism sector tends to produce slow,
gradual change for the region, yet the growth in the resources sector can lead to rapid change. Recent decline in the resources sector has slowed the current pace of change within the region, yet structural change remains evident.

3.7 Stage One: Analysis of previous studies

Section 3.7 presents a detailed overview of the analysis of previous studies employed within Stage One of this research. Figure 10 demonstrates the position of this research method within the overarching research design. An analysis of previous studies was undertaken to select the type of instrument required to measure community resilience. Additionally, the analysis was also employed to review existing community resilience indicators to guide the development indicators for the measurement tool.

Figure 10: Research design Stage One
3.7.1 Selecting the measurement tool

As distilled from the literature, to harness the notion of resilience within a community it is necessary to measure and understand the community’s current level of resilience (Holladay & Powell, 2013; Zautra et al., 2008). The literature review has uncovered a number of instruments designed to measure resilience within different community systems. However it has been demonstrated in Section 2.4 that each of these has significant limitations. Consequently, existing scales are limited due to an inability to effectively measure community resilience to long-term structural change, resulting in the need for the development of such a measurement tool. This research aims to fill this void, by developing a tool to measure community resilience, specifically to long-term change driven by the tourism and resources sectors.

A review of different studies found that indexes and scales are the most common measures of resilience (Holladay & Powell, 2012; Jordan & Javernick-Will, 2013; Paton et al., 2001). Although indexes and scales are similar, and often used interchangeably as both use items for measurement, there are differences between them. Although differences are contested in the literature, a number of authors have agreed that a primary difference is that a scale can identify the relative intensity among responses and assess patterns in responses, by considering inter-item correlations (Clark & Watson, 1995; Diamantopoulos & Winkhofer, 2001). Alternatively, an index combines these observations without considering their inter-correlations (Diamantopoulos & Winkhofer, 2001). However, scale items are unidimensional, whilst an index is multidimensional (Gardner, 1995). Given that resilience is a multifaceted concept, the items in the instrument were multidimensional. Thus, an index was developed to measure community resilience to long-term structural change. Nevertheless, scales were developed to measure unidimensional constructs such as perceptions of change and emotional stability.
The primary purpose of developing an index or scale is to produce a valid measure of an underlying construct (Clark & Watson, 1995). To achieve this, considerable attention must be given to the instrument development process to ensure measurement items are valid and reliable. Section 3.7.2 and 3.8 outline the process used to develop the indices to measure community resilience.

### 3.7.2 Identification of resilience indicators

Indices have been developed to measure a variety of constructs including the impact of a particular phenomenon, sustainability, and environmental hazards and risks (Clark & Watson, 1995; Green, Hunter & Moore, 1990; Miller, 2001), among others. Since measures are often used before adequate data exists regarding their reliability and validity, emphasis is placed on the development of the index, specifically the practices, processes and assessments that are undertaken (Hinkin, 1995). Index development has been extensively discussed within the methodological literature (Clark & Watson, 1995; Worthington & Whittaker, 2006). However, best-practice for scale and index development is not clear, resulting in varied approaches (Okoli & Pawlowski, 2004).

Previous studies agree that the process of selecting indicators is integral to developing a reputable measurement tool (Miller, 2001; Worthington & Whittaker, 2006). It is common practice for indicators to initially be drawn from the literature (Burton, 2012; Holladay & Powell, 2013; McLennan et al., 2013; Worthington & Whittaker, 2006; Zautra et al., 2008). Consequently, this research undertook an extensive literature review to catalogue community resilience indicators from previous studies. Thirty-one vulnerability and resilience studies were reviewed to identify community resilience indicators. Studies were selected following a systematic review process, similar to the process employed in Section 3.3.
As resilience is a relatively new area of enquiry, there was a limited range of empirical studies that provided community resilience indicators that could be adopted for this research. Often these studies did not present a holistic list of indicators capturing the resilience concept (Holladay & Powell, 2012). Instead, such studies only presented a relatively narrow set of indicators (Cutter et al., 2008b; Holladay & Powell, 2013; Jordan & Javernick-Will, 2013). As a result, the studies being considered had to be broadened to account for long-term structural change, encompassing resilience and vulnerability studies from environmental science (Davidson, van Putten, Leith, Nursey-Bray, Madin & Holbrook 2013), sociology (Peacock et al., 2010), and psychology disciplines (Buikstra et al., 2010). Appendix F presents the list of studies which were used to extract community resilience indicators. However, the dialecticism of the concept of resilience, and the multiple interpretations that are evident, caused challenges in identifying potential community resilience indicators. As a result, indicators were only included only if they were specifically relevant to socio-ecological resilience within community systems or could be adapted to such a context.

From reviewing the 31 studies, a list of more than 200 indicators was compiled, which also charted the frequency of each indicator within different studies. Based on a process by Miller (2001), this list was reviewed by three experts in the field. Indicators were reworked to standardise the mixed use of personal pronouns and tense. Indicators with a similar meaning or purpose were also collapsed into one improved indicator. New statements were also inductively drafted to capture specific elements of long-term structural change. The process of revising indicators was rigorous, to ensure quality and reduce personal opinions being imposed. This process resulted in an initial list of 87 indicators (refer to Appendix G). The literature debates the best approach to further refine and validate a list of indicators. There is general consensus that the most rigorous approach is to refine
the list via a Delphi panel of experts (Choi & Sirakaya, 2006; Jordan & Javernick-Will, 2013; Miller, 2001; Tsaur, Lin & Lin, 2006). Consequently, the Delphi technique was employed to refine the extensive list of indicators into a core set of highly relevant indicators. The Delphi study procedure is detailed in Section 3.8.

3.8 Stage Two: Delphi technique

The Delphi technique was employed in Stage Two to facilitate the expert panel process that was used to refine the set of indicators that could then be used in the instrument to measure community resilience to long-term structural change. Figure 11 presents the Delphi technique within the overarching research design to clearly demonstrate its position within this research. The Delphi expert panel process systematically combines expert knowledge to refine and make judgement on a particular subject matter, based on a given rationale (Miller, 2001; Park & Yoon, 2011). The purpose of this Delphi technique was to identify, assess and refine the list of 86 indicators (Choi & Sirakaya, 2006), by pooling the collective knowledge of experts and stakeholders to determine the key indicators to measure community resilience. A Delphi study is usually conducted over several rounds to achieve its objective (Okoli & Pawlowski, 2004). As there are many ways to undertake a Delphi study (Cole, Donohoe & Stellefson, 2013; Donohoe & Needham, 2009; Green et al., 1990), Section 3.8.1 reviews the various Delphi approaches was undertaken to determine the most suitable method for this research. Following the review, a detailed overview of the participant selection process for the Delphi panel is presented, leading to an in-depth discussion of the Delphi technique employed within this research.
3.8.1 Review of Delphi procedures

The review of prior Delphi studies initially incorporated all versions of the Delphi technique, including traditional, modified Delphi, fuzzy Delphi, eDelphi and Policy Delphi, among others (Chang, Huang & Lin, 2000; Lindsay, Schull, Bronskill & Anderson, 2002; Pikora, Giles-Corti, Bull, Jamrozik & Donovan, 2003). When exploring different Delphi studies, it was evident that the Delphi technique had been extensively used across an array of disciplines for diverse purposes, but primarily for: 1) forecasting and issue identification/prioritization; 2) concept and framework development; and, 3) the development and assessment of indicators (Miller, 2001; Pikora et al., 2003; Rowe & Wright, 1999). Upon reviewing these studies it was concluded that the design of the Delphi technique greatly differed between different types of research and those that were not assessing indicators were irrelevant to the present study. Consequently, the scope of the Delphi study review was delimited to focus on studies employing the Delphi technique to
refine a set of indicators, resulting in 13 studies being included in the review. Refer to Appendix H for an overview of the studies included in this review, and the different Delphi techniques which have been employed.

The assessment of the prior studies revealed electronic communication to be common within Delphi studies, however, the eDelphi technique, which uses an online platform to administer the questionnaire, is experiencing rapid growth (Cole et al., 2013; Gill, Leslie, Grech & Latour., 2013). The use of binary and Likert type measures was very common reflecting the need for the Delphi process to elicit quantitative data to assess the appropriateness of indicators (Brennan Ramirez et al., 2006; Jordan & Javernick-Will, 2013). Likert type measures were the most common, although binary were favoured when there were a particularly large set of indicators to be reviewed (Boulkedid, Abdoul, Loustau, Sibony & Alberti, 2011; Campbell, Cantrill & Roberts, 2000; Miller, 2001).

Traditionally, the first round of a Delphi study encompasses a qualitative component, where participants have the opportunity to suggest other appropriate indicators (Green et al., 1990; Hasson, Keeney & McKenna, 2000; Okoli & Pawlowski, 2004; Taylor & Judd, 1989). The value of providing an exploratory, open-ended question was recognised, with the majority of studies (10) in the Delphi review adopting a qualitative component. However, this was not a particularly prevalent approach solely for the first round. Rather studies incorporating a free response section throughout the Delphi process, allowed expert panellists to comment, offer advice and potentially justify their decisions and opinions (Beattie & Mackway-Jones, 2004; Cole et al., 2013; Miller, 2001). In particular, Cole et al. (2013) found this to be a useful approach when panel members have a range of expertise. The open response section provides participants the opportunity to highlight an indicator that may be overlooked by the majority of panellists (Cole et al., 2013).
The provision of feedback and results from the previous Delphi questionnaire round was also deemed as an important component of the Delphi technique, to allow panel members to view the different perspectives of the other panellists (Boulkedid et al., 2011; Cole et al., 2013). Most studies acknowledged the incorporation of feedback from the previous round into each questionnaire round (Beattie et al., 2004; Boulkedid et al., 2011; Choi & Sirakaya, 2006; Jordan & Javernick-Will, 2013; von der Gracht, 2012). Feedback often included the group mean and anonymous comments that justified any ratings that did not conform to the mean. Jordan and Javernick-Will (2013) argue that this allows panellists to consider the reasoning behind outlying responses and to make decisions based on a variety of perspectives.

Alternate views within the literature were presented regarding the number of Delphi questionnaire rounds and the point of conclusion for a Delphi technique. For indicator studies, the Delphi technique usually consisted of two to three questionnaire rounds. A Delphi study was often concluded when consensus among panellists was achieved (Beattie & Mackway-Jones, 2004; Lindsay et al., 2002; Miller, 2001). However, studies outside of the indicator literature provided insightful information on determining the consensus for this particular research. There are many debates in the literature over the point of conclusion for the Delphi technique and what is considered to be ‘reaching a consensus’ (Boulkedid et al., 2011; Hsu & Sandford, 2007). Von der Gracht (2012) argues that the point of conclusion should be based on stability rather than consensus. Whilst some authors view stability to be a measure of consensus (Scheibe, Skutsch & Schofer, 1975), more recent studies have viewed these two concepts as being distinctly different (Boulkedid et al., 2011; Hsu & Sanford, 2007; von der Gracht, 2012). Stability is when there is minimal or no change in responses between questionnaire rounds, where consensus is the point at which agreement between panel members is determined (von der Gracht, 2012).
Indicator studies support the conclusion of the Delphi technique being determined by stability, as consensus may not be attainable or appropriate (Cole et al., 2013). Reaching a consensus between panellists may result in important indicators being eliminated. Rather, the multiple perspectives and opinions on the indicators should be embraced, making stability an important gauge (Cole et al., 2013; Jordan & Javernick-Will, 2013; von der Gracht, 2012). This is because if there is little change between rounds then it can be expected that there will be minimal change in responses in subsequent rounds (Miller, 2001). Some studies determined the conclusion of the Delphi technique to be when both consensus and stability were achieved (Cole et al., 2013; Hsu & Sandford, 2007; Okoli & Pawlowski, 2004). However, the value of this for indicator research was not extensively discussed, with studies alluding to potential implications for the quality of indicators (Boulkedid et al., 2011; von der Gracht, 2012).

Reviewing the various Delphi technique procedures, and uncovering the most effective approaches for employing a Delphi technique to select and refine indicators, strongly informed the approach that was undertaken by this research. More specifically, key decisions for the Delphi technique such as the administration, point of conclusion, and the development and design of the instrument, have informed the approach and are explained in Section 3.8.3.

3.8.2 Participant selection

Selecting the Delphi panel participants is the most critical step in index or scale development, as it influences the quality of the indicators (Okoli & Pawlowski, 2004; Taylor & Judd, 1989). Purposive sampling was adopted, as panellists were selected based on expertise and experience in the subject area of community resilience. The selection and recruitment of participants was undertaken over multiple stages. Initially, this research targeted resilience experts from around the world to participate in the Delphi technique.
Resilience experts were determined based on their academic publications in the field of resilience, particularly in a community, social or socio-ecological field. In addition to academic publications, resilience experts were individuals, such as practitioners, who had made a considerable contribution or who were actively engaged in the practical development of resilience within community systems, through various avenues of research, community initiatives and consulting projects. Potential key experts were approached via email to ask for their participation. They were also asked if they could recommend other potential panellists who would be appropriate for inclusion in the panel.

A total of 32 resilience experts were contacted. From this list, 19 experts responded to the initial email with 15 of those agreeing to participate in the Delphi study. Resilience experts were internationally dispersed, with participants located in various countries including Australia, the United States of America, the United Kingdom, Sweden, New Zealand, Spain and South Africa, making email the preferred method of contact. Higher response and participation rates were yielded when an invitation email was sent separate to the questionnaire link. An example of the invitation letter can be found in Appendix I. The link was only sent once they had agreed to participate.

Many resilience experts suggested the inclusion of experts with sound knowledge of the region and context for a balanced panel and to ensure the appropriateness of the indicators for the specific context (Miller, 2001; Okoli & Pawlowski, 2004; Wheeller, Hart & Whysall, 1990). Direct telephone contact was preferred with regional experts to more clearly explain the research, gain other potential participants from their contacts and build rapport. Regional experts were considered to be individuals in a decision making capacity for the region, the tourism industry or the resources sector. Alternatively, individuals inextricably involved within policy formation, economic planning or community
representatives for the region were considered as experts. In total, 18 regional experts were contacted, with 11 agreeing to participate.

Overall, the Delphi participants consisted of both internationally recognised resilience experts, as well as key stakeholders from the Mackay and Whitsunday regions. Similar to the Delphi studies reviewed (Brennan Ramirez et al., 2006; Cole et al., 2013; Jordan & Javernick-Will, 2013; Lindsay et al., 2002), this Delphi study consisted of three rounds and it was anticipated that there would be participant drop out between the rounds. Limiting the size of the panel aided to control the work generated, particularly when dealing with a large number of indicators (Somers, Baker, & Isbell, 1984). From both groups of academic and regional experts, the first questionnaire link was sent to 26 participants. A total of 22 participants responded to the first questionnaire; 13 resilience experts and 9 regional experts. However, 20 of the 22 initial participants completed the second questionnaire round.

3.8.3 Analysis of findings from the Delphi process

Building on the Delphi literature review, the current Delphi study was strategically designed to encompass the most appropriate techniques to inform this research. Given the benefits of online platforms, an eDelphi was used to connect the dispersed group of participants (Cole et al., 2013). The eDelphi used the online questionnaire platform, Qualtrics, to design, administer and manage the questionnaire rounds, as well as monitor participation. Using the mailing function in Qualtrics, the personalised questionnaire links were sent via email. This enabled panel members’ participation to be tracked, allowing for reminder emails to be sent and participant withdrawals to be easily managed. Participants were given two weeks from receiving the email to complete the questionnaire, with reminders being sent after one week if they had not yet completed the questionnaire (Cole et al., 2013; Gill et al., 2013).
Given the extensive number of indicators and the diverse backgrounds of experts in the panel, multiple questionnaire rounds were required to refine the indicators. These rounds consisted of two questionnaire rounds and a final review round. Following an approach by Gardner and Nudler (2010), each questionnaire round adopted a different mode to measure the indicators. The variety of techniques seems to have resulted in a high response rate for the second round, reduced bias by allowing the indicators to be refined using multiple techniques, and enabled participants to assess the indicators from a different perspective. The questionnaire design and data analysis for Round One is explained in Section 3.8.3.1 and Section 3.8.3.2, while Round Two is detailed in Section 3.8.3.3 and Section 3.8.3.4, with Round Three being outlined in Section 3.8.3.5.

3.8.3.1   Round One questionnaire design

As previously mentioned in Section 3.8.1, the first round of the Delphi is typically an exploratory stage that includes the opportunity for participants to suggest appropriate indicators for the index, without being influenced by predetermined lists. Following previous studies (Beattie & Mackway-Jones, 2004; Cole et al., 2013; Miller, 2001), this process was incorporated into Round One of the questionnaire, by providing open-ended questions for participants to offer their comments or suggestions on the indicators at key points throughout the questionnaire. This approach is very common among Delphi techniques (Brennan Ramirez et al., 2006).

The main focus of this Round One questionnaire was to assess the indicators from the perspective of experts. Indicators were assessed using a binary and a Likert-type measure, in order to offer more explicit insight into the perceived importance of each indicator for the community resilience index (Cole et al., 2013; Okoli & Pawlowski, 2004). The binary measure sought to determine if the indicator was a measure of community resilience with the possible responses being either ‘yes’ or ‘no’. Binary scales are commonly
used to judge whether something is preferable or not (Campbell et al., 2000). This form of measurement is often used as a reduction technique and is valuable for refining large lists of indicator items (Campbell et al., 2000; Miller, 2001).

If participants selected ‘yes’ on the Binary scale, they were then asked to measure the importance of the indicator on a rating scale to determine how important they believed the indicator was for measuring community resilience. This response measure ranked responses from 1 ‘not at all important’ to 5 ‘extremely important’. Although there is debate surrounding the ideal number of response items, Dawes (2008) and Rhodes, Hunt Matheson and Mark (2010) concluded that there was no significant difference in scale formats so long as an adequate number of response options are available to allow variability and for the participant to comfortably provide their perspective on the question being asked. As a result, a five point scale was adopted for this questionnaire for its simplicity, as it provides a satisfactory range of response options yet it does not provide too many response options that could potential confuse or discourage the respondent.

3.8.3.2 Round One data analysis and results

To analyse the data from Round One of the Delphi process, the analysis followed a similar reduction method proposed by Hasson et al. (2000). As mentioned in Section 3.8.2, 22 experts participated in the Round One questionnaire. Descriptive analysis was used to determine collective opinions. For the Binary data elements, indicators with more than 50% ‘no’ responses were removed unless justified otherwise, either through the provision of a qualitative response or if it was given a high rating on the Likert-type scale. That is, if an indicator had more than 50% ‘no’ response, yet a participant who selected ‘yes’ rated it either a 4 (‘important’) or 5 (‘strongly important’), then it was not initially eliminated.

The next stage of analysis further explored the data from the second assessment of the indicators, using the Likert-type scale. Three different criteria guided the analysis.
Firstly, indicators with a mean of less than three (3) were removed. This found that although many indicators were considered to be measures of community resilience, not all were considered to be very important or appropriate for this context. Next, indicators which had 50% or more ‘yes’ responses and a mean of four (4) or above on the Likert-type scale, were considered to be appropriate indicators for the instrument. Finally, indicators with 50% or more ‘yes’ responses and a mean of 3.00 to 3.99 were reassessed in a second round. Any outliers that did not fit the above assessments were also included in Round Two for further revision, as they could not accurately be confirmed or excluded. A total of fourteen (14) indicators were selected as appropriate indicators for the instrument, twelve (12) indicators were deleted and forty-two (42) indicators were selected for reassessment in Round Two. For further information on the results of Round One, please refer to Appendix J.

3.8.3.3 Round Two questionnaire design

The purpose of Round Two was to further assess how appropriate the forty-two (42) indicators were for measuring community resilience to long-term structural change and to refine the number of suitable indicators, so that only the most important would be included in the instrument. Following the approach of Jordan and Javernick-Will (2013), feedback from Round One was provided to participants in Round Two. The feedback included the criteria against which the data were analysed and a list of the results based on the analysis. Additionally, any key qualitative responses which provided perspective on the indicator/s being reassessed was also included to enable other panel members to consider these opinions when reassessing the indicators (Jordan & Javernick-Will, 2013).

As Round Two aimed to reduce the number of indicators, the Delphi questionnaire design consisted of a ranking scale to measure assess the indicators. From the reviewed Delphi studies, ranking was not adopted as a measurement scale, as it can eliminate suitable
indicators (Boulkedid et al., 2011). However, given the purpose of the second Delphi round was to refine the list of indicators, adopting a ranking measure was deemed appropriate.

Round Two did not employ a traditional ranking measure, as the number of indicators was too great. Instead, a ‘Pick, Group and Rank’ measure was used, where panellists were asked to group indicators under broad categories. The categories were labelled as: ‘Definitely include’, ‘Possibly include’, and ‘Do not include’. This encouraged the panel members to assess the indicators from a different perspective and make a simple assessment as to whether these items were appropriate for this measuring community resilience within this specific context. This acted as a reduction method for the indicators. Similar to the first round, the questionnaire also included an open-ended response section to allow participants to make comments.

3.8.3.4 Round Two data analysis and results

Twenty of the twenty-two panel members participated in Round Two of the Delphi process. Assessing appropriate indicators for inclusion in the instrument was determined by two criteria. Indicators were included in the instrument if they had more than 50% of responses in the ‘definitely include’ category and did not have any responses in the ‘do not include’ category. The second criterion used to determine appropriate indicators for the instrument included indicators which had more than 85% of responses in the ‘definitely include’ and ‘possibly include’ categories. Based on the above criteria, eighteen (18) Round Two indicators were selected for inclusion in the instrument, whilst twenty-four (24) were eliminated.

Within the free response section of Round Two, a number of panel members noted overlap between indicators and what they were measuring. The selected indicators from Round One and Two were then subjected to further revision. The researcher then examined the indicators for any similarity and overlapping indicators were removed. These changes
were duly noted and incorporated into the third round. From both questionnaire rounds, a total of twenty-eight (28) indicators were confirmed for the instrument.

Furthermore, six panel members also made comments about the mix between short and long-term indicators in Round Two, with participants expressing different opinions towards this. Whilst the majority of indicators are focused on the long-term, short-term indicators are also required as vulnerabilities and risks in the short-term can have an effect on the long-term efficacy and sustainability of industries, contributing to long-term structural change (Bec et al., 2016). This information was also communicated in Round Three.

3.8.3.5 Round Three

A third round of assessment was not considered necessary as this stage did not produce any outliers and indicators tended to be clearly defined within categories. Instead, Round Three purely provided the panel members with feedback on the two questionnaire rounds, outlining the process that was undertaken to establish a list of appropriate indicators for this research area. This round also presented the final list of twenty-eight (28) indicators, where the statements had been rephrased into a consistent format for this research. These indicator statements are presented in Table 5. The process of rephrasing the indicator statements was reviewed by two experts in the field, prior to Round Three, to ensure the indicators retained the same meaning. The panel members were encouraged to make any comments or queries on this list of indicators.

The comments obtained from the participants in this round were positive and expressed their agreement with the indicators that had been development. No further comments or considerations were obtained from the third round, thus it was considered to be a suitable point to conclude the Delphi study.
Table 5: Final indicators to measure community resilience

<table>
<thead>
<tr>
<th>The Region….</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can access funds for dealing with short-term disasters</td>
</tr>
<tr>
<td>2. Can access insurance coverage for major public and private assets</td>
</tr>
<tr>
<td>3. Can adapt and adjust to changes easily</td>
</tr>
<tr>
<td>4. Can cope with long-term economic changes</td>
</tr>
<tr>
<td>5. Can recover from short-term disasters quickly</td>
</tr>
<tr>
<td>6. Conducts research to explore innovative ways to manage change</td>
</tr>
<tr>
<td>7. Has a diverse economy and workforce</td>
</tr>
<tr>
<td>8. Has a high level of dependency on natural resources</td>
</tr>
<tr>
<td>9. Has a high turnover of the population</td>
</tr>
<tr>
<td>10. Has access to health, housing and private sector insurance</td>
</tr>
<tr>
<td>11. Has leaders who adjust quickly to change</td>
</tr>
<tr>
<td>12. Has strong leaders who work well together</td>
</tr>
<tr>
<td>13. Has long-term plans aimed at ensuring a diversified economy</td>
</tr>
<tr>
<td>14. Has long-term plans that aim to manage the resources sector development</td>
</tr>
<tr>
<td>15. Has long-term plans that aim to manage tourism development</td>
</tr>
<tr>
<td>16. Has opportunities for education, training and learning</td>
</tr>
<tr>
<td>17. Has opportunities to discuss and share information about long-term changes</td>
</tr>
<tr>
<td>18. Integrates and shares knowledge amongst stakeholders</td>
</tr>
<tr>
<td>19. Is made up of people who support each other</td>
</tr>
<tr>
<td>20. Is made up of people who trust each other</td>
</tr>
<tr>
<td>21. Is regularly informed about changes affecting the community</td>
</tr>
<tr>
<td>22. Is reliant on income from the resources sector</td>
</tr>
<tr>
<td>23. Is reliant on income from the tourism sector</td>
</tr>
<tr>
<td>24. Participates in risk and vulnerability planning</td>
</tr>
<tr>
<td>25. Plans for disasters, loss, hazards, vulnerabilities and risk</td>
</tr>
<tr>
<td>26. Prepares and trains for long-term change</td>
</tr>
<tr>
<td>27. Prepares and trains for short-term change</td>
</tr>
<tr>
<td>28. Works well together across internal and external bodies</td>
</tr>
</tbody>
</table>

3.9 Stage Three: Resident survey

Stage Three consisted of a resident survey. This data collection method was employed to address aspects of Research Objective One, Research Objective Two and Research Objective Three. Figure 12 presents how the resident survey fits in to the sequential mixed mode process of the overarching research design. The purpose of the resident survey was threefold. Firstly, the resident survey was used to validate the indicators used in the index to measure community resilience to long-term structural change. Validating these indicators contributed to achieving Research Objective One. Secondly, the
resident survey used the community resilience indicators devised in Section 3.8.3.5 to determine the resilience of different community segments, achieving Research Objective Two. Finally, the resident survey consisted of a section which explored possible guidelines to build resilience within Mackay and the Whitsunday regions, satisfying Research Objective Three. Section 3.9.1, 3.9.2 and 3.9.3 provides an in-depth discussion of the resident survey, including the survey design, pilot testing procedures, participant selection, and survey administration.

Figure 12: Research design Stage Three

3.9.1 Questionnaire development and design

As mentioned, the purpose of the survey was threefold. However the overall aim was to measure the resilience of community groups within Mackay and the Whitsunday region to long-term structural change driven by the tourism and resources sectors, whilst also exploring guidelines to build resilience. In doing so, this satisfied Research Objective One, Research Objective Two and Research Objective Three. The survey instrument investigated
five key areas of interest (Appendix K). These areas included the perception of change in the region; resilience assessment; emotional stability assessment; demographic information; and community assessment.

Each of the five key areas was incorporated at different stages in the survey. The areas were not specifically grouped as sections; rather the survey was strategically designed to engage participants in an efficient manner, whilst gradually introducing key concepts. Although participants were given an information sheet prior to commencement, it was important that concepts were slowly established to ensure the survey wasn’t overwhelming or complex. The survey consisted of twenty-five questions, many of which had multiple components, and took approximately 10-15 minutes to complete. Initially, the survey began with simple questions connecting participants to the region, including their postcode and length of residency. An additional question related to the participants’ connection to the region was presented as an open-ended question at the end of the survey. The residents’ connection to the region provided insight into how they perceived resilience within the region. As discussed in the Section 2.3.4 of the literature review, understanding connections to place can aid in uncovering strengths and vulnerabilities in the community (DeFilippis, 2001).

The survey then filtered into the questions surrounding the resident’s perception of change within the region. As mentioned in Section 2.3.8, understanding the residents’ perception of long-term structural change provides insight into potential strategies to manage current and future change (Brody et al., 2008; Buys et al., 2012; Lorenzoni & Pidgeon, 2006). Consequently, participants were asked to assess how they perceived change in their personal lives and in the region in general, as well as how they perceive change driven by the tourism and resources sectors in the region. The prominence of change within their own life was measured on a 5-point Likert scale. However, a semantic differential scale
was used to measure the perceptions of change for the region in general, as well as change driven by the tourism and resources sectors. A semantic differential scale was the most appropriate rating scale for this question as it has the ability to measure the connotative meaning or attitudes towards change (Heise, 1970). The bipolar adjectives for this scale were adopted from Gartner (1989) and King, King and Klockars (1983). The adjectives included opportunity-threat, small-large, positive-negative, adaptive-inflexible, insignificant-overwhelming, passive-forceful, unpleasant-pleasant, gloomy-exciting, and growing-declining.

Following these questions in the survey, the twenty-eight indicators of resilience that were established in Section 3.8.3.5 were included. This resilience assessment measured the level of resilience of the region, from an institutional, social and economic perspective. Participants were asked to measure the extent that they agree within these statements on a 5-point Likert-type scale, with 1 being ‘Strongly Disagree’ and 5 being ‘Strongly Agree’. Each indicator also included a ‘Don’t Know’ and ‘Not Applicable’ option. Once the indicators were assessed, the survey then provided an open-ended question encouraging participants to discuss potential guidelines for managing change. This assessment looked at individual connectedness with the region and the potential guidelines which can assist to build resilience within the community. This question was also used to gauge the future outlook, as well as uncover any additional variables that were influencing perceptions or impeding on structural change in the community. Additionally, this question acted as a marker, as the survey then focused on questions related to the individual.

The survey then shifted to examine the emotional stability of the participants. This played a key role in determining the resilience of each region, as it was established in the literature review (Section 2.3.6) that the resilience of the individual affects the collective capacity of the community to be resilient (Adger, 2006; Norris et al., 2008). To measure the
emotional stability of participants, a scale was adapted from Judge, van Viane & de Pater (2004), based on the classifications of emotional stability by Saucier (1997). This scale adopted a 5-point Likert-type scale, asking participants to indicate the extent to which they agreed with each statement. Similar to the scale used to measure the resilience indicators, 1 reflected ‘Strongly Disagree’ and 5 reflected ‘Strongly Agree’.

The survey then concluded with demographic questions, as well as open-ended questions that gave participants the opportunity to make any other comments about change in the region or the research. The demographic information ensured that a cross section of the community was being obtained. This information also allowed for weighting the data, as well as testing the results by age, gender and employment to determine resilience levels among community segments. The open-ended questions contributed to the broad community assessment.

3.9.2 Pilot testing

To ensure the research was sound and the purpose of this stage was met, pilot testing was required for the survey. The pilot testing phase can identify issues within the instrument and assess the design and content, from which improvements can be made (van Teijlingen, Rennie, Hundley, Graham, 2001). For the survey used in Stage Three, a rigorous pilot testing procedure was undertaken to enhance the reliability of the data. The survey was constructed in both a hard copy and online version using Qualtrics. Each version of the survey underwent pilot testing. The survey was pilot tested with 58 respondents. The feedback provided from the pilot test resulted in a number of modifications to the survey, including:
• Forced response function was removed from Q8 and Q9 of the online version, as the system was not recognising the ‘Don’t Know’ or ‘Not Applicable’ option as an adequate selection.

• Q3 was changed from being an open-ended response to a multiple choice selection. Responses from the pilot test found that answers were not one specific year; they were an estimated length of time (e.g. one or two years). From this, the decision was made to create a multiple choice answer for this question, enabling respondents to select a period rather than a specific year.

• Questions were reworded to be clearer and have instructions indicating how to answer the question. In particular this was changed for Q5, Q6, Q7 and Q14.

• Automated skips were perfected for the online survey.

• Definitions of long-term structural change and resilience were made clearer in the information sheet of the hard copy survey and the first welcome statement of the online survey.

• Respondents noted feeling overwhelmed when answering the community resilience indicators, as it was quite an extensive list. From this the indicators were split into two questions to reduce visually overpowering sections.

• A number of respondents commented on the length of the survey, as it ranged between 8 and 15 minutes. The concerns over its length and complexity were considered and consequently strategic decisions were then made for the survey distribution to enable participants the time to complete the survey without being rushed or irritated with the length.
In summary, the pilot test resulted in some modifications to the design and content of the Stage Three survey. Additionally, from the pilot test, changes were made for the survey distribution to enhance the response rate and quality of the data collected.

3.9.3 Participant selection and recruitment

The participants used for this stage of the research consisted of local residents of the Mackay and Whitsunday regions. Local residents were deemed the most appropriate as they are they have to contend with long-term changes to the structure of the economy. The diverse community groups which are evident among local residents also provide an insightful and multifaceted view of perspectives of economic structural change within a community. Residents were classified as anyone who primarily resided in either of the regions and considered this their place of permanent residence. Adhering to the ethical requirements of this research, only residents over 18 years of age were targeted. Other ethical practices were also adhered to, including providing participants with detailed information about the research via an information sheet (refer to Appendix L) and gaining consent prior to participation. To recruit participants, a mixed mode process was undertaken, consisting of non-random sampling techniques.

Participants at all stages were non-randomly sampled, adopting purposive and convenience sampling which are common techniques used in community-based research (McCaughey et al., 2001; Williams & Lawson, 2001). Purposive sampling was to target residents over the age of 18 years, whilst convenience sampling enabled all people who fit this category to be approached to participate (Teddlie & Yu, 2007). Non-random sampling inhibits the ability to generalise the data, as it cannot be considered to be a representative of sample population (Kelley, Clark, Brown & Sitzia, 2003; Teddlie & Yu, 2007). However, to account for bias that results from the use of a non-random mixed mode sampling (Seely & El-Bassiouni, 1983), the data from the mixed mode collection were merged and weighted to
the population of the regions by age and sex using the latest Australian Bureau of Statistics population data.

As mentioned in Section 3.9.3, the survey was designed in both a hard copy format and an online format. The use of these two formats varied between the different participant recruitment approaches. Four different approaches were selected to recruit participants which increased participation rates and reduced the likelihood of groups being underrepresented (Teddlie & Yu, 2007). The first approach recruited participants via a third party, the second approach involved the researcher personally recruiting participants face-to-face, the third approach involved a mail drop approach, and the fourth approach used an online marketing platform.

The first stage incorporated the use of third party organisations to recruit participants. Initially, a media release was published and distributed to local news outlets. This media release raised awareness of the research and also invited survey participation. Additionally, this stage also contacted community groups to enable access to members. Approximately 15 community organisations were contacted from the two regions and 9 agreed to distribute the survey. The community groups who agreed to assist in the survey distribution shared the online survey link with members via social media and other communication networks, such as newsletters. From the combined approach of the first recruitment stage, a total of 54 respondents were gained from the Mackay region and 7 from the Whitsunday region.

The second approach in the recruitment process consisted of in-person, face-to-face contact with potential participants in each region. This approach was conducted in two ways. The first involved setting up a table in public locations in each region, inviting residents to participate in the survey. The locations included local shopping centres, sporting fields and community facilities including the public library. Screening questions were employed to
ensure participants fit the criteria of the study. The screening questions included: ‘Are you over 18 years of age?’, and ‘Are you a resident of Mackay/Whitsunday region?’. A number of residents noted time constraints for completing the survey on site. These residents were offered the option to take the survey home (they were also provided with a reply paid envelope), or given the survey link to complete it online at a time convenient for them.

The second face-to-face mode of recruiting participants consisted of the researcher personally approaching residents in each region. This was done by approaching businesses and asking staff to complete the survey, as well as door knocking in local suburbs. The potential participants were also offered the option to complete the survey online or in hardcopy at a later time using the mail back option. Approaching businesses and door knocking in local neighbourhoods is a popular technique, with proven effectiveness, for gaining survey participants for community or household studies (Klausner et al., 2001; Niven, 2004). From this second stage of recruitment, a total of 464 residents completed the survey on site; 269 from the Mackay region and 195 from the Whitsunday region.

The third recruitment approach consisted of a mail drop strategy. This approach involved prefilled envelopes (consisting of an information sheet with the survey link, a hardcopy survey and a paid reply envelope) to be personally delivered to houses in each region. Suburbs and streets from Mackay and the Whitsunday region were randomly chosen and every house within the selected streets was delivered a prefilled envelope. The effectiveness of mail drop strategies has been questioned, particularly with electronic advances in mail delivery. However, given the overwhelming use of email communication, Hoonakker and Carayon (2009) found that individuals are more likely to read postal mail than email. Approximately 2000 surveys were delivered via the mail drop approach. A total of 84 hardcopy completed surveys were received using the reply paid method, 56 from
Mackay and 27 from the Whitsunday region, resulting in a response rate of approximately 4.5%.

Following strategies employed by market research and public opinion studies (Temple & Brown, 2011; Twyman, 2008), the fourth approach to recruit participants used an online platform to advertise the survey. Although similar to the first approach which utilised third party organisations to distribute the survey link, this stage consisted of paid advertising. The Google Adwords medium was used to advertise the research and survey link, based on similar key word searches. This medium was selected because it had advanced properties which enabled only internet users in the Mackay and Whitsunday region to be target, with the display of the advertisement dependent on key word searches in Google. Additionally, costs were only incurred if someone clicked on the link. These costs were also able to be controlled by adjusting the value placed on each click, ultimately influencing the frequency of the advertisement. A total of 23 surveys were completed via the Google Adwords advertisement, all from the Whitsunday region. Combining all participant recruitment approaches for this stage of the research, a total of 663 residents completed the survey; 411 responses from Mackay residents and 252 responses from Whitsunday residents.

3.10 Stage Four: Data analysis

As presented in Stage Three, a resident survey was presented as one of the main data collection modes for this research. Stage Four involves analysing the data from the resident survey. Data analysis was a key component of the sequential mixed mode process for both stages, as demonstrated by Figure 13. Stage Four employed various data analysis techniques to address each research objective and confirm the validity of the index and scales which were devised. To test the validity of the resilience index, as well as the scale items
measuring the residents’ perception of change and emotional stability, Cronbach Alpha and factor analysis were employed. To determine the resilience of community groups and test the validity of the resilience index items and the emotional stability scale items, cluster analysis was undertaken, corresponding with Research Objective Two. Additionally, Stage Four also uncovered proposed guidelines for building resilience within Mackay and the Whitsunday regions to address vulnerable areas. A thematic analysis was used to identifying the guidelines, which aligned with Research Objective Three. The types of analysis conducted on the data and the rationale for each analysis technique is discussed in greater detail in the following sections. However, before the data analysis techniques are discussed, Section 3.10.1 first outlines the data preparation and weighting process.

Figure 13: Research design Stage Four

3.10.1 Data preparation and weighting

The data from Qualtrics was downloaded to SPSS format in order for variable labels to be imported and this file was then converted to a STATA v14.0 file for further analysis.
STATA was considered the most appropriate statistical analysis program as it can manage complex survey data (Rabe-Hesketh & Skrondal, 2006). The raw data were cleaned and checked to ensure the variable names were clear and the data was correctly input. The cleaning process also handled any incomplete surveys and missing data (Meade & Craig, 2012; Osbourne & Overbay, 2008). Incomplete surveys are different to responses which just had missing data. Incomplete or partially complete surveys are surveys where the respondent opened the survey link and clicked ‘next’ on at least one survey page, but did not complete the entire survey (Little & Smith, 1987; Twala, 2009). Responses with missing data are completed surveys where the respondent has not answered all questions.

Dealing with incomplete responses can be handled in a number of ways, but typically by either deleting or imputing the missing data. The decision to delete an incomplete survey usually depends on the progress a respondent has made in the survey and how dependent the analysis is on the questions that were not completed (Brick & Kalton, 1996; Raghunathan, 2004; Twala, 2009). Eleven incomplete surveys were deleted, due to respondents completing less than 30% of the survey, these responses were deleted to give the most complete data set (Raghunathan, 2004; Schafer, 1997). The cleaning process also uncovered a number of responses which had missing data. Given that most of the missing data was a result of the respondent’s selection of a ‘Don’t Know’ option, data imputation was not undertaken. The process of dealing with this missing data is dependent on the type of analysis being undertaken and is discussed in Section 4.5.2.

To assist in overcoming the bias of a non-random sample, the data from the survey were weighted to the resident population by age and sex for each region (Seely & El-Bassiouni, 1983). The weights applied to the data assign values to the gender and age groups of each region, based on the population data. The values assigned to the data will indicate the degree of significance that each case will have in the analysis (Dunstan et al., 2002;
Porter, 2004). Table 6 displays the sample and population for each region. These data were then analysed using descriptive statistics, correlations, Cronbach’s alpha, exploratory and confirmatory factor analysis, and cluster analysis to understand the resilience of the two regions. Furthermore, a thematic analysis was employed to uncover the proposed guidelines to build resilience. The follow sections discuss the analysis techniques in greater depth to explain each technique and its role in the study. The results of the analysis are then presented in Chapter Four and Chapter Five.

Table 6: Weighted survey sample by age and sex

<table>
<thead>
<tr>
<th></th>
<th>Sample (n)</th>
<th>Population (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mackay</td>
<td>411</td>
<td>95,786</td>
</tr>
<tr>
<td>Whitsunday</td>
<td>252</td>
<td>27,411</td>
</tr>
</tbody>
</table>

3.10.2 Cronbach's alpha and factor analysis

To assess the reliability and validity of the resilience index, as well as the scales measuring the residents’ perceptions of change and residents emotional stability, Cronbach’s alpha is used. Cronbach’s alpha estimates the reliability of the scale based on the covariance and the number of items (Field, 2009). That is, it measures the correlation between items measuring the same construct. Tests of covariance, specifically Cronbach’s alpha, are common when multi-item measures of a construct are employed, as it assesses the internal consistency of the items and the measurement of error (Krieger, Smith, Naishadham, Hartman & Barbeau, 2005; Peterson, 1994). A high alpha value, generally 0.7 or above, suggests that the items are measuring an underlying construct, and thus is acceptable (Langbein, 2006). Other researchers have argued that a lower value of above 0.6 is also acceptable (DeVellis, 2003). However, the results of this method can be misleading, as the alpha value is dependent on the number of scale items. Consequently, having more indicator
items can produce a higher alpha value, giving the appearance that the correlation is stronger (UCLA Academic Technology Services, 2016b).

The scale items for residents’ perception of change and emotional stability were also subjected to factor analyses to identify the underlying structure of the measurement scale. Factor analysis is an additional method for evaluating the correlation and relationship between scale items. Factor analysis is a suitable method to assess the dimensionality of items to provide a clearer understanding of the construct being measured (DeVellis, 2003). Principal Component Factor (PCF) analysis is an exploratory technique, used to reduce a core set of items to one dimension. Within the literature, PCF analysis is a commonly adopted technique for the purpose of developing and refinement of scales and instruments (Floyd & Widaman, 1995; Reise, Waller & Comrey, 2000). Additionally, PCF analysis is characteristically used on highly correlated variables, thus making it an appropriate method for measuring a construct (Hair, Black, Babin, Anderson & Tatham, 2006). Typically, items with a strong correlation have high values. Using STATA to conduct a PCF analysis, factors are automatically calculated based on Eigen values to estimate the proportion that a particular factor represents in the index or scale. An Eigen value represents the variance of the component, thereby providing an indication of the dimensionality of the scale (Hair et al., 2006). Furthermore, PCF analysis also provides an indication of uniqueness of each index or scale item. That is, the degree to which the retained factors explain the variable to assist with determining the suitability of variables to the scale (McLennan et al., 2013).

In addition to exploratory factor analysis methods, confirmatory factor analysis was undertaken. Confirmatory factor analysis assesses the reliability of the measures used in the model and the degree to which they fit the model (Hair et al., 2006). Structural equation modelling (SEM) was employed as a secondary statistical technique to further evaluate and confirm the extent to which measures are consistent with the PCF analysis. SEM has been
extensively used within academic studies to test construct validity for scale items (Garver & Mentzer, 1999; March, Parker, Sullivan, Stallings & Conners, 1997; Noar, 2003). The primary objective for using SEM within the present study was to assess the measurement model and determine the invariance of the factor model across samples through multiple group analysis (Hair et al., 2006; Dion, 2008). This confirmatory method provides an indication of the extent to which the variables are able to measure the residents’ perception of change and residents’ emotional stability. SEM allows both measurement and latent variables to be linked as an integrated model, clearly displaying the relationship between variables (Dion, 2008).

Additionally, to determine significant correlations and goodness-of-fit among variables, design-based F-tests are employed. Design-based F-tests are corrected tests for weighted data. Unlike t-tests, as they do not use the normal distribution. Instead, it uses an asymptotic distribution, accounting for the survey design (Seely & El-Bassiouni, 1983; Thomas & Rao, 1987). To determine the goodness-of-fit for a model and the reliability of the measures, Hooper, Coughlan and Mullen (2008) suggest using the comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA). CFI examines the discrepancy whilst also incorporating a ‘correction factor for the degree of freedom’ (Hinkin, 1995, pg. 115). A model that fits well generally has a CFI score of 0.9 or above (Hinkin, 1995), with Byrne (1994) suggesting that optimal scores would be 0.93 or above. RMSEA is a standardised measure that corrects for model complexity and sample size. Lower values indicate better fit, with acceptable scores considered to be less than 0.05 (Ping, 2004). Finally, TLI provides a non-normalised measure of goodness-of-fit, with acceptable scores above 0.9 (Hair et al., 2006).

Alternatively, for weighted data, only two indices are currently available to evaluate the goodness-of-fit for the model (McLennan & Moyle, 2016). When using weighted data,
assessing the goodness-of-fit relies on the coefficient of determination (CD) and standardised root mean squared residual (SRMR). CD is a primary output of a regression analysis assessing the proportion of variance of the dependent variable that can be explained by the independent variable (Hair et al., 2006; Hooper et al., 2008). A CD score of 1 is considered to be a perfect model fit, thus the closer the value is to 1, the stronger the fit of the model. Acceptable scores for CD are above 0.7 (Doll, Raghunathan, Lim & Gupta, 1995). SRMR transforms the sample covariance matrix and the predicted covariance matrix into correlation matrices. It measures the mean absolute correlation residual. That is, the overall variance between the observed and predicted correlations (Hooper et al., 2008). The closer the SRMR value is to zero, the better the fit of the model. A model that fits well generally has a SRMR of less than 0.08 (Melas, Zampetakis, Dimopoulou & Moustakis, 2012).

Finally, the factor analyses will enable a scale or index variable to be developed for the perceptions of change scales (PerchangeGen, PerchangeRes and PerchangeTour), the emotional stability scale and the resilience index. An index or scale variable is a consistent and standardised set of numerical values for the scale (UCLA Academic Technology Services, 2016a), converted to a compound measure that aggregates the multiple variables (Hawken & Munck, 2012). Scale variables are calculated by defining the score ranges and weights for each item and then determining the mean (Waugh, 2002). The index was created by calculating the mean score for the resilience variables, giving equal weight to each of the variables (Hawken & Munck, 2012). The development of scale and index variables enabled the constructs to be compared and analysed one another to determine the relationship between the constructs.
3.10.3 Cluster analysis

The emotional stability scale and the community resilience index both consisted of crucial variables which contribute to measuring and interpreting a community or region’s level of resilience. Following previous studies which aim to assess group characteristics within a population (Fredline & Faulkner, 2000; Lickel, Hamilton, Wieczorkowska, Lewis, Sherman & Uhles, 2000; Weatherell, Tregear & Allinson, 2003), cluster analysis is employed. Cluster analysis involves the process of finding groups within the data. More specifically, it is an exploratory statistical analysis technique, which identifies similarity and forms groups on the basis of proximity and variance (Hair et al., 2006).

For the present research, cluster analysis is used to analyse the community resilience and emotional stability data to determine the levels of resilience for different community groups. Hierarchical clustering, specifically the Ward’s linkage method, was used to form the segments of the cluster analysis. Hierarchical cluster formation allows the researcher to explore a range of potential cluster solutions (Rundle-Thiele, Kubacki, Tkaczynski & Parkinson, 2015). The Ward’s linkage method was identified as an optimal approach for the analysis as it combines all possible pairs of clusters and uses an analysis of variance approach to evaluate the distances between clusters (Hair et al., 2006).

Cluster analysis was conducted on the emotional stability and resilience variables to explore residents’ likely resilience to long-term structural change. The literature suggests that there may be different levels of resilience and emotional stability amongst certain community groups (Adger, 2006; Norris et al., 2008). This drove the development of Research Objective 2, which aimed to determine levels of resilience of different segments within communities undergoing long-term structural change driven by the tourism and resources sectors. Additionally, cluster analysis is used to reassess the validity of the indicators in the resilience index and the emotional stability scale. Although not a commonly
adopted method for assessing scale validity, Romesburg (2004) states that exploratory statistical analysis techniques, such as cluster analysis, can be an additional assessment method when items have been adapted from existing scales.

When assessing the resilience of different community segments using cluster analysis, one of the limitations is that cluster analysis does not provide an explanation or interpretation of the cluster variables. However, by comparing the clusters variables against other variables, correlations can be identified (Rundle-Thiele et al., 2015). For example, comparing the cluster variable of the emotional stability scale with the cluster variable of resilience index, relationships between these variables can be determined and aid in measuring the level of resilience. Further insight on the level of community resilience can also be gained from comparing the cluster variables by regions and against other demographic variables to understand the resilience characteristics of the population.

3.10.4 Thematic analysis

The survey contained a number of open-ended questions designed to produce rich qualitative data. A thematic analysis is conducted on these data to organise, describe and uncover the themes in the data. This type of analysis involves manually examining and recording patterns in the data which can then be grouped into categories or themes. Key themes can be identified using open, axial and selective coding (Corbin & Strauss, 1990). Open coding is a reduction technique that breaks down and conceptualises large amounts of data to extract the key characteristics of the information. Axial coding makes connections and recognizes similarities between the characteristics that were identified in the open coding stage. Finally, selective coding is the process of determining the core categories or themes for which the groups of data sit (Corbin & Strauss, 1990).

Open-ended survey data can be challenging to analyse using traditional code based analysis methods. This is primarily due to the typically limited data that is acquired from
each respondent, as responses tend to have a brief, direct structure (Jackson & Trochim, 2002). Nevertheless, open, axial and selective coding is undertaken to draw themes from the qualitative data. The purpose of this analysis is to unearth possible resilience guidelines, not to be exhaustive of all possible guidelines. The data coding was subjected to an intercoder reliability test, where two people coded the data and compared the findings. Following an approach by McLennan et al. (2015), to further analyse these data, the frequency of data for each theme is calculated to further provide insight into how residents perceive change within the regions.

### 3.11 Chapter summary

Chapter Three has introduced the overarching methodological approach for this research. Firstly, the philosophical approach was explained and justified. Then, the methods which have been used in previous community resilience studies were reviewed and critiqued to identify the most suitable methods to achieve the aim and objectives of this research. From this review, the research design was presented, introducing the selected methods. The research utilises a sequential mixed mode design, situated within case study approach. Two Australian regions are used as the case studies for this research, with Section 3.5 outlining the three phase case study selection process. Following the selection process, the two case study regions, Mackay and Whitsundays, were briefly discussed providing a contextual overview of the structure of each region.

Chapter Three then discussed each of the sequential stages of the research design. Stage One, presented in Section 3.7, involved an analysis of previous studies to determine the most appropriate tool to measure community resilience to long-term structural change. Once an index had been established as the most appropriate measurement tool, an analysis of previous studies was conducted to identify community resilience indicators to long-term
structural change. Stage Two employed the Delphi technique to assess and refine the indicators identified in Stage One. Section 3.8.1 reviewed the approaches undertaken by previous Delphi studies to determine the most appropriate Delphi technique to employ within the present study. The participant selection process for the Delphi study was then outlined in Section 3.8.2, followed by an overview of the Delphi process in Section 3.8.3.

Section 3.9 then introduced Stage Three of the research design, which was a resident survey to assess the resilience of community segments and identify guidelines for building resilience. Within Section 3.9, the survey development, pilot testing procedures and participant selection and recruitment processes were outlined. Following Stage Three, Stage Four consisted of the analysis stage for the resident survey data. The key forms of analysis include Cronbach’s alpha, design-based F-tests, exploratory factor analysis (Principal Component Factor analysis), confirmatory factor analysis (Structural Equation Modelling), cluster analysis, and thematic analysis. The next chapter presents the results of the survey from conducting the specific analytical tests, as well as the other descriptive statistics of the survey data.
4 CHAPTER FOUR: RESULTS

4.1 Introduction

Chapter Four presents the results of the resident survey. The purpose of the resident survey was to validate the indicators used in the index to measure community resilience to long-term structural change, corresponding with Research Objective One. In doing so, the survey also elicited information about the resilience of the community members, achieving Research Objective Two. Furthermore, the survey was also used to explore possible guidelines to build resilience within Mackay and the Whitsunday regions, satisfying Research Objective Three.

Chapter Four begins by presenting an overview of the respondents and compares demographic results across the Mackay and Whitsunday regions. Section 4.3 then presents the residents’ perceptions of change and devises scales to measure these perceptions using exploratory and confirmatory factor analysis. Next, Section 4.4 presents the emotional stability results and validates the scale using exploratory and confirmatory factor analysis. A cluster analysis is also used to determine the emotional stability of different community groups. In addition, the relationship between emotional stability clusters and perceptions of change is explored.

The analysis then turns to presenting the results of the resilience index presented in Section 4.5, which employs exploratory factor analysis. The resilience of community groups is then identified through a cluster analysis and the relationship between community resilience clusters and perceptions of change is explored. Section 4.5.2 then presents the relationship between community resilience, emotional stability and perceptions of change. Finally, Section 4.6 presents the final model of the results.
4.2 Overview of results

4.2.1 Profile of respondents

Table 7 provides an overview of the respondents who participated in the resident survey. A series of design based $F$-tests were conducted on the sample demographics using the weighted survey data to compare the two regions. Design based $F$-tests revealed that there were no significant difference between the residents of Mackay and Whitsundays for age ($F(5.28, 3496.01)=0.895, p=0.488$), gender ($F(1, 662)=0.01, p=0.908$), or length of time the respondents had lived in the region ($F(6.86, 4538.47)=0.96, p=0.457$). Similarly, there was no significant difference between the two regions in terms of the respondents’ education levels ($F(4.76, 3149.32)=0.78, p=0.558$), employment status ($F(1, 662)=0.83, p=0.363$), or the average household income ($F(5.50, 3642.02) =1.71, p=0.1210$).

However, the results reveal that there was a significant ($F(1, 662)= 5.89, p=0.0155$) difference between the respondents’ country of origin for Mackay and the Whitsundays. Additionally, both regions had a larger Australian born population than a non-Australian born population. Next to Australia, the United Kingdom, New Zealand and South Africa were the main birthplaces of residents for both regions.
Table 7: Descriptive summary of respondents

<table>
<thead>
<tr>
<th></th>
<th>Mackay</th>
<th>Whitsunday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample ((n))</td>
<td>411</td>
<td>252</td>
</tr>
<tr>
<td>Population ((N))</td>
<td>95,786</td>
<td>27,411</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>Female</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19 years</td>
<td>3.5%</td>
<td>5%</td>
</tr>
<tr>
<td>20-29 years</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>30-39 years</td>
<td>28.5%</td>
<td>31%</td>
</tr>
<tr>
<td>40-49 years</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>50-59 years</td>
<td>12%</td>
<td>13%</td>
</tr>
<tr>
<td>60+ years</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Years in region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>1-2 years</td>
<td>7.5%</td>
<td>5.5%</td>
</tr>
<tr>
<td>3-5 years</td>
<td>14.5%</td>
<td>24%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>24.5%</td>
<td>27%</td>
</tr>
<tr>
<td>11-20 years</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>21-30 years</td>
<td>14%</td>
<td>9%</td>
</tr>
<tr>
<td>More than 30 years</td>
<td>13%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under $40,000</td>
<td>20%</td>
<td>12%</td>
</tr>
<tr>
<td>$40,000- $69,999</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>$70,000- $99,999</td>
<td>23%</td>
<td>33%</td>
</tr>
<tr>
<td>$100,000- $149,999</td>
<td>17.5%</td>
<td>17%</td>
</tr>
<tr>
<td>$150,000-$199,999</td>
<td>5.5%</td>
<td>4%</td>
</tr>
<tr>
<td>Over $200,000</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Don’t Know/Prefer not to answer</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Secondary</td>
<td>36.5%</td>
<td>43%</td>
</tr>
<tr>
<td>University</td>
<td>21%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Trade/vocational</td>
<td>31.5%</td>
<td>29%</td>
</tr>
<tr>
<td>Other</td>
<td>6%</td>
<td>11.5%</td>
</tr>
</tbody>
</table>

4.3 Resident perceptions of regional structural change

As mentioned in Section 3.9, respondents were asked how prominent change is in their lives to gain an understanding of how individuals were affected by change. The prominence of change was measured on a 5-point Likert-type scale. Using a semantic
differential scale, the following bipolar adjectives were used to assess the respondents’ perception of change: Opportunity/Threat; Small/Large; Positive/Negative; Adaptive/Inflexible; Insignificant/Overwhelming; Passive/Forceful; Unpleasant/Pleasant; Gloomy/Exciting; Growing/Declining. These variables were used on three scales to measure the respondents’ perception of change in general, change driven by the resources sector and change driven by tourism. Design based $F$-tests were conducted on the variables to compare the perceptions of each region. Table 8 presents the results for the respondents’ perceptions of change in general.

Table 8: Perceptions of change in general

<table>
<thead>
<tr>
<th>Item</th>
<th>Mackay Mean</th>
<th>Whitsunday Mean</th>
<th>Design based $F$-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prominence of change</td>
<td>4.0</td>
<td>3.8</td>
<td>$F(1, 652) = 5.69, p = 0.017$</td>
</tr>
<tr>
<td>Opportunity/Threat</td>
<td>2.7</td>
<td>2.6</td>
<td>$F(1, 662) = 0.84, p = 0.360$</td>
</tr>
<tr>
<td>Small/Large</td>
<td>3.7</td>
<td>3.6</td>
<td>$F(1, 662) = 3.00, p = 0.084$</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>3.2</td>
<td>2.9</td>
<td>$F(1, 662) = 7.24, p = 0.007$</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>3.0</td>
<td>2.8</td>
<td>$F(1, 662) = 3.89, p = 0.049$</td>
</tr>
<tr>
<td>Insignificant/Overwhelming</td>
<td>3.4</td>
<td>3.3</td>
<td>$F(1, 662) = 1.31, p = 0.253$</td>
</tr>
<tr>
<td>Passive/Forceful</td>
<td>3.6</td>
<td>3.4</td>
<td>$F(1, 662) = 3.13, p = 0.077$</td>
</tr>
<tr>
<td>Unpleasant/Pleasant</td>
<td>2.8</td>
<td>3.1</td>
<td>$F(1, 662) = 10.83, p = 0.001$</td>
</tr>
<tr>
<td>Gloomy/Exciting</td>
<td>2.8</td>
<td>3.1</td>
<td>$F(1, 662) = 7.52, p = 0.006$</td>
</tr>
<tr>
<td>Growing/Declining</td>
<td>2.4</td>
<td>2.3</td>
<td>$F(1, 662) = 0.40, p = 0.528$</td>
</tr>
</tbody>
</table>

As displayed in Table 8, residents in Mackay rated the prominence of change in their region significantly higher than those in the Whitsundays. Furthermore, residents’ perceptions of change varied significantly between Mackay and the Whitsunday region. There were significant differences in how residents perceived change in the region. Residents in Mackay felt the prominence of change was significantly greater than residents in the Whitsundays. In addition, Mackay residents were significantly more likely to feel that change was more negative and unpleasant for the region, compared with the Whitsunday residents. Consequently, Mackay residents viewed change as significantly more gloomy than Whitsunday residents. The flexibility of change was also viewed as significantly more
adaptive by Whitsunday residents than Mackay residents. There was no significant difference between the two regions in terms of the residents’ general perceptions of change being an opportunity/threat, small/large, insignificant/overwhelming, passive/forceful or growing/declining.

Table 9 presents the results for the respondents’ perceptions of change driven by the resources sector. This research was conducted at an opportune time when mining had reached its peak within the selected regions, yet residents were still acutely aware of the impacts of the structural change driven by the resources sector. Consequently, considering the change driven by the resources sector, both regions perceived this change to be growing and forceful. Additionally, residents from both regions consider the change to be unpleasant, presenting more of a threat for each region than an opportunity. However, the residents’ perception of change specifically driven by the resources sector, differed greatly between the two regions. Notably, Mackay residents considered change to be inflexible ($\bar{x} = 3.6$), which significantly differed from the Whitsunday residents who felt change was more adaptable ($\bar{x} = 3.2$). Similarly, change driven by the resources sector was viewed as being more overwhelming in Mackay than in the Whitsunday region. Consequently, Mackay residents considered this change to be significantly more negative and gloomy than Whitsunday residents. Nevertheless, both regions considered this change to be negative and gloomy.

Table 9: Perceptions of change driven by the resources sector

<table>
<thead>
<tr>
<th>Item</th>
<th>Mackay Mean</th>
<th>Whitsunday Mean</th>
<th>Design based $F$-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity/Threat</td>
<td>3.4</td>
<td>3.2</td>
<td>$F(1, 662) = 2.96, p = 0.086$</td>
</tr>
<tr>
<td>Small/Large</td>
<td>4.2</td>
<td>3.9</td>
<td>$F(1, 662) = 7.26, p = 0.007$</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>3.8</td>
<td>3.4</td>
<td>$F(1, 662) = 7.35, p = 0.007$</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>3.6</td>
<td>3.2</td>
<td>$F(1, 662) = 11.33, p =&lt;0.001$</td>
</tr>
<tr>
<td>Insignificant/Overwhelming</td>
<td>3.9</td>
<td>3.6</td>
<td>$F(1, 662) = 7.08, p = 0.008$</td>
</tr>
<tr>
<td>Passive/Forceful</td>
<td>3.9</td>
<td>3.7</td>
<td>$F(1, 662) = 5.86, p = 0.016$</td>
</tr>
<tr>
<td>Unpleasant/Pleasant</td>
<td>2.3</td>
<td>2.5</td>
<td>$F(1, 662) = 2.03, p = 0.155$</td>
</tr>
<tr>
<td>Gloomy/Exciting</td>
<td>2.2</td>
<td>2.5</td>
<td>$F(1, 662) = 6.79, p = 0.009$</td>
</tr>
<tr>
<td>Growing/Declining</td>
<td>2.3</td>
<td>2.4</td>
<td>$F(1, 662) = 0.78, p = 0.376$</td>
</tr>
</tbody>
</table>
Table 10 presents the results for the respondents’ perceptions of change driven by tourism. Residents of both regions considered tourism driven change to be positive and an opportunity for the region, as well as adaptive, pleasant, and exciting. Conversely, residents in each region had significantly different perceptions on the magnitude of change driven by tourism. Change driven by tourism was considered substantially greater in the Whitsunday region than in Mackay. Mackay viewed change driven by tourism as relatively small. Consequently, Mackay considered the change driven by tourism to be more insignificant than the Whitsunday region which had a relatively neutral position. Change driven by tourism was also perceived as considerably more passive by residents in Mackay than those in the Whitsunday region.

To establish a scale for identifying the factors influencing the resident perceptions of change, a factor analysis was conducted. The following sections present the results of the exploratory and confirmatory factor analysis conducted on the resident perceptions scales. The objective of the factor analysis was to refine the indicators and construct a concise scale for measuring resident perceptions of change in a region. The exploratory factor analysis using principal component factor analysis is first presented, followed by confirmatory factor analysis using structural equation modelling.

Table 10: Perceptions of change driven by tourism

<table>
<thead>
<tr>
<th>Item</th>
<th>Mackay Mean</th>
<th>Whitsunday Mean</th>
<th>Design based F-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity/Threat</td>
<td>2.0</td>
<td>1.8</td>
<td>$F(1, 662) = 11.26, p = &lt; 0.001$</td>
</tr>
<tr>
<td>Small/Large</td>
<td>2.5</td>
<td>3.3</td>
<td>$F(1, 662) = 58.17, p = &lt; 0.001$</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>2.3</td>
<td>2.1</td>
<td>$F(1, 662) = 2.29, p = 0.131$</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>2.5</td>
<td>2.3</td>
<td>$F(1, 662) = 2.76, p = 0.097$</td>
</tr>
<tr>
<td>Insignificant/Overwhelming</td>
<td>2.5</td>
<td>3.1</td>
<td>$F(1, 662) = 50.13, p = &lt; 0.001$</td>
</tr>
<tr>
<td>Passive/Forceful</td>
<td>2.5</td>
<td>3.0</td>
<td>$F(1, 662) = 30.64, p = &lt; 0.001$</td>
</tr>
<tr>
<td>Unpleasant/Pleasant</td>
<td>3.7</td>
<td>4.0</td>
<td>$F(1, 662) = 9.9, p = 0.002$</td>
</tr>
<tr>
<td>Gloomy/Exciting</td>
<td>3.6</td>
<td>3.7</td>
<td>$F(1, 662) = 3.10, p = 0.079$</td>
</tr>
<tr>
<td>Growing/Declining</td>
<td>3.3</td>
<td>2.8</td>
<td>$F(1, 662) = 21.28, p = &lt; 0.001$</td>
</tr>
</tbody>
</table>
4.3.1 Scale development

Three scales were developed to measure residents’ perception of change within their region across three categories. These three categories included perceptions of general change in the region (PerchangeGen); perceptions of change driven by the resources sector (PerchangeRes); and perceptions of change driven by tourism (PerchangeTour). A Cronbach’s alpha test was conducted on the nine items measuring residents’ perception of change in the region. As previously mentioned in Section 3.10.2, Cronbach’s alpha measures the correlation between items measuring the same construct, assessing the internal consistency of the items and the measurement of error.

For assessing PerchangeGen, the scale received an overall reliability coefficient (Cronbach’s alpha) of 0.84. This number aligns with the precision threshold suggested by Hair et al. (2006) and Tavakol and Dennick (2011) (0.7-0.9), showing a high correlation between items. Similarly, the reliability coefficient for the scale measuring PerchangeRes and PerchangeTour were 0.90 and 0.78 respectively. These scores display high correlation, yet are still within the optimal threshold. If the score is above 0.9, then there is risk of items being redundant, as they may be testing the same question (Tavakol & Dennick, 2011). The reliability coefficient test also displayed the positive and negative loadings, suggesting the variables which may need to be reverse coded before further analysis. Consequently, the variables Unpleasant/Pleasant, Gloomy/Exciting and Growing/Declining were reverse coded across the three scales PerchangeGen, PerchangeRes and PerchangeTour.
Table 11: Perceptions of change Cronbach's alpha

<table>
<thead>
<tr>
<th>Item</th>
<th>PerchangeGen</th>
<th>PerchangeRes</th>
<th>PerchangeTour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sample (n)</td>
<td>Sign*</td>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>Opportunity / Threat</td>
<td>663</td>
<td>+</td>
<td>0.819</td>
</tr>
<tr>
<td>Small / Large</td>
<td>663</td>
<td>+</td>
<td>0.829</td>
</tr>
<tr>
<td>Positive / Negative</td>
<td>663</td>
<td>+</td>
<td>0.798</td>
</tr>
<tr>
<td>Adaptive / Inflexible</td>
<td>663</td>
<td>+</td>
<td>0.816</td>
</tr>
<tr>
<td>Insignificant / Overwhelming</td>
<td>663</td>
<td>+</td>
<td>0.817</td>
</tr>
<tr>
<td>Passive / Forceful</td>
<td>663</td>
<td>+</td>
<td>0.814</td>
</tr>
<tr>
<td>Unpleasant / Pleasant</td>
<td>663</td>
<td>-</td>
<td>0.802</td>
</tr>
<tr>
<td>Gloomy / Exciting</td>
<td>663</td>
<td>-</td>
<td>0.801</td>
</tr>
<tr>
<td>Growing / Declining</td>
<td>663</td>
<td>-</td>
<td>0.865</td>
</tr>
<tr>
<td>Test Scale</td>
<td></td>
<td></td>
<td><strong>0.836</strong></td>
</tr>
</tbody>
</table>

* ‘Sign’ indicates the direction of the relationship (whether it is positive or negative). Reverse scorings are suggested for any that enter negatively.
To further evaluate the reliability and dimensionality of the items and explore the construct being measured, an exploratory factor analysis (EFA) was conducted. As mentioned in Section 4.3.1, PCF analysis was used as a data reduction technique to identify the dimensionality of the items. By employing a Likelihood Ratio (LR) test it was found there was an equal variance between all possible pairs of groups across *PerchangeGen*, *PerchangeRes* and *PerchangeTour*. The correlations were also sufficiently large for the PCF analysis to be meaningful. According to Kaiser Criterion, only factors with eigenvalues equal or greater than 1 should be retained (Ledesma & Valero-Mora, 2007). EFA revealed that only one factor was retained under the PCF analysis for each scale (*PerchangeGen*; *PerchangeRes*; *PerchangeTour*). As displayed in Table 12, 13 and 14, Factor1 accounted for 68% of total variance in the scale for *PerchangeGen* in the region, 74% for *PerchangeRes*, and 63% for *PerchangeTour*.

**Table 12: PerchangeGen Principle Component Factor analysis**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Difference</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor1</td>
<td>3.37716</td>
<td>2.84299</td>
<td>0.6754</td>
<td>0.6754</td>
</tr>
<tr>
<td>Factor2</td>
<td>0.53418</td>
<td>0.02395</td>
<td>0.1068</td>
<td>0.7823</td>
</tr>
<tr>
<td>Factor3</td>
<td>0.51022</td>
<td>0.18526</td>
<td>0.1020</td>
<td>0.8243</td>
</tr>
<tr>
<td>Factor4</td>
<td>0.32496</td>
<td>0.07148</td>
<td>0.0650</td>
<td>0.9493</td>
</tr>
<tr>
<td>Factor5</td>
<td>0.25348</td>
<td>.</td>
<td>0.0507</td>
<td>1</td>
</tr>
</tbody>
</table>

Number of observations = 663; Number of parameters = 6; Rotation: (unrotated); Retained factors = 1
LR test: independent vs. saturated: chi2(10) = 1703.72, chi2<0.001
Table 13: PerchangeRes Principle Component Factor analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Difference</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor1</td>
<td>4.50766</td>
<td>3.74751</td>
<td>0.644</td>
<td>0.644</td>
</tr>
<tr>
<td>Factor2</td>
<td>0.76016</td>
<td>0.2815</td>
<td>0.1086</td>
<td>0.7525</td>
</tr>
<tr>
<td>Factor3</td>
<td>0.47896</td>
<td>0.05849</td>
<td>0.0684</td>
<td>0.821</td>
</tr>
<tr>
<td>Factor4</td>
<td>0.42046</td>
<td>0.03224</td>
<td>0.0601</td>
<td>0.881</td>
</tr>
<tr>
<td>Factor5</td>
<td>0.38823</td>
<td>0.13532</td>
<td>0.0555</td>
<td>0.9365</td>
</tr>
<tr>
<td>Factor6</td>
<td>0.2529</td>
<td>0.06127</td>
<td>0.0361</td>
<td>0.9726</td>
</tr>
<tr>
<td>Factor7</td>
<td>0.19163</td>
<td>.</td>
<td>0.0274</td>
<td>1</td>
</tr>
</tbody>
</table>

Number of observations = 663; Number of parameters = 7; Rotation: (unrotated); Retained factors = 1
LR test: independent vs. saturated: chi2(21) = 2866.38, chi2<0.001

Table 14: PerchangeTour Principle Component Factor analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Difference</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor1</td>
<td>3.13852</td>
<td>2.48783</td>
<td>0.6277</td>
<td>0.6277</td>
</tr>
<tr>
<td>Factor2</td>
<td>0.65069</td>
<td>0.09629</td>
<td>0.1301</td>
<td>0.7578</td>
</tr>
<tr>
<td>Factor3</td>
<td>0.5544</td>
<td>0.21898</td>
<td>0.1109</td>
<td>0.8687</td>
</tr>
<tr>
<td>Factor4</td>
<td>0.33542</td>
<td>0.01445</td>
<td>0.0671</td>
<td>0.9358</td>
</tr>
<tr>
<td>Factor5</td>
<td>0.32097</td>
<td>.</td>
<td>0.0642</td>
<td>1</td>
</tr>
</tbody>
</table>

Number of observations = 663; Number of parameters = 5; Rotation: (unrotated); Retained factors = 1
LR test: independent vs. saturated: chi2(10) = 1390.10, chi2<0.001

According to Netemeyer, Bearden and Sharma (2003) and Ping (2004), each construct being measured must comprise at least three items. From the PCF analysis, five items were retained for PerchangeGen and PerchangeTour, whilst seven items were retained for PerchangeRes. Table 15 displays the factor loadings and uniqueness of the variables in the factors for each scale. The uniqueness represents the degree of variance in the variable that is not shared with other variables. A uniqueness value above 0.6 is considered high, suggesting that the variable is not well explained by the retained factors. Furthermore, factor loadings are required to be above 0.7 (Hair et al., 2006). In Table 15, variables that do not align with these thresholds are marked with an asterisk (*). From the PCF analysis, these variables are eliminated. The uniqueness and factor loading for all other variables are adequate and are retained for further analysis. Given that the tourism and resources sectors are large contributors to the economy and have a strong presence in each
region, the correlation between resources and tourism sector change with regional change in general was explored. This was conducted by undertaking confirmatory factor analysis, which is discussed in the following section.

Table 15: Factor loadings and unique variances

<table>
<thead>
<tr>
<th>Variable</th>
<th>PerchangeGen</th>
<th>PerchangeRes</th>
<th>PerchangeTour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor1</td>
<td>Uniqueness</td>
<td>Factor1</td>
</tr>
<tr>
<td>Opportunity/Threat</td>
<td>0.7687</td>
<td>0.4091</td>
<td>0.8114</td>
</tr>
<tr>
<td>Small/Large</td>
<td>0.5229*</td>
<td>0.4455</td>
<td>0.6394*</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>0.8640</td>
<td>0.2534</td>
<td>0.9006</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>0.7576</td>
<td>0.4260</td>
<td>0.7932</td>
</tr>
<tr>
<td>Insignificant/</td>
<td>0.6400*</td>
<td>0.3906</td>
<td>0.7580</td>
</tr>
<tr>
<td>Overwhelming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive/Forceful</td>
<td>0.6680*</td>
<td>0.4108</td>
<td>0.7562</td>
</tr>
<tr>
<td>Unpleasant/Pleasant</td>
<td>0.8573</td>
<td>0.2651</td>
<td>0.8508</td>
</tr>
<tr>
<td>Gloomy/Exciting</td>
<td>0.8549</td>
<td>0.2692</td>
<td>0.8393</td>
</tr>
<tr>
<td>Growing/Declining</td>
<td>-0.1076*</td>
<td>0.5154</td>
<td>-0.3394*</td>
</tr>
</tbody>
</table>

Following the EFA, the scale items were further examined using confirmatory factor analysis (CFA). CFA was used within a structural equation modelling (SEM) framework to further evaluate and confirm the extent to which measures are consistent with the PCF analysis for the model. Data considerations when conducting SEM usually relate to missing data and sample size (Hair et al., 2006). The design of the survey, particularly the forced-response component of the online survey, resulted in the data having no missing data, besides those of incomplete surveys that were deleted from the database. Therefore, addressing the missing values for this analysis was not required for this research. Minimum sample sizes are a requirement of SEM, with the estimated accepted sample being 12 cases for each variable being estimated (Westland, 2010). With 17 variables, the required minimum sample size was calculated to be 204. Thus, the current sample of 663 was considered adequate. Given that no missing values were present and there was an acceptable sample size, SEM was conducted.
To test the reliability of measures, each item (PerchangeGen, PerchangeRes and PerchangeTour) was individually assessed. As established in Section 3.10.2, CFI, TLI and RMSEA were used to determine the goodness-of-fit for a model and the reliability of the measures for unweighted data. A model that fits well generally has a CFI and TLI score of 0.9 or above (Hinkin, 1995), whilst acceptable RMSEA are considered to be less than 0.05 (Ping, 2004). Alternatively, CD and SRMR scores (refer to Section 3.10.2) are used for weighted data. Acceptable scores for CD are above 0.7 (Doll et al., 1995), whilst acceptable SRMR scores are less than 0.08 (Melas et al., 2012). To ensure the robustness of measures, the goodness-of-fit for all three items were assessed using both weighted and non-weighted data.

When assessing the measures, two variables (Insignificant/Overwhelming and Passive/Forceful) within PerchangeRes were found to have a low correlation which affected the overall goodness-of-fit of the model. Consequently these two items were removed and was found to improve the overall fit of the model. Table 16 presents the retained measures from the EFA and CFA. A total of five variables were retained for each scale.
The model assessments with the final variable items using weighted and unweighted data can be found in Table 17. Evidently, most measures proved reliable for each item, which suggests a strong model fit. However, across all three items, the RMSEA scores were higher than 0.05. With scores comfortably within the desired range across all other indices, the above average score for RMSEA were not considered to be a concerning factor for the model fit (Fan, Thompson & Wang, 1999). In fact, Chen, Curran, Bollen, Kirby and Paxton (2008) argue that RMSEA cut off points can vary depending on certain factors, such as sample size, model specifications and degrees of freedom, suggesting it can range between 0.05 and 0.15. Hair et al. (2006) also supports the higher cut off point for RMSEA values.
After confirming the final measures for each item, the model can be assessed. For the model, covariances were explored between PerchangeGen, PerchangeRes and PerchangeTour. The goodness-of-fit was assessed using survey weights, thus the model fit relied on the CD and SRMR values. The goodness of fit indices for the model, shown in Table 18, indicated acceptable CD and SRMR scores. Given the complexity of the model, high scores across CD and SRMR indices indicates a robust model fit (Ping, 2004). Hoyle (2011) argues that a CD score of 0.998 may not be legitimate when there isn’t high accuracy and precision in measurements. However, Schermelleh-Engel and Moosbrugger (2003) recognise that high scores can result from complex models. Given that each item was thoroughly tested individually, model bias or error can be considered minimal (Hoyle, 2011).

### Table 18: Goodness-of-fit for the perceptions of change model

<table>
<thead>
<tr>
<th>Required Level</th>
<th>Model Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD Above 0.7</td>
<td>0.998</td>
</tr>
<tr>
<td>SRMR Below 0.08</td>
<td>0.042</td>
</tr>
</tbody>
</table>

For the perceptions of change model, Figure 14 demonstrates each of the five measures have high scores within the three items, further confirming their strength. Moreover, the model indicated that in comparison to PerchangeTour, PerchangeRes had a much more significant impact on PerchangeGen (0.67). In contrast, the aggregated
*PerchangeTour* variable had a noticeably weaker path to *PerchangeGen* (0.37). This suggests that the perceptions of change driven by the resources sector are more significant than the change driven by tourism. It further suggests that perceptions of the resources sector have a greater influence on the perceptions of general change within a region. Consequently, resilience to change driven by the resources sector may differ to resilience to change driven by tourism. A scale variable was generated for each (refer to Section 3.10.2) to determine how each contributes to community resilience. The correlation between community resilience and the scale variables are presented in Section 4.6.
Figure 14: Perceptions of change model

<table>
<thead>
<tr>
<th>Opportunity/Threat</th>
<th>Positive/Negative</th>
<th>Adaptive/Flexible</th>
<th>Pleasant/Unpleasant</th>
<th>Exciting/Gloomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q26_1</td>
<td>Q26_3</td>
<td>Q26_4</td>
<td>Q26_7a</td>
<td>Q26_8a</td>
</tr>
<tr>
<td>Q25_1</td>
<td>Q25_3</td>
<td>Q25_4</td>
<td>Q25_7a</td>
<td>Q25_8a</td>
</tr>
<tr>
<td>Q27_1</td>
<td>Q27_3</td>
<td>Q27_4</td>
<td>Q27_7a</td>
<td>Q27_8a</td>
</tr>
</tbody>
</table>
4.4 Emotional stability

The literature suggests that there may be different levels of emotional stability and resilience amongst certain community groups (Adger, 2006; Norris et al., 2008). This drove the development of Research Objective 2, which aimed to determine levels of resilience of different segments within communities undergoing long-term structural change driven by the tourism and resources sectors. It was hypothesized that emotional stability might be a determinant of resilience. To measure the emotional stability of community members, a validated scale was adopted from the literature (Saucier, 1997, refer to Section 3.9.1). To further verify the emotional stability scale in this context, both EFA and CFA were conducted following the same process used to assess perceptions of change scales. Section 4.4 presents the results of the factor analyses and cluster analysis conducted on the emotional stability scale. The exploratory and confirmatory factor analysis using principal component factor analysis and structural equation modelling are presented first, followed by the cluster analysis.

4.4.1 Scale development

A Cronbach’s alpha test was conducted on the seven items measuring residents’ emotional stability. As previously mentioned in Section 3.10.2, Cronbach’s alpha measures the correlation between items measuring the same construct, assessing the internal consistency of the items and the measurement of error. The scale received an overall reliability coefficient (Cronbach’s alpha) of 0.82. This number indicates a high correlation between items and satisfies the precision threshold range suggested by Hair et al. (2006) and Tavakol and Dennick (2011) (0.7-0.9). As displayed in Table 17, the coefficient test also determined the negatively loaded variables which require reverse coding. Consequently, the variables Nervous, Stressed, Depressed and Mood Swings were reverse coded.
Table 19: Emotional stability Cronbach’s alpha

<table>
<thead>
<tr>
<th>Item</th>
<th>Sample (n)</th>
<th>Sign</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimistic</td>
<td>663</td>
<td>+</td>
<td>0.8279</td>
</tr>
<tr>
<td>Nervous</td>
<td>663</td>
<td>-</td>
<td>0.8127</td>
</tr>
<tr>
<td>Stressed</td>
<td>663</td>
<td>-</td>
<td>0.8051</td>
</tr>
<tr>
<td>Depressed</td>
<td>663</td>
<td>-</td>
<td>0.8156</td>
</tr>
<tr>
<td>Mood Swings</td>
<td>663</td>
<td>-</td>
<td>0.7992</td>
</tr>
<tr>
<td>Ability to cope</td>
<td>663</td>
<td>+</td>
<td>0.8322</td>
</tr>
<tr>
<td>Overall happiness</td>
<td>663</td>
<td>+</td>
<td>0.8085</td>
</tr>
</tbody>
</table>

Test scale 0.8159

PCF analysis was used to further evaluate the reliability and dimensionality of the items. The LR test result was significant indicating equal variance between all possible pairs of groups and meaningful correlations. The PCF analysis revealed that two factors were retained for the emotional stability scale. As displayed in Table 20, Factor1 accounted for 50% of total variance and Factor2 accounted for 18%. Two factors were retained given the positive and negative variables, thus one factor represented the positive and one represented the negative. The variables are also well explained by the retained factors, with all the variables having a uniqueness score below the threshold of 0.6 recommended by Hair et al. (2006) (refer to Table 21).

Table 20: Emotional stability Principle Component Factor analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Difference</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor1</td>
<td>3.53169</td>
<td>2.29696</td>
<td>0.5045</td>
<td>0.5045</td>
</tr>
<tr>
<td>Factor2</td>
<td>1.23473</td>
<td>0.54297</td>
<td>0.1764</td>
<td>0.6809</td>
</tr>
<tr>
<td>Factor3</td>
<td>0.69176</td>
<td>0.17042</td>
<td>0.0988</td>
<td>0.7797</td>
</tr>
<tr>
<td>Factor4</td>
<td>0.52134</td>
<td>0.12892</td>
<td>0.0745</td>
<td>0.8542</td>
</tr>
<tr>
<td>Factor5</td>
<td>0.39242</td>
<td>0.06134</td>
<td>0.0561</td>
<td>0.9103</td>
</tr>
<tr>
<td>Factor6</td>
<td>0.33109</td>
<td>0.03412</td>
<td>0.0473</td>
<td>0.9576</td>
</tr>
<tr>
<td>Factor7</td>
<td>0.29697</td>
<td>.</td>
<td>0.0424</td>
<td>1</td>
</tr>
</tbody>
</table>

Number of observations = 663; Rotation: (unrotated); Retained factors = 2; Number of parameters = 13
LR test: independent vs. saturated: $\chi^2$(21) = 1862.97 Prob>\chi2 = 0.0000

10 “Sign” indicates the direction of the relationship (whether it is positive or negative). Reverse scorings are suggested for any that enter negatively.
Table 21: Emotional stability factor loadings and unique variances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor1</th>
<th>Factor2</th>
<th>Uniqueness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimistic</td>
<td>0.6288</td>
<td>0.4924</td>
<td>0.3621</td>
</tr>
<tr>
<td>Nervous</td>
<td>0.7241</td>
<td>-0.3582</td>
<td>0.3474</td>
</tr>
<tr>
<td>Stressed</td>
<td>0.7623</td>
<td>-0.2657</td>
<td>0.3483</td>
</tr>
<tr>
<td>Depressed</td>
<td>0.7877</td>
<td>-0.2313</td>
<td>0.3260</td>
</tr>
<tr>
<td>Mood Swings</td>
<td>0.6089</td>
<td>-0.5472</td>
<td>0.3298</td>
</tr>
<tr>
<td>Coping ability</td>
<td>0.7393</td>
<td>0.4007</td>
<td>0.2929</td>
</tr>
<tr>
<td>Overall Happiness</td>
<td>0.7022</td>
<td>0.5290</td>
<td>0.2271</td>
</tr>
</tbody>
</table>

CFA was used to further assess the scale items. Given that the scale only consisted of seven variables, there was sufficient sample to conduct SEM (Westland, 2010). Due to the weighting of the data, only CD and SRMR were available to assess the goodness-of-fit for the model (see Section 3.10.2). A strong model fit requires a CD index level above 0.7 and a SRMR index level below 0.08 (Doll et al., 1995; Hooper et al., 2008). For the emotional stability model, the CD was 0.85, comfortably above the required index level. However, the SRMR score was 0.085, which was slightly higher than the required index level of < 0.08. Given the strength of the CD score and the reliability of variables in the PCF analysis, the model was considered valid (Hooper et al., 2008). For the emotional stability model, Figure 15 demonstrates that each of the seven variables have acceptable standardised estimate scores above 0.5 (Loehlin, 2004). Although some scores are below the recommended 0.6 (Drukker, 2011; Loehlin, 2004), lower scores are expected when using weighted data (McLennan & Moyle, 2016). The scale was then converted into a scale variable (refer to Section 3.10.2). This assisted with the regression analysis and created a variable that could then be compared against the other scales and indices to determine how each contributes to community resilience.
Figure 15: Emotional stability model

Key 1: Q19_1_1 = Optimistic; Q19_1_2a = Nervous; Q19_1_3a = Stressed; Q19_1_4a = Depressed; Q19_1_5a = Mood Swings; Q19_1_6 = Ability to cope; Q19_1_7 = Overall Happiness

4.4.2 Emotional stability of community segments

The emotional stability variables were also used in a cluster analysis to explore whether there were community segments with clustered emotional stability scores. Cluster analysis was used as a tool to identify structures within the data through segmentation, that is, how natural groups of respondents based on their responses to the emotional stability scale variables (Hair et al., 2006). As mentioned in Section 3.10.3, hierarchical clustering, specifically the Ward’s linkage method, was used to form the segments of the cluster analysis.

For the emotional stability scale, four clusters were identified. The number of clusters were identified through a dendrogram (refer to Figure 16), which is a tree diagram showing the relationships of similarity among groups (Almeida, Barbosa, Paid & Formosinho, 2007; Romesburg, 2004). Highly separated subtrees are suggestive of cluster groups (Almeida et al., 2007; Karthikeyan, Peter & Chidambaranathan, 2011). As displayed in Figure 16, four highly separated subtrees can be identified. Figure 17 breaks down the regions by the clusters, displaying how the population of each region is distributed over the
cluster groups. The majority of the Mackay population falls within Cluster 4 (41%) and Cluster 1 (26%). Similarly, the Whitsunday population (57%) also primarily falls within Cluster 4, however, another large proportion (21%) falls within Cluster 2. Furthermore, Figure 18 compares each cluster by region, to determine how each cluster population is defined. Although Mackay residents make up the majority of the population for all clusters, Cluster 2 and 4 consist of a relatively even population from both regions.

Figure 16: Emotional stability clusters

![Dendrogram for WardsES cluster analysis](image)

Figure 17: Regions by emotional stability clusters

![Bar chart showing distribution by cluster](image)
The emotional stability of each cluster was determined by examining the clusters against each emotional stability indicator. Table 22 outlines the mean ($\bar{x}$) and median ($\tilde{x}$) values of the clusters for each indicator. The mean reflects the average score in the data set. The median score, on the other hand, is also a measure of central tendency, but it is not affected by outliers in the data set (Wilcox & Keselman, 2003). Thus, it is important to report both the mean and the median scores. The first three indicators (Optimistic; Ability to cope; Happy with lifestyle) positively represent emotional stability, thus the higher the value, the more emotionally stable the group. The following four indicators (Nervous; Stressed; Depressed; Mood swings) negatively characterise emotional stability; thus, lower values represent higher emotionally stability. Table 22 indicates that Cluster 4 has high emotional stability, while Cluster 3 is inclined towards emotional instability.

**Table 22: Clusters by emotional stability**

<table>
<thead>
<tr>
<th>Emotional stability indicators</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimistic</td>
<td>$\bar{x}$=3.3, $\tilde{x}$=3</td>
<td>$\bar{x}$=4.2, $\tilde{x}$=4</td>
<td>$\bar{x}$=2.9, $\tilde{x}$=3</td>
<td>$\bar{x}$=4.1, $\tilde{x}$=4</td>
</tr>
<tr>
<td>Ability to cope</td>
<td>$\bar{x}$=3.2, $\tilde{x}$=3</td>
<td>$\bar{x}$=4.0, $\tilde{x}$=4</td>
<td>$\bar{x}$=2.9, $\tilde{x}$=3</td>
<td>$\bar{x}$=4.1, $\tilde{x}$=4</td>
</tr>
<tr>
<td>Happy with lifestyle</td>
<td>$\bar{x}$=2.8, $\tilde{x}$=3</td>
<td>$\bar{x}$=3.9, $\tilde{x}$=4</td>
<td>$\bar{x}$=2.8, $\tilde{x}$=3</td>
<td>$\bar{x}$=4.0, $\tilde{x}$=4</td>
</tr>
<tr>
<td>Nervous</td>
<td>$\bar{x}$=2.8, $\tilde{x}$=3</td>
<td>$\bar{x}$=3.1, $\tilde{x}$=3</td>
<td>$\bar{x}$=3.8, $\tilde{x}$=4</td>
<td>$\bar{x}$=1.9, $\tilde{x}$=2</td>
</tr>
<tr>
<td>Stressed</td>
<td>$\bar{x}$=3.4, $\tilde{x}$=3</td>
<td>$\bar{x}$=3.5, $\tilde{x}$=3</td>
<td>$\bar{x}$=4.1, $\tilde{x}$=4</td>
<td>$\bar{x}$=2.2, $\tilde{x}$=2</td>
</tr>
<tr>
<td>Depressed</td>
<td>$\bar{x}$=2.3, $\tilde{x}$=2</td>
<td>$\bar{x}$=2.6, $\tilde{x}$=3</td>
<td>$\bar{x}$=3.9, $\tilde{x}$=4</td>
<td>$\bar{x}$=1.7, $\tilde{x}$=2</td>
</tr>
<tr>
<td>Mood swings</td>
<td>$\bar{x}$=1.9, $\tilde{x}$=2</td>
<td>$\bar{x}$=2.7, $\tilde{x}$=3</td>
<td>$\bar{x}$=3.1, $\tilde{x}$=3</td>
<td>$\bar{x}$=1.6, $\tilde{x}$=2</td>
</tr>
</tbody>
</table>
4.4.2.1 The relationship between emotional stability clusters and resident demographics

Analysing the emotional stability cluster groups against the demographic characteristics provides more insightful characteristics on the cluster groups, whilst also alluding to potential characteristics of vulnerable or emotionally unstable groups. It is important to remember during this analysis that Clusters 1 and 3 were more likely to be from Mackay, while Clusters 2 and 4 were more likely to be from the Whitsundays. Design-based F-tests revealed that there was a significant difference \( F(14.38, 9519.39)=2.40, p=0.002 \) between the education levels of the emotional stability clusters, with Cluster 2 having lower qualifications than respondents in Cluster 3. There were also significant differences by gender \( F(2.99, 1976.80)=3.78, p=0.010 \) with Cluster 2 and 3 being more likely to be female and Cluster 1 and 4 being more likely to be male. Employment status \( F(2.97, 1967.91)=7.74, p=<0.001 \) also significantly varied by the clusters, with Cluster 2 and 4 being more likely to be employed than those in Cluster 1 and 3. Thus, these characteristics can be considered as influencing the emotional stability of the community residents. However, no significant different was found between age, income or lifestyle group.

4.4.2.2 The relationship between emotional stability clusters and perceptions of change

A strong correlation was found between the emotional stability of participants and their perception of change in the region. This correlation between emotional stability and perceptions of change in the region was evident across the PerchangeGen, PerchangeRes and PerchangeTour measures. For PerchangeGen, a strong correlation existed for the perception of change variable, Positive/Negative \( F(11.26, 7456.67)=4.02, p=<0.001 \), with Cluster 2 and Cluster 4 viewing change more positively than Cluster 1 and Cluster 3. Similarly, a significant difference existed among cluster groups for the variable, Pleasant/Unpleasant \( F(11.75, 7781.73)=2.69, p=0.001 \). For this variable, Cluster 1 and
Cluster 4 viewed change in general to be more pleasant than Cluster 2 and Cluster 3. Additionally, the Adaptable/Inflexible variable displayed a strong relationship with emotional stability \((F(11.43, 7566.46)=2.42, p=0.0046)\). It was evident that Cluster 4 considered change to be more adaptable than the other clusters. Lastly, similar results were found for the exciting/gloomy perception of change \((F(11.43, 7568.77)= 2.16, p=0.0124)\), with Cluster 4 considering change to be less gloomy than other clusters.

Table 23 displays the mean \((\bar{x})\) and median \((\tilde{x})\) values for \(\text{PerchangeGen}\) variables by the emotional stability cluster groups. The lower the scores, the more the cluster is categorised by desirable perceptions of change (Opportunity, Positive, Adaptive, Pleasant, Exciting). It is evident to see that Cluster 4 considered change to be less threatening and more positive, adaptive and pleasant than the other clusters, corresponding with high emotional stability presented for this cluster in Section 4.4.2.1. Alternatively, cluster three which was identified to have the highest level of instability in Section 4.4.2.1, perceived change as more negative, inflexible, unpleasant and gloomy than the other clusters. This indicates that there may be a strong relationship between the residents’ emotional stability and their perceptions of long-term structural change.

<table>
<thead>
<tr>
<th>(\text{PerchangeGen})</th>
<th>Clusters</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Opportunity/Threat</td>
<td>1 (\bar{x}=2.8, \tilde{x}=3)</td>
<td>2 (\bar{x}=2.9, \tilde{x}=3)</td>
<td>3 (\bar{x}=2.7, \tilde{x}=3)</td>
<td>4 (\bar{x}=2.5, \tilde{x}=3)</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>(\bar{x}=3.5, \tilde{x}=3)</td>
<td>(\bar{x}=3.1, \tilde{x}=3)</td>
<td>(\bar{x}=3.6, \tilde{x}=4)</td>
<td>(\bar{x}=2.8, \tilde{x}=3)</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>(\bar{x}=3.2, \tilde{x}=3)</td>
<td>(\bar{x}=3.0, \tilde{x}=3)</td>
<td>(\bar{x}=3.4, \tilde{x}=3)</td>
<td>(\bar{x}=2.9, \tilde{x}=3)</td>
</tr>
<tr>
<td>Pleasant/Unpleasant</td>
<td>(\bar{x}=3.4, \tilde{x}=3)</td>
<td>(\bar{x}=3.1, \tilde{x}=3)</td>
<td>(\bar{x}=3.4, \tilde{x}=3)</td>
<td>(\bar{x}=2.9, \tilde{x}=3)</td>
</tr>
<tr>
<td>Exciting/Gloomy</td>
<td>(\bar{x}=3.4, \tilde{x}=4)</td>
<td>(\bar{x}=3.2, \tilde{x}=3)</td>
<td>(\bar{x}=3.4, \tilde{x}=4)</td>
<td>(\bar{x}=2.9, \tilde{x}=3)</td>
</tr>
</tbody>
</table>

Table 24 displays the mean \((\bar{x})\) and median \((\tilde{x})\) values for \(\text{PerchangeRes}\) variables by the emotional stability cluster groups. Design-based \(F\)-tests revealed strong correlations between the emotional stability clusters and \(\text{PerchangeRes}\) variables. For \(\text{PerchangeRes}\), there was a significant difference \((F(11.52, 7623.44)=2.98, p<0.001)\) between the clusters in
terms of their perceptions of the change being an Opportunity/Threat, with Cluster 1 and Cluster 3 (those more likely to be from Mackay) considering change driven by the resources sector to be more of a threat than Cluster 2 and Cluster 4 (those more likely to be from the Whitsundays). Additionally, while all clusters consider change driven by the resources sector to be inflexible, Cluster 1 and Cluster 3 felt it was more inflexible than Cluster 2 and Cluster 4. Similarly, Cluster 1 also considered change driven by the resources sector to be more significantly ($F(11.07, 7329.60)= 4.12, p<0.001$) more unpleasant than the other clusters.

As indicated in Section 4.4.2, Cluster 1 and Cluster 3 consisted of higher numbers of Mackay residents, who also had lower levels of overall emotional stability. This can be attributed to the prominence of change driven by the resources sector in Mackay and the impact the sector has had on the community. Ultimately, this allows for the hypothesis that structural change can impact on residents’ emotional stability and, conversely, that emotional stability can determine how resilient residents might be to structural change.
Table 24: PerchangeRes by emotional stability clusters

<table>
<thead>
<tr>
<th>PerchangeRes</th>
<th>Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Opportunity/Threat</td>
<td>$\bar{x}=3.7$, $\bar{x}=4$</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>$\bar{x}=4.1$, $\bar{x}=4$</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>$\bar{x}=3.8$, $\bar{x}=4$</td>
</tr>
<tr>
<td>Pleasant/Unpleasant</td>
<td>$\bar{x}=3.9$, $\bar{x}=4$</td>
</tr>
<tr>
<td>Exciting/Gloomy</td>
<td>$\bar{x}=4.2$, $\bar{x}=4$</td>
</tr>
</tbody>
</table>

The relationship between emotional stability and PerchangeTour presented contrasting results to that of PerchangeRes. For PerchangeTour, a strong relationship existed between emotional stability and the perception of change variable, Positive/Negative ($F(11.30, 7481.39)=2.82, p=0.001$). Change driven by the tourism sector was considered to be positive by all cluster groups; however, Cluster 2 and Cluster 4 rated this more positively than the other two clusters. There were significant differences between the clusters for the Pleasant/Unpleasant variable ($F(10.85, 7181.00)=3.56, p<0.001$), as well as the Opportunity/Threat variable ($F(10.48, 6940.97)=3.45, p<0.001$). Cluster 2 and 4 were more likely than the other clusters to consider change driven by tourism to be pleasant and an opportunity.

As displayed in Table 25, PerchangeTour displayed relatively similar responses for the change perception measure across all four clusters, with only small differences evident between mean and median values. Nevertheless, Cluster 2 (which predominantly consists of Whitsunday residents) considered change to be more positive and pleasant compared with other cluster groups. This highlights the differences between the tourism and resources sectors and the relationship structural change from these sector have with the emotional stability of residents in the community.
Section 4.5 presents the index development and results of the resilience variables, which were assessed to address Research Objective One and Research Objective Two. Research Objective One seeks to develop an instrument to measure community resilience to long-term structural change driven by the tourism and resources sectors. To confirm the set of indices used for the instrument, exploratory and confirmatory factor analysis was undertaken. To address Research Objective Two, cluster analysis was employed to determine the levels of resilience among community segments within the two regions.

### 4.5.1 Index development

As previously mentioned in Section 3.8, the indices used to measure community resilience to structural change in the resident survey were developed through an extensive Delphi process. To further test and confirm the indicators for the development of the index, exploratory and confirmatory factor analysis was conducted. This procedure is explained in more detail in the Methodology in Section 3.10.2. Firstly, a Cronbach’s alpha test was conducted on the twenty-eight variables measuring community resilience to structural change (Table 26). The community resilience index received an overall reliability coefficient (Cronbach’s alpha) of 0.84, representing a high correlation between items.

<table>
<thead>
<tr>
<th>Table 25: PerchangeTour by emotional stability clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PerchangeTour</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Opportunity/Threat</td>
</tr>
<tr>
<td>Positive/Negative</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
</tr>
<tr>
<td>Pleasant/Unpleasant</td>
</tr>
<tr>
<td>Exciting/Gloomy</td>
</tr>
</tbody>
</table>
Four variables (Res_8, Res_9, Res_22, and Res_23) were found to have negative loadings and were reverse coded.

Table 26: Resilience scale variables and index Cronbach’s alpha scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Label</th>
<th>Sample (n)</th>
<th>Sign</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res_1</td>
<td>Can access funds for dealing with short-term disasters</td>
<td>663</td>
<td>+</td>
<td>0.8374</td>
</tr>
<tr>
<td>Res_2</td>
<td>Can access insurance coverage for major public and private assets</td>
<td>663</td>
<td>+</td>
<td>0.8381</td>
</tr>
<tr>
<td>Res_3</td>
<td>Can adapt and adjust to changes easily</td>
<td>663</td>
<td>+</td>
<td>0.8321</td>
</tr>
<tr>
<td>Res_4</td>
<td>Can cope with long-term economic changes</td>
<td>663</td>
<td>+</td>
<td>0.8323</td>
</tr>
<tr>
<td>Res_5</td>
<td>Can recover from short-term disasters quickly</td>
<td>663</td>
<td>+</td>
<td>0.8367</td>
</tr>
<tr>
<td>Res_6</td>
<td>Conducts research to explore innovative ways to manage change</td>
<td>663</td>
<td>+</td>
<td>0.8342</td>
</tr>
<tr>
<td>Res_7</td>
<td>Has a diverse economy and workforce</td>
<td>663</td>
<td>+</td>
<td>0.8386</td>
</tr>
<tr>
<td>Res_8</td>
<td>Has a high level of dependency on natural resources</td>
<td>663</td>
<td>-</td>
<td>0.8465</td>
</tr>
<tr>
<td>Res_9</td>
<td>Has a high turnover of the population</td>
<td>663</td>
<td>-</td>
<td>0.8453</td>
</tr>
<tr>
<td>Res_10</td>
<td>Has access to health, housing and private sector insurance</td>
<td>663</td>
<td>+</td>
<td>0.8381</td>
</tr>
<tr>
<td>Res_11</td>
<td>Has leaders who adjust quickly to change</td>
<td>663</td>
<td>+</td>
<td>0.8321</td>
</tr>
<tr>
<td>Res_12</td>
<td>Has strong leaders who work well together</td>
<td>663</td>
<td>+</td>
<td>0.8348</td>
</tr>
<tr>
<td>Res_13</td>
<td>Has long-term plans aimed at ensuring a diversified economy</td>
<td>663</td>
<td>+</td>
<td>0.8332</td>
</tr>
<tr>
<td>Res_14</td>
<td>Has long-term plans that aim to manage resources sector development</td>
<td>663</td>
<td>+</td>
<td>0.8357</td>
</tr>
<tr>
<td>Res_15</td>
<td>Has long-term plans that aim to manage tourism development</td>
<td>663</td>
<td>+</td>
<td>0.8357</td>
</tr>
<tr>
<td>Res_16</td>
<td>Has opportunities for education, training and learning</td>
<td>663</td>
<td>+</td>
<td>0.8455</td>
</tr>
<tr>
<td>Res_17</td>
<td>Has opportunities to discuss and share information about long-term changes</td>
<td>663</td>
<td>+</td>
<td>0.8323</td>
</tr>
<tr>
<td>Res_18</td>
<td>Integrates and shares knowledge amongst stakeholders</td>
<td>663</td>
<td>+</td>
<td>0.8342</td>
</tr>
<tr>
<td>Res_19</td>
<td>Is made up of people who support each other</td>
<td>663</td>
<td>+</td>
<td>0.8360</td>
</tr>
<tr>
<td>Res_20</td>
<td>Is made up of people who trust each other</td>
<td>663</td>
<td>+</td>
<td>0.8370</td>
</tr>
<tr>
<td>Res_21</td>
<td>Is regularly informed about changes affecting the community</td>
<td>663</td>
<td>+</td>
<td>0.8322</td>
</tr>
<tr>
<td>Res_22</td>
<td>Is reliant on income from the resources sector</td>
<td>663</td>
<td>-</td>
<td>0.8454</td>
</tr>
<tr>
<td>Res_23</td>
<td>Is reliant on income from the tourism sector</td>
<td>663</td>
<td>-</td>
<td>0.8384</td>
</tr>
<tr>
<td>Res_24</td>
<td>Participates in risk and vulnerability planning</td>
<td>663</td>
<td>+</td>
<td>0.8341</td>
</tr>
<tr>
<td>Res_25</td>
<td>Plans for disasters, loss, hazards, vulnerabilities and risk</td>
<td>663</td>
<td>+</td>
<td>0.8359</td>
</tr>
<tr>
<td>Res_26</td>
<td>Prepares and trains for long-term change</td>
<td>663</td>
<td>+</td>
<td>0.8325</td>
</tr>
<tr>
<td>Res_27</td>
<td>Prepares and trains for short-term change</td>
<td>663</td>
<td>+</td>
<td>0.8346</td>
</tr>
<tr>
<td>Res_28</td>
<td>Works well together across internal and external bodies</td>
<td>663</td>
<td>+</td>
<td>0.8314</td>
</tr>
</tbody>
</table>

Test scale **0.8414**

11 ‘Sign’ indicates the direction of the relationship (whether it is positive or negative). Reverse scorings are suggested for any that enter negatively.
PCF analysis was used to explore the dimensionality of the index. Unlike Section 4.3 and Section 4.4 which aimed to develop a scale, the results of the PCF analysis were not unidimensional. That is, indices were multidimensional, with multiple factors retained. Given the complexity of resilience (Adger & Vincent, 2005), it was expected that resilience would have multiple dimensions. As shown in Table 27, the LR test was significant indicating the PCF analysis is meaningful. For the resilience index nine factors were retained reflecting the complexity of the subject and the multidimensionality of the indices. Nevertheless, more than 60% of the variance is explained by the retained factors.

Table 27: Resilience index

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Difference</th>
<th>Proportion</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor1</td>
<td>2.56214</td>
<td>0.51721</td>
<td>0.0915</td>
<td>0.0915</td>
</tr>
<tr>
<td>Factor2</td>
<td>2.04493</td>
<td>0.00868</td>
<td>0.0730</td>
<td>0.1645</td>
</tr>
<tr>
<td>Factor3</td>
<td>2.03625</td>
<td>0.00616</td>
<td>0.0727</td>
<td>0.2373</td>
</tr>
<tr>
<td>Factor4</td>
<td>2.03009</td>
<td>0.17161</td>
<td>0.0725</td>
<td>0.3098</td>
</tr>
<tr>
<td>Factor5</td>
<td>1.85848</td>
<td>0.01248</td>
<td>0.0664</td>
<td>0.3761</td>
</tr>
<tr>
<td>Factor6</td>
<td>1.84599</td>
<td>0.01570</td>
<td>0.0659</td>
<td>0.4421</td>
</tr>
<tr>
<td>Factor7</td>
<td>1.83030</td>
<td>0.09920</td>
<td>0.0654</td>
<td>0.5074</td>
</tr>
<tr>
<td>Factor8</td>
<td>1.73110</td>
<td>0.10457</td>
<td>0.0618</td>
<td>0.5693</td>
</tr>
<tr>
<td>Factor9</td>
<td>1.62653</td>
<td>.</td>
<td>0.0581</td>
<td>0.6273</td>
</tr>
</tbody>
</table>

Number of observations = 663; Rotation: orthogonal varimax (Kaiser off); Retained factors = 9; Number of parameters = 216; LR test: independent vs. saturated: chi2(378) = 5105.06 Prob>chi2 = 0.0000

Table 28 shows that the uniqueness is low (below 0.6), signifying that the variance in the resilience variables are well explained by the retained factors. However, variable Res_6 is above 0.6 which can be considered high (Hair et al., 2006). Table 28 also presented the factor loadings for the resilience variables. The variables with a factor loading above 0.6 are highlighted in bold, meaning they are significant within the corresponding factor. Seven (7) variables have low factor loadings, that is, a score below 0.6. The low factor loadings suggest the variables have a low contribution to the factors (Yong & Pearce, 2013). However, given the purpose of the PCF analysis is not to refine index items, the variables with a low factor loading are still be retained. By analysing the factors from the variables
with a high factor loading, the index dimensions can be explained. However, given the sparse distribution of variables across factors, not all dimensions can be accurately explained. Nevertheless, the variables retained under Factor1 and Factor5 represent planning and preparedness for community resilience. Alternatively, Factor2 variables reflect stakeholder collaboration, whilst Factor6 represents access to resources and Factor3 resource dependency.

The resilience index, which is the compound measure that aggregates the multiple variables, was then developed. The index was created by calculating the mean score for the resilience variables, giving equal weight to each of the variables (Hawken & Munck, 2012) (refer to Section 3.10.2). The index was then used to analyse and compare the relationship between the community resilience, emotional stability and the perceptions of change (PerchangeGen, PerchangeRes and PerchangeTour). This is presented in Section 4.6.
Table 28: Rotated resilience factor loadings and unique variances

<table>
<thead>
<tr>
<th>Variable</th>
<th>Factor1</th>
<th>Factor2</th>
<th>Factor3</th>
<th>Factor4</th>
<th>Factor5</th>
<th>Factor6</th>
<th>Factor7</th>
<th>Factor8</th>
<th>Factor9</th>
<th>Uniqueness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res_1</td>
<td>0.1256</td>
<td>0.0820</td>
<td>0.0601</td>
<td>0.1768</td>
<td>0.0399</td>
<td><strong>0.7459</strong></td>
<td>0.0114</td>
<td>0.0367</td>
<td>-0.0531</td>
<td>0.3803</td>
</tr>
<tr>
<td>Res_2</td>
<td>0.0949</td>
<td>0.0039</td>
<td>-0.1604</td>
<td>0.1495</td>
<td>0.2089</td>
<td><strong>0.6990</strong></td>
<td>-0.0735</td>
<td>-0.0128</td>
<td>0.0408</td>
<td>0.4034</td>
</tr>
<tr>
<td>Res_3</td>
<td>0.0503</td>
<td>0.3704</td>
<td>-0.2118</td>
<td>0.0640</td>
<td>0.0493</td>
<td>0.2293</td>
<td>0.4576</td>
<td>0.1339</td>
<td>0.2954</td>
<td>0.4417</td>
</tr>
<tr>
<td>Res_4</td>
<td>0.0475</td>
<td>0.3764</td>
<td>-0.0586</td>
<td>0.0508</td>
<td>0.0091</td>
<td>0.2974</td>
<td>0.3715</td>
<td>0.3013</td>
<td>0.1668</td>
<td>0.5049</td>
</tr>
<tr>
<td>Res_5</td>
<td>0.1579</td>
<td>0.2129</td>
<td>0.2657</td>
<td>0.1463</td>
<td>-0.1871</td>
<td>0.4856</td>
<td>0.2988</td>
<td>0.1366</td>
<td>0.0528</td>
<td>0.4562</td>
</tr>
<tr>
<td>Res_6</td>
<td>0.1897</td>
<td>0.0609</td>
<td>-0.2032</td>
<td>-0.0610</td>
<td>0.1664</td>
<td>0.2638</td>
<td>0.2618</td>
<td>0.3504</td>
<td>0.1459</td>
<td>0.6054</td>
</tr>
<tr>
<td>Res_7</td>
<td>0.1126</td>
<td>0.0738</td>
<td>-0.0089</td>
<td>0.1341</td>
<td>0.1300</td>
<td>-0.0096</td>
<td><strong>0.7358</strong></td>
<td>-0.0752</td>
<td>-0.1705</td>
<td>0.3706</td>
</tr>
<tr>
<td>Res_8</td>
<td>-0.0308</td>
<td>-0.0472</td>
<td><strong>0.7293</strong></td>
<td>0.2281</td>
<td>0.0413</td>
<td>-0.0105</td>
<td>-0.0163</td>
<td>-0.0969</td>
<td>0.0170</td>
<td>0.4012</td>
</tr>
<tr>
<td>Res_9</td>
<td>-0.0817</td>
<td>0.0193</td>
<td><strong>0.7583</strong></td>
<td>-0.0750</td>
<td>0.0333</td>
<td>0.0657</td>
<td>-0.0293</td>
<td>0.0051</td>
<td>0.0337</td>
<td>0.4049</td>
</tr>
<tr>
<td>Res_10</td>
<td>-0.1242</td>
<td>0.0406</td>
<td>0.2448</td>
<td>0.0763</td>
<td>0.1678</td>
<td>0.4917</td>
<td>0.1237</td>
<td>0.3949</td>
<td>0.1508</td>
<td>0.4532</td>
</tr>
<tr>
<td>Res_11</td>
<td>0.1442</td>
<td><strong>0.7945</strong></td>
<td>-0.0777</td>
<td>0.0911</td>
<td>0.1809</td>
<td>0.0395</td>
<td>0.1395</td>
<td>-0.0019</td>
<td>0.0986</td>
<td>0.2702</td>
</tr>
<tr>
<td>Res_12</td>
<td>0.1023</td>
<td><strong>0.8009</strong></td>
<td>0.1119</td>
<td>0.0902</td>
<td>0.0807</td>
<td>0.0678</td>
<td>0.0026</td>
<td>0.1465</td>
<td>-0.0402</td>
<td>0.2933</td>
</tr>
<tr>
<td>Res_13</td>
<td>0.1323</td>
<td>0.2331</td>
<td>-0.0194</td>
<td>0.0376</td>
<td><strong>0.6595</strong></td>
<td>0.0347</td>
<td>0.1700</td>
<td>0.2384</td>
<td>-0.0983</td>
<td>0.3949</td>
</tr>
<tr>
<td>Res_14</td>
<td>0.1471</td>
<td>0.1628</td>
<td>0.0377</td>
<td>0.0596</td>
<td><strong>0.7555</strong></td>
<td>0.1231</td>
<td>-0.0676</td>
<td>0.1710</td>
<td>-0.0988</td>
<td>0.3174</td>
</tr>
<tr>
<td>Res_15</td>
<td>0.1804</td>
<td>0.0165</td>
<td>0.1049</td>
<td>0.0766</td>
<td><strong>0.6946</strong></td>
<td>0.0630</td>
<td>0.2047</td>
<td>-0.0703</td>
<td>0.3108</td>
<td>0.3204</td>
</tr>
<tr>
<td>Res_16</td>
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<td>0.1443</td>
<td>0.1294</td>
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<td><strong>0.6076</strong></td>
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</tr>
<tr>
<td>Res_17</td>
<td>0.0757</td>
<td>0.1923</td>
<td>-0.1348</td>
<td>0.1154</td>
<td>0.1782</td>
<td>0.0137</td>
<td>0.3151</td>
<td>0.5483</td>
<td>0.1007</td>
<td>0.4837</td>
</tr>
<tr>
<td>Res_18</td>
<td>0.1566</td>
<td>0.1542</td>
<td>-0.0266</td>
<td>0.2926</td>
<td>0.1421</td>
<td>0.0789</td>
<td>-0.1229</td>
<td><strong>0.7054</strong></td>
<td>-0.0411</td>
<td>0.3246</td>
</tr>
<tr>
<td>Res_19</td>
<td>0.0840</td>
<td>0.0795</td>
<td>0.0568</td>
<td><strong>0.8654</strong></td>
<td>0.0427</td>
<td>0.0986</td>
<td>0.1139</td>
<td>0.0485</td>
<td>0.0993</td>
<td>0.1978</td>
</tr>
<tr>
<td>Res_20</td>
<td>0.0276</td>
<td>0.0705</td>
<td>0.0766</td>
<td><strong>0.8750</strong></td>
<td>0.0449</td>
<td>0.1202</td>
<td>0.0451</td>
<td>0.1259</td>
<td>0.0065</td>
<td>0.1884</td>
</tr>
<tr>
<td>Res_21</td>
<td>0.1817</td>
<td>0.3721</td>
<td>-0.2503</td>
<td>0.1886</td>
<td>0.0977</td>
<td>-0.1255</td>
<td>0.4715</td>
<td>0.1991</td>
<td>0.0799</td>
<td>0.4367</td>
</tr>
<tr>
<td>Res_22</td>
<td>-0.0011</td>
<td>0.0193</td>
<td><strong>0.6720</strong></td>
<td>0.1164</td>
<td>0.0437</td>
<td>-0.0448</td>
<td>-0.0371</td>
<td>0.0133</td>
<td>-0.3996</td>
<td>0.3693</td>
</tr>
<tr>
<td>Res_23</td>
<td>0.1005</td>
<td>0.0905</td>
<td>-0.0024</td>
<td>0.2121</td>
<td>0.0849</td>
<td>0.0529</td>
<td>0.0348</td>
<td>0.0931</td>
<td><strong>0.7918</strong></td>
<td>0.2899</td>
</tr>
<tr>
<td>Res_24</td>
<td><strong>0.6361</strong></td>
<td>-0.0522</td>
<td>0.0217</td>
<td>-0.0407</td>
<td>0.1138</td>
<td>0.0371</td>
<td>0.0300</td>
<td>0.4594</td>
<td>0.1521</td>
<td>0.3411</td>
</tr>
<tr>
<td>Res_25</td>
<td><strong>0.6748</strong></td>
<td>-0.0455</td>
<td>0.0694</td>
<td>0.0027</td>
<td>0.0451</td>
<td>0.0413</td>
<td>0.3207</td>
<td>-0.0137</td>
<td>0.1910</td>
<td>0.3945</td>
</tr>
<tr>
<td>Res_26</td>
<td><strong>0.7222</strong></td>
<td>0.2291</td>
<td>-0.1260</td>
<td>-0.0007</td>
<td>0.1887</td>
<td>0.0753</td>
<td>0.0856</td>
<td>0.0656</td>
<td>-0.1453</td>
<td>0.3360</td>
</tr>
<tr>
<td>Res_27</td>
<td><strong>0.6973</strong></td>
<td>0.2133</td>
<td>-0.0570</td>
<td>0.3228</td>
<td>0.1042</td>
<td>0.1067</td>
<td>-0.0934</td>
<td>-0.1308</td>
<td>-0.0246</td>
<td>0.3121</td>
</tr>
<tr>
<td>Res_28</td>
<td><strong>0.6192</strong></td>
<td>0.1566</td>
<td>-0.0719</td>
<td>0.0423</td>
<td>0.1418</td>
<td>0.0662</td>
<td>0.0189</td>
<td>0.3080</td>
<td>0.1923</td>
<td>0.4284</td>
</tr>
</tbody>
</table>
4.5.2 Resilience of community segments

Section 4.5.2 reports the results of the cluster analysis which was conducted on the community resilience variables to explore residents’ likely resilience to long-term structural change. The community resilience variables refer to the indicators that were developed in Section 3.8.3. The resilience variables provided insight into the communities’ level of resilience to structural change. By conducting cluster analysis on the resilience variables, it is possible to identify if there are segments of the community with similar resilience levels, thus addressing Research Objective Two. Research Objective Two aimed to determine levels of resilience among different segments within communities undergoing long-term structural change driven by the tourism and resources sectors.

As explained in Section 3.10.1, the resilience variables were screened, which identified that all variables had missing data. The missing data for variables varied greatly, with four variables exceeding 20% (Res_2, Res_18, Res_24, Res_28). It was identified that this was the result of respondents answering ‘Don’t Know’ for these variables. Commonly, variables with more than 10% missing data should either be deleted or if appropriate, an imputation method should be undertaken (Graham, 2009). However, it was determined that the variables were not candidates for deletion, as the ‘Don’t Know’ responses were not considered to be true missing data, rather they were potentially valid results due to particular types of respondents not being able to answer the question for a reason that is related to their resilience levels. Consequently, following Graham (2009), the missing data was treated as providing ‘useful’ results. Including the ‘Don’t Know’ selection in the analysis provides unique insight into the resident perception of the variables and the lack of awareness of these indicators could present valid findings. Cluster analysis can be categorical, enabling the inclusion of this data without obscuring the data set. Consequently, these responses were combined by assigning a score of ‘0’ for each variable.
The Ward’s linkage method was used to form the segments of the hierarchical cluster analysis (refer to Section 3.10.3). Similar to Section 4.4.2, the number of clusters were identified through a dendrogram (refer to Figure 19). As displayed in Figure 16, three highly separated subtrees can be identified for the community resilience index. Figure 20 breaks down the regions by the clusters, displaying how the population of each region is distributed over the cluster groups. The majority of the Mackay population (73%) falls within Cluster 2. Similarly, the Whitsunday population (52%) also primarily falls within Cluster 2; however, another large proportion (42%) falls within Cluster 3. Furthermore, Figure 21 compares each cluster by region, to determine how each cluster population is defined. Mackay resident make up the majority of the population for Cluster 1 (71%) and Cluster 2 (70%), whilst Cluster 3 predominantly consists of Whitsunday residents (61%).

Figure 19: Community resilience clusters
To further explore community resilience, the mean ($\bar{x}$) and median ($\tilde{x}$) (refer to Section 4.4.2) for each resilience indicator was calculated for each cluster. The higher the scores, that is, the closer the score to 5, reflects higher levels of resilience. However, scores closer to 0 reflected lower levels of resilience and/or higher uncertainty. Table 29 shows that Cluster 1 and Cluster 2 have relatively low levels of community resilience, whilst Cluster 3 has higher levels of resilience. In fact, Cluster 1 had more “Don’t Know” responses ($\tilde{x}=0$), than the other cluster groups. This represented uncertainty within the cluster group, contributing to the lower levels of resilience. The weak and strong areas of the community can be identified when examining the resilience indicators individually. For example, economic support was found to be a significant contributor to the resilience of cluster three. Alternatively, across all three clusters, low levels of resilience were found relating to long
and short-term planning. Additionally, community connectivity and collaboration was particularly low for Cluster 1 and 2, with Cluster 3 only displaying average levels. From the analysis, it was evident that there were a strong correlation between the emotional stability of participants and the perceptions of community resilience \((F(5.92, 3918.66)=4.93, p<0.001)\). That is, the participants’ emotional stability influenced their response to community resilience indicators.

**Table 29: Clusters by community resilience indicators**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Res_1</td>
<td>1: (\bar{x}=1.3, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_2</td>
<td>1: (\bar{x}=0.9, \bar{x}=0)</td>
</tr>
<tr>
<td>Res_3</td>
<td>1: (\bar{x}=1.8, \bar{x}=2)</td>
</tr>
<tr>
<td>Res_4</td>
<td>1: (\bar{x}=1.7, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_5</td>
<td>1: (\bar{x}=1.8, \bar{x}=2)</td>
</tr>
<tr>
<td>Res_6</td>
<td>1: (\bar{x}=1.2, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_7</td>
<td>1: (\bar{x}=2.1, \bar{x}=2)</td>
</tr>
<tr>
<td>Res_8*</td>
<td>1: (\bar{x}=3.6, \bar{x}=4)</td>
</tr>
<tr>
<td>Res_9*</td>
<td>1: (\bar{x}=3.1, \bar{x}=4)</td>
</tr>
<tr>
<td>Res_10</td>
<td>1: (\bar{x}=1.9, \bar{x}=2)</td>
</tr>
<tr>
<td>Res_11</td>
<td>1: (\bar{x}=1.4, \bar{x}=2)</td>
</tr>
<tr>
<td>Res_12</td>
<td>1: (\bar{x}=1.4, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_13</td>
<td>1: (\bar{x}=1.1, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_14</td>
<td>1: (\bar{x}=1.1, \bar{x}=1)</td>
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<td>Res_15</td>
<td>1: (\bar{x}=1.5, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_16</td>
<td>1: (\bar{x}=2.6, \bar{x}=3)</td>
</tr>
<tr>
<td>Res_17</td>
<td>1: (\bar{x}=1.2, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_18</td>
<td>1: (\bar{x}=0.9, \bar{x}=0)</td>
</tr>
<tr>
<td>Res_19</td>
<td>1: (\bar{x}=2.1, \bar{x}=2)</td>
</tr>
<tr>
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<td>1: (\bar{x}=1.8, \bar{x}=2)</td>
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<td>Res_21</td>
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<tr>
<td>Res_22*</td>
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<td>Res_23*</td>
<td>1: (\bar{x}=2.5, \bar{x}=2)</td>
</tr>
<tr>
<td>Res_24</td>
<td>1: (\bar{x}=0.9, \bar{x}=0)</td>
</tr>
<tr>
<td>Res_25</td>
<td>1: (\bar{x}=1.7, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_26</td>
<td>1: (\bar{x}=1.2, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_27</td>
<td>1: (\bar{x}=1.3, \bar{x}=1)</td>
</tr>
<tr>
<td>Res_28</td>
<td>1: (\bar{x}=0.7, \bar{x}=0)</td>
</tr>
</tbody>
</table>

* Indicators are negatively phrased and represent opposite levels of resilience.
4.5.2.1 The relationship between community resilience and resident demographics

Similar to the emotional stability scale, analysing the resilience cluster groups against the demographic characteristics provides more insightful characteristics on the cluster groups. A design-based F-test showed a significant difference between the education levels \((F(9.67, 6403.60)= 2.20, p=0.017)\) of the community resilience clusters. It was found that Cluster 2 had higher qualifications than those in Cluster 1 and Cluster 3. Significant differences were also found for gender \((F(2.00, 1323.30)=3.52, p=0.030)\). Although more females were found across all clusters, Cluster 1 had a proportionally more females than Cluster 2 and 3. Household income also significantly varied between cluster groups \((F(11.36, 7521.93)=2.78, p=0.001)\), with higher household incomes found in Cluster 3, than in Cluster 1 and Cluster 2. Thus, these characteristics can be considered as influencing the community resilience of the regions. No significant differences were found among clusters for age or lifestyle group.

4.5.2.2 The relationship between community resilience and perceptions of change

Design-based F-tests were undertaken to determine if community resilience differed by perceptions of change. The results indicated that community resilience was related to perceptions of change, with a significant correlation \((F(7.40, 4822.52)=2.22, p=0.027)\) between the community resilience clusters and the variable measuring the residents’ perceived prominence of change. However, this was not found to be a key factor influencing resilience, as the mean scores for the prominence of change were similar across each cluster (Cluster 1=3.8, Cluster 2= 4.0, Cluster 3= 3.8). Nevertheless, a strong relationship existed between the community resilience cluster groups and residents perception of change in the region, suggesting that a resident’s perception of change influenced their level of resilience.
This was evident across all three scales measuring the perceptions of change, including \textit{PerchangeGen}, \textit{PerchangeRes} and \textit{PerchangeTour}.

For \textit{PerchangeGen}, all measures of this scale were found to have a strong correlation with the community resilience cluster groups. Larger proportions of Cluster 2 and 3 were significantly ($F(7.68, 5081.31)=3.11, p=0.002$) more likely than Cluster 1 to consider change in the region to be an opportunity. Cluster 1 and 2 were also significantly ($F(7.78, 5153.25)=3.80, p<0.001$) more likely to consider change to be more inflexible than Cluster 3, whilst Cluster 3 viewed change as significantly ($F(7.62, 5047.73)=4.70, p<0.001$) more pleasant than the other cluster groups.

Compared with the relationship between \textit{PerchangeGen}, it is evident that the change driven by the resources sector (\textit{PerchangeRes}) has the strongest relationship with the level of community resilience. From the design-based F-tests, all \textit{PerchangeRes} measures excluding one (Opportunity/Threat) presented significant differences between the community resilience clusters and \textit{PerchangeRes}. This was particularly evident for the variable Positive/Negative, with Cluster 1 and 2 viewing change driven by the resources sector significantly ($F(7.56, 5004.63)= 6.54, p=<0.001$) more negatively than Cluster 3. Similarly, while all clusters viewed change driven by the resources sector as unpleasant, Cluster 1 and Cluster 2 were significantly more likely than Cluster 3 to view is as unpleasant ($F(7.10, 4686.13)=7.41, p=<0.001$) and gloomy ($F(7.89, 5224.05)=6.79, p=<0.001$).

The design-based F-tests also revealed significant differences between the variables for \textit{PerchangeTour}, thus relationships may exist between perception of tourism change and community resilience. Cluster 2 and Cluster 3 considered change driven by tourism to be significantly ($F(7.08, 4686.13)= 5.29, p=<0.001$) more of an opportunity than Cluster 1. Cluster 3 also considered change to be significantly ($F(7.43, 4918.66)= 5.84, p=<0.001$) more positive than the other clusters. Cluster 3’s community resilience levels were
considered to be average (see Section 4.5.2), demonstrating the influence that the perceptions of change have on the perceived resilience of community groups.

Table 30 displays the mean (\( \overline{x} \)) and median (\( x̃ \)) values for PerchangeGen, PerchangeRes and PerchangeTour variables by the community resilience cluster groups to demonstrate differences among groups. The lower the scores, the more the cluster is categorised by desirable perceptions of change (Opportunity, Positive, Adaptive, Pleasant, Exciting).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>PerchangeGen</strong></td>
<td></td>
</tr>
<tr>
<td>Opportunity/Threat</td>
<td>( \overline{x}=2.9, x̃=3 )</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>( \overline{x}=3.0, x̃=3 )</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>( \overline{x}=3.1, x̃=3 )</td>
</tr>
<tr>
<td>Pleasant/Unpleasant</td>
<td>( \overline{x}=3.1, x̃=3 )</td>
</tr>
<tr>
<td>Exciting/Gloomy</td>
<td>( \overline{x}=2.9, x̃=3 )</td>
</tr>
<tr>
<td><strong>PerchangeRes</strong></td>
<td></td>
</tr>
<tr>
<td>Opportunity/Threat</td>
<td>( \overline{x}=3.3, x̃=3 )</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>( \overline{x}=3.5, x̃=3 )</td>
</tr>
<tr>
<td>Adaptive/Inflexible</td>
<td>( \overline{x}=3.5, x̃=3 )</td>
</tr>
<tr>
<td>Pleasant/Unpleasant</td>
<td>( \overline{x}=3.6, x̃=3 )</td>
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<td>Exciting/Gloomy</td>
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</tr>
<tr>
<td><strong>PerchangeTour</strong></td>
<td></td>
</tr>
<tr>
<td>Opportunity/Threat</td>
<td>( \overline{x}=2.2, x̃=2 )</td>
</tr>
<tr>
<td>Positive/Negative</td>
<td>( \overline{x}=2.3, x̃=2 )</td>
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<tr>
<td>Adaptive/Inflexible</td>
<td>( \overline{x}=2.3, x̃=3 )</td>
</tr>
<tr>
<td>Pleasant/Unpleasant</td>
<td>( \overline{x}=2.2, x̃=2 )</td>
</tr>
<tr>
<td>Exciting/Gloomy</td>
<td>( \overline{x}=2.4, x̃=2 )</td>
</tr>
</tbody>
</table>

For PerchangeGen, it is evident to see that Cluster 3 considers change to be the least threatening and more positive, corresponding with higher community resilience presented for this cluster in Section 4.5.2. Furthermore, Cluster 1 and 2, who were found to have lower levels of community resilience, are also found to perceive change more negatively than Cluster 3. This supports the strong correlations between PerchangeGen and community resilience.
resilience presented by the design-based F-tests. Similarly for *PerchangeRes*, it has been established that Cluster 3 view change driven by the resources sector more positively than Cluster 1 and Cluster 2, who view the change more of a threat, inflexible and unpleasant. These results strengthen the notion that there is a relationship between the perceptions of change and community resilience, as Cluster 1 and 2 had lower levels of community resilience (see Section 4.5.2). Alternatively, when comparing the perceptions of change driven by tourism (*PerchangeTour*) and the community resilience clusters, a largely desirable perception exists among the cluster groups. This is evidenced by the low mean and median scores in Table 30.

### 4.5.2.3 The relationship between emotional stability and community resilience

Section 4.5.2.2 revealed significant relationships between *PerchangeGen*, *PerchangeRes*, *PerchangeTour* and resilience levels of the community. That is, the residents’ perception of change influences their level of resilience. Section 4.4.2.2 also indicated a strong relationship between *PerchangeGen*, *PerchangeRes*, *PerchangeTour* and emotional stability. Consequently, there is a link between residents’ perception of change and their emotional stability. Logically, a relationship may also exist between community resilience and emotional stability.

A design-based F-test revealed a strong relationship between the community resilience index and the emotional stability scale ($F(1, 662) = 40.72, \ p < 0.001$). The results suggest that if emotional stability is low, then the level of community resilience will also be low. To expand on this relationship, the correlation between the cluster variables for community resilience and emotional stability was also explored. A strong correlation was also presented between the community resilience cluster groups and the emotional stability cluster groups ($F(5.92, 3918.66) = 4.93, \ p < 0.001$). That is, the clusters with higher emotional stability (Cluster 2 and 4) were found to be predominantly within resilience Cluster 2 and 3.
Incidentally, community resilience Clusters 2 and 3 were considered to have higher levels of resilience than Cluster 1. With the more emotionally stable cluster groups corresponding with the cluster groups which had the higher levels of resilience, this demonstrates a strong relationship between emotional stability and community resilience.

### 4.6 Community resilience, emotional stability and perceptions of change model

After confirming the measures and exploring relationships between the PerchangeGen, PerchangeRes, PerchangeTour and emotional stability scales, as well as the resilience index, the final model can be assessed. For the model, co-variances were explored between the resilience index, the emotional stability scale, PerchangeGen, PerchangeRes and PerchangeTour. Given the complexity of the model and the high number of variables contained with each index and scale, the model could not be run using survey weights. Consequently, the SEM model was devised without the use of survey weights. However, to confirm the relationships and validate the model, path analysis for individual variables was employed using survey weights (Bentler & Bonett, 1980; Loehlin, 2004).

As survey weights were not used in the model, the goodness-of-fit relied on CFI, TLI, SRMR and CD values (refer to Section 3.10.2). The goodness of fit indices, shown in Table 33, indicated acceptable CFI, TLI and SRMR scores, representing a robust model fit. On the other hand, the CD did not meet the required index level (Ping, 2004). However, Schermelleh-Engel and Moosbrugger (2003) recognise that low CD scores can result from complex models. Given that each item was thoroughly tested individually and the CFI, TLI and SRMR scores were acceptable, model bias or error can considered minimal (Hoyle, 2011).
Table 31: Goodness-of-fit for the resilience, emotional stability and perceptions of change model

<table>
<thead>
<tr>
<th>Required Index</th>
<th>Level</th>
<th>Model Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD</td>
<td>Above 0.7</td>
<td>0.63</td>
</tr>
<tr>
<td>SRMR</td>
<td>Below 0.08</td>
<td>0.67</td>
</tr>
<tr>
<td>CFI</td>
<td>Above 0.9</td>
<td>0.922</td>
</tr>
<tr>
<td>TLI</td>
<td>Above 0.9</td>
<td>0.91</td>
</tr>
</tbody>
</table>

For the final model, Figure 22 demonstrates high sores between the variables, further confirming their strength. Moreover, the final model indicated that in comparison to PerchangeTour, PerchangeGen (0.98) and PerchangeRes (0.7) had a much more significant impact on perceptions of change. Additionally, a positive relationship was identified between emotional stability and resilience (0.25). This suggests that as emotional stability increases, resilience will also increase. Alternatively, a negative relationship was identified between perceptions of change and resilience (-0.28). This suggests that as resilience increases, the perceptions of change decrease. To validate the model, path analysis was conducted between individual variables using survey weights (Shipley, 2000).
Figure 22: Community resilience, emotional stability and perceptions of change model
Table 32 presents the results of the path analysis for the individual variables in the model. Path analysis is a multiple regression, which provides estimates of significance between sets of variables (Shipley, 2000). The regression presented similar results to the model, with a positive relationship evident between resilience and emotional stability, and a negative relationship between perceptions of change and resilience. The standard error scores also display a clearer relationship between variables, whilst the use of survey weights demonstrates a stronger relationship. Figure 23 presents the path diagram, displaying these relationships.

**Table 32: Variable path analysis**

| Variables          | Coef. | Std. Err. | t    | P>|t|   | [95% Conf. Interval] |
|--------------------|-------|-----------|------|-------|----------------------|
| Resilience         |       |           |      |       |                      |
| Emotional Stability| 0.05  | 0.009     | 5.51 | 0.000 | 0.033 - 0.069        |
| PerchangeGen       | -1.47 | 0.244     | -6.01| 0.000 | -1.944 - -0.987      |
| Resilience         | -1.49 | 0.334     | -4.45| 0.000 | -2.144 - -0.832      |
| PerchangeRes       | -1.34 | 0.302     | -4.44| 0.000 | -1.934 - -0.748      |
| PerchangeTour      |       |           |      |       |                      |

**Figure 23: Path analysis diagram**

![Path analysis diagram](image-url)
4.7 Chapter summary

Chapter Four has presented the quantitative results of the resident survey, which was designed to assess the resilience of each region. This chapter began by presenting an overview of the respondents, comparing the results across the two regions. This section focused on comparing the respondents by demographic characteristics and using design-based F tests to compare how change is perceived in each region. Chapter Four then presented the results of resident perceptions of regional structural change. Exploratory and confirmatory factor analyses were used to develop the scales PerchangeGen, PerchangeRes and PerchangeTour, where five items for each were retained and a scale variable was generated for each.

Next, the chapter presented the results of the emotional stability variables and devised a scale. Exploratory and confirmatory factor analysis was undertaken to confirm the items within this scale, followed by the development of a scale variable. The emotional stability variables were also used to undertake cluster analysis to provide insight into the resilience of community groups and how the residents’ emotional stability influences the resilience of the community. A similar approach was then undertaken on the resilience variables. Firstly, exploratory factor analysis was conducted on the resilience variables to confirm the indices which measure community resilience to long-term structural change. A resilience variable was then developed. Following this, cluster analysis was undertaken to determine the resilience of community groups. From the cluster analysis of the emotional stability variables and the resilience variables, clusters with a higher proportion of Mackay residents were found to be less resilient and less emotionally stable than cluster with larger proportions of Whitsunday residents. A significant relationship was also found between the emotional stability and resilience levels of the communities. Finally, a structural equation model and path analysis model was presented using the index and scale variables,
connecting *PerchangeGen, PerchangeRes, PerchangeTour*, emotional stability and resilience. This showed that a positive relationship was evident between resilience and emotional stability, and a negative relationship between perceptions of change and resilience.
5 CHAPTER FIVE: RESILIENCE GUIDELINES EMERGING FROM THE RESULTS

5.1 Introduction

Chapter Four presented the results of the quantitative data. Now, Chapter Five presents the results of the thematic analysis which was conducted on the qualitative data that emerged from the resident survey. Thematic analysis was undertaken on the open-ended questions (questions 10 and 25 in the survey) posed to participants relating to their opinion on potential guidelines and responses to managing long-term structural change. In total, 276 respondents from Mackay and 116 respondents from the Whitsundays offered comments to these open-ended questions. The responses were entered into a spreadsheet and manually coded into core themes. It is acknowledged that these results are not representative of the population, nor do they demonstrate the most important guidelines. Instead, they offer insight into the guidelines that came most frequently to mind amongst the respondents who offered their opinion and highlights a range of possible guidelines for coping with structural change.

From the open coding process, responses relating to potential guidelines were grouped using twenty-five (25) codes. The codes from this stage were later considered to be subthemes, as the axial coding process grouped the codes into ten key themes. Table 3 displays the key themes and subthemes, along with the frequency (i.e. number of responses) for each subtheme. The findings within these themes unearth a number of potential guidelines, as well as specific areas that guidelines need to target. Evidently, guidelines were identified across all aspects of the community, including economic, social, institutional, environmental and political systems. Consequently, the selective coding process, as outlined in Section 3.10.4, resulted in five categories of suggested guidelines to build resilience: economic diversification; employment opportunities; stakeholder collaboration;
communication and planning; and emotional stability. However, it must be acknowledged that many guidelines are interrelated with considerable overlap. Furthermore, the notion of increased government support underpinned all guidelines. In accordance with the ethical procedures, the results are presented in a manner which preserves the anonymity to ensure confidentiality.

Table 33: Key themes, subthemes and frequency of guidelines to build community resilience

<table>
<thead>
<tr>
<th>Theme</th>
<th>Subthemes</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic development</td>
<td>Economic outlook</td>
<td>20 responses</td>
</tr>
<tr>
<td></td>
<td>Local employment</td>
<td>52 responses</td>
</tr>
<tr>
<td></td>
<td>Economic diversification</td>
<td>50 responses</td>
</tr>
<tr>
<td></td>
<td>Government support</td>
<td>5 responses</td>
</tr>
<tr>
<td></td>
<td>Affordability</td>
<td>16 responses</td>
</tr>
<tr>
<td>Infrastructure/</td>
<td>Development, improvement and investment</td>
<td>30 responses</td>
</tr>
<tr>
<td>facilities/services</td>
<td>Cooperate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Community cohesion/connectedness</td>
<td>14 responses</td>
</tr>
<tr>
<td></td>
<td>Community/stakeholder cooperation and action</td>
<td>14 responses</td>
</tr>
<tr>
<td></td>
<td>Community spirit</td>
<td>5 responses</td>
</tr>
<tr>
<td></td>
<td>Community consultation and involvement</td>
<td>23 responses</td>
</tr>
<tr>
<td>Communication</td>
<td>Knowledge sharing between stakeholder (open and regular</td>
<td>24 responses</td>
</tr>
<tr>
<td></td>
<td>Accurate, transparent and up to date information</td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>Improve government action</td>
<td>20 responses</td>
</tr>
<tr>
<td></td>
<td>Local power and control</td>
<td>4 responses</td>
</tr>
<tr>
<td>Education</td>
<td>Training and skill diversification</td>
<td>7 responses</td>
</tr>
<tr>
<td></td>
<td>Increase awareness and understanding</td>
<td>7 responses</td>
</tr>
<tr>
<td>Planning</td>
<td>Investment</td>
<td>4 responses</td>
</tr>
<tr>
<td></td>
<td>Long/short-term</td>
<td>40 responses</td>
</tr>
<tr>
<td>Social</td>
<td>Improvement and development</td>
<td>31 responses</td>
</tr>
<tr>
<td></td>
<td>Government support</td>
<td>8 responses</td>
</tr>
<tr>
<td></td>
<td>Trust (for government, organisations and community members)</td>
<td>2 responses</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Environmental</td>
<td>22 responses</td>
</tr>
<tr>
<td></td>
<td>Economic</td>
<td>11 responses</td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td>2 responses</td>
</tr>
</tbody>
</table>

5.2 Guidelines for economic diversification

Addressing issues such as unemployment, inflation and a path dependent economy were highlighted as key areas for future development and change management strategies.
Economic diversification was a key guideline emerging from the findings, particularly as a means of overcoming path dependency. Respondents identified two key guidelines for economic diversification in the region. These included skill diversification and regional economic diversification for environmental and economic sustainability. However, respondents first acknowledged that greater government and council attention, investment and support were the key focal points of future strategies, to support and foster economic diversification. As respondents stated, “We must have government support to change this and leverage agriculture in the region” [238_Mack]; and “local government needs to provide incentives for diversification in the form of infrastructure and tax breaks” [652_Mack].

The diversification of regional economic sectors was highlighted as a main guideline for both regions. This involved leveraging other sectors such as agriculture, or giving more attention to tourism in Mackay, to overcome the change driven by the resources sector. A number of respondents highlighted this point: “People often forget about agriculture, it’s quite a stable part of the economy” [297_Mack]; “Tourism is the sleeping giant in Mackay” [143_Mack]; and “need to be stronger support of sugar and tourism industry” [423_Mack]. In particular, economic diversification guidelines in the Whitsunday region emphasised the need for new ventures to be sensitive towards tourism: “I agree we need to expand our economy, but we should not look at options that negatively affect tourism (our dominant industry) i.e. mining/Abbot Point” [565_Whit]; and “Abbot Point would be a disaster for tourism. Need to think about the bigger picture and how it will impact our economy as a whole” [612_Whit]. This drew on the notion of economic sustainability and the ability for sectors to coexist. Whilst economic sustainability underpinned guidelines for the diversification of regional economic sectors, it was also emphasised that environmental sustainability should be a key component of guidelines aimed to grow and diversify
economic sectors. One respondent highlighted that environmental protection and sustainability should be central to all diversification guidelines, “Council needs to consider the environment before they pursue any more economic activities…need to stop chasing money and start chasing sustainability” [469_Whit].

Furthermore, Respondent [306_Mack] suggested that guidelines to diversify skills and further education were needed to leverage skills within other sectors, rather than altering the resources sector operations, “restructuring mining isn't necessarily what is needed, the problem is the lack of education and ability for people to save money and diversify their skills for other industries which is intensifying the problem”. Two other respondents also recognised training as a guideline so that skills can be transferrable to other sectors “more training so people who lose job in mining can use skills in other sectors” [106_Mack]; and “utilize capabilities developed for mining to service other industries” [292_Mack]. Additionally, education for the community members was supported by respondents to assist residents to deal with the fluctuations of different sectors: “educate people on the cyclical nature of the mining industry so that they can prepare for the inevitable bust - also so they don't make stupid investment decisions” [340_Mack]. One respondent also noted how education can make residents less resistant to intentional changes that are implemented to address economic changes, “sometimes pointing out the issues (long/short-term) and making clear how change can help will improve their acceptance and they will be more inviting of changes” [166_Mack].

5.3 Guidelines to improve employment opportunities

Employment concerns within the Mackay and Whitsunday regions were identified as key outcomes of structural change, which may inhibit resilience within the community. A number of respondents presented guidelines for addressing the employment concerns,
particularly situated around increasing local employment opportunities and improving job security. A lack of local employment opportunities was said to be a result of increased commute employees and international visitors such as backpackers. One Mackay respondent stated that the “unemployment [was] due to FIFO and mines not hiring locals” [188_Mack], whilst a Whitsunday respondent acknowledged that “we employ a lot of working holiday people here and our jobs are targeted towards these workers” [483_Whit]. Guidelines to improve local employment included the development of government policy which favours local employment and inhibits the number of outside employees which companies are allowed to employ: “Government should only use 457 workers if they have a skill that we require and it something that locals don’t have. It should be a legal requirement that locals have priority. Otherwise it’s taking away the locals’ opportunities for work” [177_Mack].

Furthermore, it was noted that despite the increase in outside employment, the regions lacked diverse employment opportunities, with skilled local residents unable to find work in their trained field. These challenges were identified throughout various economic sectors in each region: “I have a postgrad degree, 10 years’ experience in finance and I am forced to work in a retail position because it is the only job I can find” [544_Whit]; “I have a university degree in environmental science, but haven’t been able to find any entry level positions” [381_Mack]. Similar to Section 5.2, economic diversification was noted as a key guideline to manage the impacts of structural change to address the lack of employment opportunities, encouraging more employment opportunities in different sectors. Government support, through financial schemes and incentives, was also identified as a guideline to encourage small and medium sized business to employ more recently qualified locals. As one respondent offered, “Financial rebates from council are needed for companies to take
on young and inexperienced workers, mainly those straight from university. *Competition is high and without experience most aren’t competitive*” [381_Mack].

Respondents of each region suggested the community vulnerability created by the lack of local employment opportunities was intensified by the lack of job security. Thus another key guideline presented by respondents was to improve job security. Greater government support was identified as a guideline to improve job security within small and medium sized businesses. Respondent [168_Mack] suggested that financial assistance would help alleviate the impacts of structural change by creating more job security, “*my employees would feel better if they knew there was job security. We know that it will pick up again, but we need some financial assistance to help us get through this low point.*” Another guideline included education, aligning with the guidelines presented in Section 5.2. Education and training was identified as a guideline for long-term planning and forecasting for businesses to better prepare for the future. Additionally, education was also considered to assist individuals and businesses to diversify their skills and operations to be more viable during bust periods.

### 5.4 Guidelines for stakeholder cooperation

It was overwhelmingly acknowledged that the Mackay and Whitsunday regions “*need[s] to build more of a community to get people (and industries) working together not against*” [110_Mack]. Guidelines to improve stakeholder cooperation focused primarily on improving community connectivity and cohesion, aiming to develop a sense of community and shared responsibility. To develop a sense of community, guidelines focused on bringing community members together, such as through developing community activities and support groups, with the assistance of government funding. Respondents argued that cooperation would allow ideas and opinions to be shared, enabling different perspectives of change to be
expressed and fostering alternative change management solutions. Cooperation among stakeholders would encourage community members and governing stakeholders to be working towards common objectives. Furthermore, community cohesion contributes to building emotional stability among community members to improve the community’s ability to manage change and ultimately build resilience. Additional guidelines proposed by respondents to build stakeholder cooperation included greater community involvement, improving leadership through increased local power, and generating greater connection between community actions and objectives.

Respondents from both regions presented increased community consultation, engagement and involvement within regional planning as key guidelines for stakeholder cooperation. One respondent also argued that guidelines to improve community engagement will also “give decision makers a greater understanding of community objectives” [377_Mack]. However, to achieve stakeholder cooperation to address and manage change, respondents emphasised that more local power and control is needed within both regions, to provide more effective leadership and have a greater role in decision making. As one respondent stated, “Council needs to stand up to the mining companies and help the rest of the community do this too. Give us power and choices” [273_Mack], reiterating the perceived need for greater community involvement and consultation to build resilience. Additionally, cooperation between governing bodies was also thought to need strengthening, “better interfacing between local, state and federal government and clear lines of communication between these bodies and other nongovernment community stakeholders and residents” [364_Mack].

To develop broader mechanisms to engage and incorporate community ideas, one respondent proposed, “More opportunities to discuss opinions on what's needed and what people want to invest/spend money on. Have more channels for residents to have their say,
not just community meetings because not everyone can attend these” [195_Mack]. Additionally, respondents highlighted the need for large organisations, particularly mining companies, to have less influence over the actions and directions of the community. Thus, collective resident objectives should drive the direction of the community actions. Other guidelines were largely situated around improving communication among stakeholders. These guidelines are presented in the following section.

5.5 Guidelines to improve communication and planning

Respondents from the Mackay and Whitsunday regions identified poor communication to be limiting their ability to manage structural change within the regions. Guidelines for developing more open communication channels and making information more available centred on the premise of stakeholder cooperation which was presented in Section 5.4. Thus, there was substantial overlap between the guidelines, specifically ones focusing on increasing community consultation. Nevertheless, the first guideline proposed by residents to improve communication was the regular provision of accurate and detailed information by decision makers to community residents. Additionally, developing open communication channels was suggested to provide effective information that allowed community members to respond to or prepare for change, whilst also providing feedback mechanisms that encouraged information sharing and community engagement. As one respondent stated, “If they share information with us, we can provide them with information and at the end of the day, all parties can act with more knowledge” [63_Mack].

Respondents noted plans within both the Mackay and Whitsunday regions to primarily have a short-term focus. Consequently, planning guidelines identified to improve the resilience of the communities predominantly focused on the development of long-term plans. Regional planning strongly linked with the notion of economic diversification, with
this being central to guidelines for long-term planning, “we need realistic long-term plans that do not rest on mining. More focus should be given to sugar cane industry and other agricultural industries” [196_Mack]. However, in addition to guidelines for economic diversification, guidelines for regional planning were identified. The incorporation of response strategies and scenario planning for different types of change was a key guideline suggested by one respondent. This respondent stated, “Improve the quick response of supporting resources to any implemented change... plan for the change and allocate resources for the expected and the unexpected” [486_Mack].

Particularly in Mackay, forward thinking and scenario planning were two key guidelines to manage change and ultimately build resilience to structural change driven by the resources sector. More specifically, several respondents called for greater consideration of the next downturn within long-term regional plans. As one respondent stated, “Let's start preparing for the next mining DOWNTURN” [203_Mack]. Another respondent also highlighted the importance of planning for the downturn in the boom periods to better manage the changes, “How can we avoid this [downturn] happening again... Let's use the next boom to make sure the downturn isn't as severe next time” [202_Mack]. A similar suggestion was put forth by a Whitsunday respondent, highlighting the need for more action planning, which calls for improved management of resources. Respondent [522_Whit] stated, “Disaster action plans... action plans for economic change... much of the disaster change impacts the economy so these should be synonymous... this will help us use and manage our resources”.

Moreover, the notion of resource management was further acknowledged by other respondents as a particular focus for guidelines and planning initiatives. This was expressed from the perspective of both managing resource use and managing the impact of changes on resources, which further emphasised the need for sustainable management and planning. As
one respondent stated, “I think our economy has proven to be resilient in the past, but I am concerned about the future because we are either exhausting or damaging all of our assets now. Plans should be assessing our assets and ensuring they are used in a sustainable matter” [118_Mack]. Thus, the incorporation of sustainable management practices, for economic and environmental resources, within regional plans was a key guideline proposed by respondents of both regions.

To achieve sustainable practices, respondents noted that short-term plans must also connect with long-term plans. That is, short-term plans should not compromise the long-term objective; rather contribute to achieving the long-term plans. As one respondent stated, “short-term plans seem to contradict or conflict with the long-term plans… short and long-term plans should work together” [522_Whit]. One reason attributed to disconnect between short and long-term plans was the political influence over community plans. That is, changes in government significantly alter long-term plans. This was expressed by one respondent:

“Plans are often meant to be long-term, but they change with every new government, so generally they are really only a couple of years. This is an issue for planning because in the long-term our community suffers and doesn't progress” [270_Mack]

Nevertheless, Respondent [270_Mack] acknowledged greater community engagement and local power can be a guideline to assist with overcoming political influences over long-term plans: “If community members have more control in decision making, then they will still have the influence when changes in government happen. That way, plans will still be what the community wants and there won’t be major changes”. Furthermore, community engagement and local power will also aid to create more open communication channels and provide greater access to information. In turn this will assist will developing sustainable long-term plans.
5.6 Guidelines for social and emotional stability

Education has been previously mentioned as a guideline to manage structural change and build resilience. It was also identified as a key guideline for improving social and emotional stability within both the Mackay and Whitsunday regions. In particular respondents suggested that developing education facilities and institutions would assist in alleviating a number of economic and social challenges. As one respondent stated, “education has a low value within the region. This is creating a wealth of problems, especially social problems” [274_Mack]. Improving educational institutions was presented as a guideline for managing change in both regions. One respondent from Mackay indicated that the region needs to “improve university facility. Need postgraduate education. Need medical, engineering, dentistry in local university. This will help provide our economy with more variety of qualified workers” [182_Mack]. A similar statement was made by a Whitsunday respondent, “education is extremely limited in the region... unless our children leave they have little to no choice but to work in tourism or retail... better education systems is helping to expand the opportunities for the children and the economy... gives them choices instead of turning to government financial assistance” [609_Whit]. However, as mentioned in Section 2.3, this guideline will only be viable if the issue of employment opportunities for the local community is addressed. Additionally, informal education was also seen as a guideline to improve emotional stability. Education in this capacity was seen from the perspective of knowledge and awareness development and can “help people to deal with problems they are facing. Also, having more knowledge can open up someone’s perspective to be more understanding of things and their surroundings” [68_Mack].

Another guideline emerging from the findings included the development of social infrastructure to improve social and emotional stability. The need for social infrastructure was highlighted by one respondent: “this mining recession has hit us hard and this has
become a really sad town. I know the council have a hard task on its hands trying to salvage the economy, but they should be focusing on making this a happier place with more activities so that more people want to stay” [477_Mack]. Therefore, the development of more social activities was proposed as a guideline to enhance residents’ contentment within the region and strengthen community social systems. This corresponds with the guidelines for stakeholder cooperation that were presented in Section 5.4 which aimed to improve the emotional stability and shift development towards community objectives. To further improve social and emotional stability within the regions through social infrastructure development, respondents acknowledged that more public services were required to support the social issues that were emerging from structural changes within the region:

“the fast growth of the region and now the downturn has caused many social problems and has put pressure on a lot of the public services available. For us to address this there has to be better services to cope with these changes. E.g. having more support and services for drug and alcohol addiction, support services specifically for families and the people losing jobs, and improved medical and even simply having basic services i.e. recycling. This will help to cope with these changes better and maybe even improve quality of life.” [491_Whit]

5.7 Chapter summary

Chapter Five has presented results of the thematic analysis which was conducted on open-ended survey questions. The purpose of these questions was to further identify areas which community members perceived to be weak and explore potential guidelines to manage structural change and build resilience. A thematic analysis revealed five key themes: economic diversification, employment opportunities, social and infrastructure development, stakeholder cooperation, and communication and planning. From a discussion of these findings, key guidelines within each theme were identified. Guidelines largely focused on:

- Encouraging economic diversification,
- Increasing local control over economic activity and employment,
• Increasing community participation and involvement within planning,
• Opening communication channels,
• Shifting the focus toward long-term planning, and
• Giving greater attention to resources management and sustainable practices

Chapter Six further discusses the findings of the research in relation to the literature.
CHAPTER SIX: DISCUSSION

6.1 Introduction

The overarching aim of this research was to examine the concept of resilience and how it can be harnessed to address long-term structural change driven by the tourism and resources sectors in Australia. Chapters Four and Five presented the results of this research and Chapter Six discusses these results in accordance with the broader academic literature. This chapter is structured to address each research objective individually, in order to address the overarching aim of this research. First, Section 6.2 presents the discussion of Research Objective One, whilst Research Objective Two and Research Objective Three are discussed in Sections 6.3 and 6.4 respectively. Section 6.5 concludes this chapter by providing a summary of the chapter and connecting each of the research objectives with the overarching aim of this research.

6.2 Discussion of Research Objective One

Research Objective One sought to develop an instrument to measure community resilience to long-term structural change driven by the tourism and resources sectors. Sections 4.3, 4.4 and 4.5 presented the different types of instruments that have been developed to measure resilience, drawing from existing scales and instruments in the literature. Given the complexity of the term resilience and the variety of subcomponents which contribute to community resilience, new measurement tools were required to assess residents’ perceptions of change, emotional stability, and community resilience specifically to long-term structural change. Therefore, Research Objective One was achieved through the development of the perceptions of change scales, the emotional stability scale and a resilience index, which were described in Chapter Three and reported in Chapter Four.
Perceptions of change were measured over three individual scales. The scales were constructed to measure the perceptions of change in general (PerchangeGen), the perceptions of change driven by the resources sector (PerchangeRes), and the perceptions of change driven by tourism (PerchangeTour). Unlike existing scales which frequently measure individual perceptions of a specific phenomenon using a Likert-type scale (Gibson, Zhao, Lovrich & Gaffney, 2002; Turker, 2008), this research used a rating scale with bipolar adjectives to gauge residents’ perceptions. Bailey and Pearson (1983) found respondents to be more inclined to express their perceptions through the use of adjectives. More recent research has also substantiated this, supporting the use of a rating scale with bipolar adjectives to measure perceptions (Mastro, Behm-Morawitz & Ortiz, 2007; Newell & Goldsmith, 2001). The scale devised within the present research aimed to assess how individuals feel or are affected by change, as well as the individual’s broader perceptions of change. Consequently, five items for each scale were retained to measure perceptions of change. The analysis conducted in Section 4.3.1 displayed a strong result for the validity of the items for measuring each construct.

The SEM model, presented in Section 4.3.1, also displayed a strong relationship between the perceptions of change scales. However, this research determined that change driven by the resources sector was more prominent than change driven by tourism, and contributed more prominently to perceptions of change in general within a region. This is similar to the findings of a number of previous studies which attribute this prominence of change induced by the resources sector to stem from the dominance this sector has within an economy (Gilberthorpe & Papyrakis, 2015; McDonald, Mayes, & Pini, 2012). Compared with other economic sectors, structural change driven by the resources sector tends to be more visually altering and have a more noticeable impact on the environment, economy and social systems (Gilberthorpe & Papyrakis, 2015; Sachs & Warner, 2001). For instance, Bec,
Moyle and McLennan (2016) acknowledge that aesthetic alterations to the land and community infrastructure were clearly evident on account of increased activity in the resources sector, such as the damage that large trucks and other equipment were having on roads, together with increased commercial construction. Additionally, for the Whitsunday region, tourism has a longer standing presence within the region where changes tend to be gradual over a longer period, potentially making the changes induced by this sector less prominent (Weber, 2006). Consequently, the findings suggest that resilience to change driven by the resources sector differs to resilience to change driven by tourism.

The retained items in the scales also linked with common adjectives used to describe the sectors. For instance, change driven by the resources sector was found to be perceived as more negative than positive, as well as more of a threat than an opportunity. The retained items are terms that have commonly been attributed to resident perceptions of the resources sector in previous studies. This is particularly due to the environmental degradation that often results from the resources sector activities (Kitula, 2006), economic path dependency (Gilberthorpe & Papyrakis, 2015), and the lack of control residents’ feel over operational aspects association with the resources sector (Garvin et al., 2009; Hilson, 2002).

The emotional stability scale was developed by adapting the Likert-type scale items used by Judge et al. (2004), based on the classifications of emotional stability by Saucier (1997). As a result, the scale consisted of seven items to measure emotional stability. From the analysis conducted in Section 4.4.1, the results show that all of the items are measuring the construct, forming a reputable scale. Similar to previous studies which explore the relationship between emotional stability and change management (McKee-Ryan, Song, Wanberg & Kinicki, 2005; Oreg, 2003), the retained items aligned with the attributes proposed by Bonanno (2004) and Seery (2011) that were considered to be indicators of individual human resilience. Most notably, the change management and emotional stability
literature considers individual wellbeing to be a core component of an individual’s ability to manage change, including attributes such as overall happiness and ability to cope, as well as levels of stress, depression and nervousness (Bonanno, 2004; McKee-Ryan et al., 2005). Therefore, the emotional stability scale that was developed assists to measure community resilience, by providing insight into the individual resilience of the community members.

Despite the array of literature pertaining to change stemming from the tourism and resources sectors, indicators addressing long-term change and other forms of structural change were limited. The resilience index, on the other hand, was constructed by drawing on indicators from previous research. Various resilience and vulnerability indicators were extracted from previous research across different fields including environmental science (Davidson et al., 2013), regional economics (Zautra et al., 2008), sociology (Peacock et al., 2010), and psychology disciplines (Buikstra et al., 2010).

A total of twenty-eight indicators were selected for the index (refer to Section 3.8), to measure resilience across the broader community system. Unlike a scale, an index can be multidimensional, and given the complexity and multidimensionality of resilience (Adger & Vincent, 2005), a set of indices were developed to measure resilience. As expected, multiple constructs were measured by the index, with key dimensions consisting of planning and preparedness, stakeholder cooperation, access to resources, and resource dependency. These dimensions directly align with the characteristics of community resilience (Davoudi et al., 2012; Newman & Dale, 2005; Norris et al., 2008) and are also supported in a number of existing resilience scales (Holladay & Powell, 2013; Somers, 2009). For instance, Somers’ (2009) resilience scale measured the short and long-term planning and preparation strategies to identify vulnerabilities in the system and assess the system’s ability to address future changes. Additionally, Holladay and Powell’s (2013) resilience scale measured stakeholder
collaboration through items which looked at power and knowledge sharing, as well as networks.

Alternatively, an area not thoroughly explored in the community resilience literature or supported in existing community resilience measurement tools, is the notion of having access to resources and the level of dependence on these resources. The availability of resources has repeatedly been measured within instruments (Bonanno et al., 2007; Sherrieb et al., 2010; Tierney, 2003). However, there is often an assumption that available resources mean that communities have access to these resources and they can be leveraged when needed. Social capital literature suggests that available resources cannot always be accessed by the entire population (Jordan & Javernick-Will, 2013; Tsai, 2000; Van Der Gaag & Snijders, 2005). Furthermore, measuring the availability of resources does not necessarily take into account the system’s dependence on these resources, which will influence the resource availability in the future (Adger, 2003). Therefore, the index developed in the present research aimed to measure the community’s access to resources and level of dependency on resources, giving an indication of the readiness of resources to manage future change. This finding also connects to broader literature on ecological resilience (Adger, 2003; Mayunga, 2007), supporting the notion that community capacity and capital assessments must consider current and future states of resources to address and manage change in the future.

Consequently, the scales and index developed in the present research complement existing theories and approaches in the literature (DeVillis, 2012; Diamantopoulos et al., 2001). The scales developed to measure residents’ perceptions of change contribute to the body of knowledge by refining a set of bipolar adjectives that specifically measure community resilience to long-term structural change. Alternatively, while the set of indices used to measure resilience are not unique to the literature, the development of the instrument
for measuring resilience to long-term structural change makes both a theoretical and methodological contribution to existing knowledge. The index contributes to the body of knowledge, as the index was significantly refined using a robust methodology, providing a set of valid resilience indicators. The scales and index developed in this research were then combined to construct a model which demonstrates the relationship between resilience, emotional stability and perceptions of change. The results of this model present a strong correlation among these three concepts, supporting the argument that community resilience is influenced by the residents’ emotional stability and their perceptions of change (Bonanno, 2004; Norris et al., 2008). Furthermore, this model contributes to existing knowledge by identifying the significance emotional stability and perceptions of change have on the level of community resilience.

6.3 Discussion of Research Objective Two

Community resilience is reliant on the capacity of the social, economic, institutional and environmental systems of a region to respond to change (Magis, 2010). Research Objective Two sought to determine levels of resilience among different segments within communities undergoing long-term structural change driven by the tourism and resources sectors. To achieve this objective, a survey was conducted with 663 residents from the Mackay and Whitsunday regions. In doing so, the resident perceptions of different facets of the social, economic, institutional and environmental systems were explored to determine the level of community resilience to long-term structural change.

Investigating Research Objective Two found that the community’s level of resilience was largely influenced by the residents’ perception of change in the region and the prominence of change for the individual. Results demonstrated that residents of a resources-based region viewed change as being more prominent than a tourism-based region, and
largely viewed change as negative. This aligns with the findings discussed in Section 6.2, which attributes the greater prominence of the resources sector resulting from its economic dominance and the noticeable physical change the sector creates (Gilberthorpe & Papyrakis, 2015; Sachs & Warner, 2001). Consequently, this research found that regions undergoing structural change predominantly driven by the resources sector were less resilient than tourism-based regions. The results identified that residents with a connection to the resources sector were less resilient than residents who were not associated with this sector. This finding was evident for residents of both a resource-based region and a tourism-based region.

The findings of the present research aligned with existing literature pertaining to the positive and negative impacts of the tourism and resources sectors within a region (Andereck, Valentine & Knopf, 2005; Petkova, Lockie, Rolfe & Ivanova, 2009). This included positive impacts such as employment and local development, and negative impacts such as environmental degradation and inflation. However, while the changes induced by the resources sector were predominantly negatively perceived, the present study further revealed an opportunistic perception of change for the future. This finding differed from existing research which largely portrays community concern and a pessimistic outlook when experiencing negative change induced by the resources sector (Ballard & Banks, 2003; Measham & Fleming, 2014). The shift in community outlook also impacted the resilience of community members, presenting higher levels of resilience for certain segments of the community, particularly those not associated with the resources sector. These characteristics were particularly found among residents with a connection to the tourism sector. According to Neil and Tykkylainen (1998), a downturn in the resources sector often results in increased attention given to other sectors, including tourism. Thus, the potential for greater tourism
focus could explain the higher levels of resilience for this sector when faced with structural change driven by the resources sector.

Previous research has suggested that people with higher household incomes can be less vulnerable and thus more resilient to change, as they have greater access to resources that enable them to manage or overcome change (King & MacGregor, 2000; Morduch, 1994; Orthner, Jones-Sanpei & Williamson, 2004). However this was not supported in the present study in regard to long-term structural change. Interestingly household income was not a significant factor for community resilience. The results of this research recognised that a large proportion of the high income earners in each region were connected with the resources sector. Consequently, this group had a more negative outlook for the future and presented heightened uncertainty, given the changes this sector was undergoing. Furthermore, previous studies have identified a relationship between community resilience and place attachment, specifically the length of residency of community members (Sherrieb et al., 2010; Zautra et al., 2008). The results of the present study did not identify a significant correlation, thus it was not considered to be a factor influencing resilience with the Mackay and Whitsunday regions.

On the other hand, the present research substantiated the importance of the resilience indicators relating to education and gender (O’Brien et al., 2004). Education and gender have commonly been central to discussions of vulnerability and resilience in response to change. In fact, a number of authors have included these indicators as part of the development of Social Vulnerability Indices for managing changes in social systems (Cutter & Finch, 2008; Rygel, O’Sullivan & Yarnal, 2006). Whilst the education levels of community members have been extensively explored within the literature for vulnerability and resilience (Cutter, Boruff & Shirley, 2003; Paton, 2006; Tobin & Whiteford, 2002), there are differing perspectives as to how gender can affect resilience within a community.
Similar to previous studies (Arora-Jonsson, 2011; Morrow, 1999; Nelson, Meadows, Cannon, Morton & Martin, 2002), this research identified men to be more resilient than women, particularly in Mackay. Previous studies commonly note gender inequality as a predominant factor for the heightened vulnerability of women (Arora-Jonsson, 2011; Nelson et al., 2002). However, such research is often set in developing nations (Demetriades & Esplen, 2008; Tzannatos, 1999), and potentially this could be a reason for different levels of resilience between men and women to long-term structural change. This finding is contrary to previous studies which commonly noted gender inequality as a predominant factor for the heightened vulnerability of women (Arora-Jonsson, 2011; Nelson et al., 2002). However, such research is often set in developing nations (Demetriades & Esplen, 2008; Tzannatos, 1999), and potentially this could be a reason for different levels of resilience between men and women to long-term structural change.

Alternatively, this research presented similar findings to Murray, Baldwin, Ridgway and Winder’s (2005) study which explored skill diversification in response to economic change. Murray et al.’s (2005) study found that trade labour within resource-based economies had a degree of fluidity among skills which could be easily diversified or transferred across industries. It was also recognised that these were predominantly male-dominated industries, which resulted in the male population being perceived as more adaptable in the workforce to economic change (Murray et al., 2005). Given the economic structure of the two regions under investigation, Murray et al.’s (2005) study can assist in explaining the differences in resilience among community segments. Findings of the study conducted by Murray et al. (2005) resonate with this research, specifically in the Mackay region, where the resources sector is the dominant economic sector and gender had a larger impact on resilience.
Furthermore, this research found that resident perceptions of the changes being experienced in the region decreased among the more resilient groups of the community. That is, as resilience increases, perceptions of change decrease. Ayers and Forsyth (2009) attribute this relationship to be a result of the individual’s lack of awareness of the change/s. However, the results of the present research do not support these interpretations because resilient groups were found to have stronger adaptive characteristics, including having a positive outlook towards future change, and having the ability to cope with most problems. The present research has expanded knowledge in this area by challenging existing assumptions. Rather, this research supports findings within the broader psychology literature, which suggests that change is less prominent in the lives of resilient individuals (Bless, Fiedler & Strack, 2004; Bonanno, 2004). Thus, resilient people are less influenced or dictated by change, as they have the mechanisms to adapt and better manage change.

In determining the resilience of community segments, the emotional stability of the residents was also considered. Similar to extant literature, the present research found a strong connection between the emotional stability of individuals and their levels of resilience (Adger, 2006; Norris et al., 2008). That is, the lower the emotional stability of the individual, the lower their resilience to address and manage change. Within the resilience and change management literature, the link between individual resilience, emotional stability and community resilience has been addressed to some extent (Adger, 2006; Norris et al., 2008; Tompkins & Adger, 2004). However, this literature predominantly focuses on the resources available to the individual to respond to change. The present research has further contributed to this body of knowledge by identifying a connection between residents’ emotional stability and community resilience. The connection between emotional stability and resilience draws from the social capital and psychology literature which highlights
individual wellbeing as a key characteristic for individuals to manage change (Bonanno et al., 2007; Pretty, 2003).

Additionally, in the present research, specific areas of emotional stability were found to influence community resilience more than others. This included the emotional stability items ‘depressed’, ‘ability to cope’, ‘nervous’ and ‘happy with lifestyle’, providing insight into the areas of the community which warrant greater focus in building resilience. It was identified that respondents with a connection to the resources sector had lower emotional stability compared with respondents who were not directly associated with the sector. From the literature on community perceptions of mining, it is evident that change places specific pressure on the lifestyle of individuals, generating a high degree of uncertainty for the individuals involved with or connected to the resources sector (Ivanova, Rolfe, Lockie & Timmer, 2007; Petkova et al., 2009). The pressure and uncertainty inflicted by mining directly aligns with the key emotional stability factors, such as stress and concern for future outlook, which influence an individual’s ability to be resilient (Bonanno, 2004; Manzo & Perkins, 2006; Seery, 2011). Therefore, the impacts of the resources sector on the emotional stability of residents, assists in explaining the lower levels of resilience for community segments associated with the resources sector.

Nevertheless, irrespective of the tourism and resources sectors, community groups which had higher emotional stability viewed change within the community as more of an opportunity rather than a threat. Previous studies in psychology have shown that having a positive outlook is central for change management and fostering positive change (Avey, Wernsing & Luthans, 2008). More specifically, studies on cognitive behavioural intervention have found that a positive outlook towards change can promote action, direction and commitment, limiting the negative traumas associated with change, such as stress and anxiety (Beck, 2011; Fredrickson & Joiner, 2002; Jacobson, Martell & Dimidjian, 2001).
This is particularly important for building resilience, as it requires long-term planning and forward thinking (Folke et al., 2005; Walker et al., 2002).

6.4 Discussion of Research Objective Three

Research Objective Three sought to identify guidelines for harnessing community resilience to address long-term structural change driven by the tourism and resources sectors. Guidelines were identified by respondents through the open-ended questions in the resident survey, with the themes and subthemes categorising these guidelines directly aligning with the characteristics of resilience presented in the literature (refer to Section 2.3.8). Proposed guidelines for building resilience in the regions were grouped under five main categories: economic diversification; employment opportunities; stakeholder cooperation; communication and planning; and social and emotional stability. It is also worth noting here that qualitative data solicited from respondents also aligned with the emotional stability scale and the resilience index used in this study, in that the two regions were found to have low emotional stability and low resilience.

6.4.1 Economic diversification

The most notable guideline from the open-ended responses for building resilience was to improve economic diversification within the Mackay and Whitsunday regions, encouraging the region to overcome economic path dependency. The path dependence literature presents a historical viewpoint on the implications arising from a region being overly reliant on one sector. Most notably, regions experience difficulty reengaging other sectors in the future, as resources, development and policy tend to be structured towards the dominant sector (Martin & Sunley, 2006). Economic diversification has been extensively discussed in the literature and is a key guideline for building community resilience (Berkes
& Ross, 2013; Newman & Dale, 2005; Pike, Dawley & Tomaney, 2010). However, Fasano and Iqbal (2003) and Sharpley (2002) identified that economic diversification can negatively impact on the existing dominant sector, or the new sector may not be able to acquire the resources required. This position aligns with the notion of ‘Dutch disease’, suggesting it can be difficult balancing multiple sectors as conflicting resources, objectives and attention can comprise one sector, which often recreates the cycle of single sector economic dependency (Dwyer, Pham, Jago, Bailey & Marshall, 2016; Sharpley, 2002). Single sector economic dependence refers to economies which rely on or have one dominant sector, which can inhibit growth in other economic sectors (Cutter et al., 2003).

Nevertheless, the guidelines identified in this research were focused on developing a balanced economy, with sustainability being a primary consideration for all activity. Guidelines suggested included, though were not limited to, resource sharing, having a greater environmental focus by placing emphasis on renewable alternatives, and investing in sectors which are viable in the long-term and do not deplete natural resources or compromise the viability of other sector within the community system. This follows the principles developed by Barbier (1987) and MacNeill (1989) for sustainable economic development, which emphasise that short-term economic gain should not drive approaches. Rather the focus should be on maintaining natural resources and developing long-term cohesion between sectors (Barbier, 1987; MacNeill, 1989). More recent studies have supported these principles, with sustainability and resource management central to economic viability (Barbier, 2011; Giddings, Hopwood & O’Brien, 2002; Moyle et al., 2014). Sustainability has also been a core objective of a number of resilience applications (Berkes et al., 2000; Espiner et al., 2015; Fiksel, 2006), supporting the notion that sustainable processes and sustainable management are key outcomes of resilience (McCool, 2015).
Furthermore, the ideals behind diversification are predominantly for increased economic stability during periods of change and fluctuation (Pike et al., 2010). However, the present research also identified economic diversification as a guideline to build resilience within the social system. Having more employment opportunities across different sectors was suggested to improve elements of the social system. Building resilience in this system was perceived to be undertaken through economic diversification by reducing population turnover, increasing personal wellbeing, and developing a more cohesive community. The potential for these outcomes are supported in the literature, with Sherrieb et al. (2010) identifying lack of job opportunities as a key motivator for a transient population. There are also a number of studies linking employment with personal wellbeing, and unemployment as a key contributor to health implications such as stress and anxiety (Di Tella, MacCulloch & Oswald, 2001; Price, Choi & Vinokur, 2002; Ross & Mirowsky, 1999). Moreover, Robinson (2005) highlights community cohesion as a plausible outcome of increased employment opportunities and the positive repercussions which can extend from reduced unemployment in a community.

Additionally, skill diversification was also presented as an economic guideline for building resilience. The premise of this guideline was to diversify the skills of residents, to enable easier transition into new forms of employment, potentially in different economic sectors, during periods of change. This concept has been examined within the literature, commonly termed livelihood diversification (Cinner & Bodin, 2010; Ellis, 2000; Sallu, Twyman & Stringer, 2010). However, many of these studies have discussed this concept within the context of developing countries where improving living conditions has been the focus. The present study has adopted a different perspective looking at the broader community, rather than focusing on individual livelihoods.
Guidelines for achieving skill diversification can consist of both formal and informal training offered through a range of mediums. Formal education and training is well documented for skill diversification, focusing on institutions to facilitate the knowledge exchange (Singh, 2000). However, the findings of the present research suggest the development of voluntary community projects as a guideline for encouraging residents to expand and diversify skills as a precaution for future events. This substantiates the change management literature which encourages knowledge and skill sharing to overcome present and future change (McKenzie, Truc & van Winkelen, 2001), whilst voluntary efforts draw on community development approaches for sustainable development (Ayas & Zeniuk, 2001; Kelly & Caputo, 2006). Although informal training does not necessarily provide the expertise required for employment within this field, it does establish a foundation for these skills to be developed if needed in the future (Singh, 2000).

As the above discussion demonstrates, this research extends previous studies by highlighting the interconnectivity between the resilience of economic and social systems, revealing how vulnerabilities in one system can affect the other. The guidelines emerging from this research also have implications for reducing unemployment through skill diversification, as community members will have a broader range of employment options and can have more of an opportunity to transfer skills to other sectors if one sector is undergoing change.

6.4.2 Employment opportunities

Whilst economic diversification creates new employment opportunities, the findings from this research revealed a need for additional guidelines which specifically aid community members to secure local employment. Government support and intervention was central to the guidelines identified to improve local employment opportunities. New policy and legislation development was proposed as a mechanism for encouraging organisations to
employ local residents. On this point, Cheshire, Everingham and Pattenden (2011) found that stricter regulations enforced by local government on mining companies assisted in increasing local community involvement in mining projects. The implemented legislation set out strict guidelines for corporate social responsibility initiatives, such as detailing minimum requirements for local employment within the organisation’s workforce and stipulating the provision of training programs for local community members.

Whilst specific legislation was not developed for employment structures of mining companies in Cheshire et al.’s (2011) study, the legislation encouraged greater integration between the community and the mining companies. This resulted in stronger, more cooperative partnerships, which in turn lead to more benefits being received by the community, including an increase in local employment (Cheshire et al., 2011). Nevertheless, Storey (2010) explains that the traditional purpose of FIFO employment, which is to establish a workforce in remote regions where there is substantial distance from other communities, is changing. Instead, FIFO is becoming a prominent operational structure for mining companies in locations where existing communities are already established (Storey, 2010; Vojnovic, Michelson, Jackson & Bahn, 2014). Storey (2010) found this to be impacting on the local community employment opportunities, calling for more legislation which prohibits preference being given to commute employees over local community members. Greater policy promoting local employment aligns with the proposed guidelines of the present research, which aim to promote local employment, through tightening government legislation.

The present research also highlighted a need for guidelines which assisted the creation of more entry level positions, as residents identified that a number of young people were leaving the region due to a lack of employment opportunities. Further guidelines included the development of government initiatives for the private sector, such as incentives
for business to hire young and/or inexperienced workers. Similar incentives to provide more employment opportunities for young workers have been established at local and state levels both in Australia and internationally, often through apprenticeship schemes and training grants (Bowles & Candela, 2005; Lehmann, 2000). However, whilst such initiatives can increase graduate employment, Lehmann (2000) and Emslie (2009) found that incentives have been used as an opportunity for cheap labour, with some businesses found to be underpaying young employees. Additionally, these schemes can also contradict existing equal employment schemes that aim to promote the hiring of older workers (Brooke & Taylor, 2005). Therefore, existing literature suggests that greater focus be on strategies which create new employment opportunities, rather than developing strategies which specifically assist with the employment of young workers.

To build economic resilience, particularly in relation to economic diversification, guidelines must also aim to strengthen the social and institutional systems (Berkes & Ross, 2013). This will create a balanced community and ensure that vulnerable aspects of the community do not adversely impact the strategies implemented. For example, guidelines must outline effective power and control systems within the community, as economic diversification is often hampered by power figures that skew resource endowment or restrict behaviour (Auty, 2001). Thus, the following sections discuss the guidelines that were identified in relation to other aspects of the community.

6.4.3 Stakeholder cooperation

The findings revealed cohesion and cooperation among stakeholders of both regions as an area which needed improvement. Consequently, a number of guidelines focused on building cooperation among all stakeholders, as existing consultation was suggested to be conducted with very limited power figures within the community. These findings were expected given stakeholder cooperation and collaboration are key components of the social
capital and capacity building literature which facilitates change management within social systems (Adger, 2003; Callois & Aubert, 2007; Inkpen & Tsang, 2005), directly aligning with the characteristics of socio-ecological resilience (Bec et al., 2016).

A key guideline unearthed by the present research was the ongoing incorporation of community consultation and engagement within planning and decision making in the regions. The proposed guideline encouraged the use of multiple channels to consult and engage with a greater range of community members, including online forums and local meetings. A review of regional and community development approaches (refer to section 1.2) revealed community engagement as a well-established strategy in this field (Blackstock, 2005; Gilchrist, 2009; Mathie & Cunningham, 2003). Engaging community members creates a sense of inclusion and positions the region to develop a sense of place attachment (Chavis & Wandersman, 1990; Manzo & Perkins, 2006). Place attachment has commonly been recognised as a source of individual capital that has the ability to influence community resilience (Manzo & Perkins, 2006; Zautra et al., 2008).

Cooperation and cohesion among stakeholders were also key findings for building resilience. Whilst the proposed guidelines encouraged greater community engagement within decision making, there was a large focus on community involvement, empowerment and the ability for community members to be able to take action and drive initiatives (such as, establishing greater local power and control within the community). Building on from engagement, cooperative action can foster shared values and goals, which in turn encourages cohesion (Gilchrist, 2009). Thus, cooperation and local empowerment are central to strategies within the capacity building literature, as a means of fostering community members to take action and enabling change to be managed in a way best suited to the community (Keast et al., 2007; Phelps & Tewdwr-Jones, 2000). However, shifting power to the local community, while it has been proven to be an effective strategy, can be difficult to
implement, sustain and execute effectively. For instance Alsop, Bertelsen and Holland (2006) noted the reluctance of governing organisations to pursue long-term empowerment strategies, as it leads to their power being undermined. Additionally, Bailey (2010) and van Oudtshoorn and Thomas (1995) identified internal conflict and a lack of progress as result of increased power and control at the local level. Therefore, guidelines for empowerment must recognise the notion of cooperation among all stakeholders and participatory governance (Fung & Wright, 2001).

Similar to cooperation, Gilchrist (2009) and Mathie and Cunningham (2005) consider stakeholder collaboration a crucial component in community development and planning, as it can create unity within the community but also be leveraged to solve community issues. However, Keast, Brown and Mandell (2007) identify repercussions that can extend from too much community cohesion and collaboration, including reduced creativity and individual thinking within the community, stagnated growth, the creation of insider/outsider behaviour and exclusionary practices. These repercussions call for more coordinated and cooperative efforts (Keast et al., 2007).

A number of authors have also highlighted cooperation as a key characteristic of resilient systems (Folke et al., 2005; Nkatha et al., 2008). This strongly correlates with practices of Asset Based Community Development (ABCD) and Community Driven Development (CDD), which places emphasis on transferring responsibility to community members (Mansuri & Rao, 2004). Previous studies have also explored the notion of endowing greater responsibility to residents as a means of building resilience, further supporting the appropriateness of these proposed guidelines (Cadell, Karabanow & Sanchez, 2001; Folke et al., 2005; Norris et al., 2008).

Moreover, the literature notes the role of governance as a major factor in ascertaining stakeholder cooperation, with many studies alluding to the notion of change within
government structures to achieve cooperation (Ansell & Gash, 2008; Dredge, 2006; Lowndes & Skelcher, 1998). Governing bodies often dictate how individuals, groups and organisations are able to coexist within a community. Thus, reassessing governance structures is potentially required to establish cohesion among stakeholders (Mitchell & Shortell, 2000). Aligning with previous research, the findings from the present study revealed guidelines which focused on shifting leadership in order to build cooperation among stakeholders. Similar to Buikstra et al. (2010) and Holladay and Powell (2013), the findings suggested more local power and control were needed to manage the direction of development, undertake action that is in line with the community objectives, and ultimately build resilience.

To do so, the proposed guidelines outlined the role of voluntary representatives from various community groups to be explicitly involved in local government discussions and decision making. A similar premise was expressed by Fawcett et al. (1995) who employed empowerment theory to assist in addressing critical issues within a community. Voluntary advocates from a range of community groups acted as the voice for community members within local government planning. It was found that local control provided more effective leadership and enabled the region to achieve their development needs (Fawcett et al., 1995). Therefore, having greater control at the local level, through the appointment of voluntary representatives to serve on governing bodies, can allow actions to satisfy social and environmental objectives, rather than focusing explicitly on economic drivers (Mansuri & Rao, 2004; Nalbandian, 1999). However, it can also assist the community in shaping the economy towards favourable objectives in response to structural change.

6.4.4 Communication and planning

Closely linked to the notion of stakeholder cooperation, the findings of this research found improving communication to be a focus for build resilience within the two regions, as
it encourages knowledge and information to be shared and utilised for managing change. Communication, frequently influenced by leadership, plays a vital role in the operation, management and organisation of a community (Vries, Bakker-Pieper & Oostenveld, 2009; Yang, 2007). Previous research has placed emphasis on the importance of communication, more specifically knowledge sharing, for building or maintaining resilience (Berkes, 2009; Phelps & Tewdwr-Jones, 2000; Zautra et al., 2008). Supporting previous literature, the present research found a lack of communication was impeding the regions’ ability to be resilient.

The change management literature presents a number of strategies to improve communication including making information pertaining to regional change publically available, which in turn allows stakeholders to address change in a proactive manner (Klein, 1996; Maguire & Cartwright, 2008; Paton & Johnston, 2001). Providing information also encourages stakeholders to present new ideas or strategies for managing change (Brashers, 2001). Thus, a guideline to build resilience within the Mackay and Whitsunday regions must include establishing open communication between stakeholders by having information more readily available and accessible to the community members.

Access to information was also found to be an issue for Taylor and Wright (2004). However, change in leadership and governance practices towards local community empowerment aided to alleviate the issue. In turn, they found this enabled the community to be more prepared and capable of managing both expected and unexpected change (Taylor & Wright, 2004). Thus, restructuring governance within Mackay and the Whitsundays may assist in addressing the communication and information challenges both regions are facing. This aligns with Section 6.4.3, emphasising the support for guidelines which encourage more power and control at the local level.
Strongly linked with communication was the notion of planning. The guidelines put forth by respondents primarily focus on developing long-term plans. For long-term planning, forward thinking was a significant concept that needed to be harnessed within planning strategies. This approach to planning differs from previous resilience studies, which tend to focus on response planning to best prepare for and manage the aftermath of disastrous events (Biggs et al., 2012; Calgaro et al., 2009; Larsen et al., 2011; Norris et al., 2008). However, the change management literature encompasses forward thinking strategies for long-term planning that proactively prepare for change in the community system (Maguire & Cartwright, 2008; Oakland & Tanner, 2007).

Economic policy categorises strategies in the change management literature, focusing on the development of risk management and mitigation plans, and controlling inflation through deflationary fiscal policy and tightening monetary policy (Gali & Perotti, 2003; Greenspan, 2004; Lamb, 1987). The guidelines emerging from the present research align with strategies in the change management literature. Planning for the next boom and bust mining cycle was repeatedly proposed as a guideline for building resilience within the two regions, particularly Mackay which is greatly influenced by fluctuation in the resources sector. Guidelines were targeted at local government and included policies to manage growth in the resources sector, to develop risk management plans, and to diversify investments including investment in other sectors (refer to guidelines presented in Section 6.4.1).

Furthermore, respondents highlighted the need for guidelines to consider and plan for multiple outcomes stemming from long-term structural change, such as the impact structural change has on resource availability. The guidelines emerging from the present research encouraged the use of scenario and action planning for the sustainable management of resources. Specifically, using scenario planning to assess how community resources are
impacted by, or can be utilised to address, different forms of change, particularly long-term structural change. Scenario planning is a well-established strategy in the change management literature (Peterson, Cumming & Carpenter, 2003; Polasky, Carpenter, Folke & Keeler, 2011; Schoemaker, 1995), and has also been employed by a number of resilience researchers (Davoudi et al., 2012; Walker et al., 2004). Resilience researchers have found scenario planning to assist communities and regions with preparing for change, shifting the focus from reactive responses in planning, to proactive planning (Davoudi et al., 2012).

Within the regional development literature, scenario planning has commonly been employed to assess the impact different forces have on a community’s level of resilience. However, the guidelines emerging from the present research encouraged the use of scenario and action planning for the sustainable management of resources, which is, using scenario planning to assess how community resources are impacted by, or can be utilised to address, different forms of change, particularly long-term structural change. This highlighted the management of scarce resources as a key indicator of community resilience. Discussions on social capital also consider community resources as essential assets for addressing community change and ultimately building resilience (Magis, 2010). Yet resource management, from the perspective of sustainable resource planning, has not been adequately discussed as a key factor of community resilience (Benson & Garmestani, 2011a). The present research contributes to this body of knowledge by identifying the relationship between sustainable resource planning and community resilience. As the relationship between sustainable resource management and community resilience is an emerging area (McCool, 2015), further research in this area is warranted before scenario planning can be effectively implemented in this capacity to build resilience.

Although guidelines to encourage greater community participation within long-term planning were limited in the results of the present research, additional guidelines can be
drawn from broader literature to improve planning and communication with regions. Building on the concept of ‘crowdsourcing’, where information pertaining to a specific topic is sought from the broader population, Seltzer and Mahmoudi (2012) identified the potential use of this strategy to address and provide feedback on collective community issues. Within a regional planning context, the strategy could involve establishing an online community forum where information can be contributed and shared between all regional stakeholders. This would consist of an ongoing process, where information was frequently updated (Seltzer & Mahmoudi, 2012). Using data mining strategies to manage big data, Kim, Trimi and Chung (2014) suggest that patterns can be identified within the data and information can be used to inform short and long-term planning approaches. This strategy can assist with improving communication and planning in the region, whilst also fostering community consultation.

6.4.5 Social and emotional stability

Education was considered to be a key approach for improving the social resilience and emotional stability of community members within both the Mackay and Whitsunday regions. According to Kuhlicke et al. (2011), education is a key component of social capacity building, for individuals, groups and institutions, to manage change. Similar to previous studies (Chandra et al., 2013; Keim, 2008), the proposed guidelines emerging from this research focused on the need to educate community members on how best to manage current and future changes, including how to reposition change as an opportunity. The findings also emphasized education as being a mechanism to assist the community to understand the patterns of economic structural change to promote long-term planning and forward thinking (Berkes & Jolly, 2002; Keen, Brown & Dyball, 2005). The literature acknowledges a number of guidelines to educate community members on broad community issues. These guidelines can also be utilised to educate residents of the Mackay and
Whitsunday regions about long-term structural change and ways to manage change in this capacity. The guidelines include establishing community workshops and information sessions, making information available online, and engaging with social media platforms to generate awareness (Berkes & Jolly, 2002; Wegner & Snyder, 2000).

Additionally, the development of education institutions was also mentioned as a guideline for community resilience. Developing or improving education facilities is central to numerous regional development strategies for social improvement within both developing and developed countries (Glewwe, 2002; Iyer et al., 2005; Woolcock & Narayan, 2000). A guideline uncovered within the change management literature is the diversification of educational institutions. Drawing from ABCD and CDD theories, these guidelines involve developing partnerships between education institutions of different regions to deliver stronger and more extensive services for rural communities (Arnold, Newman, Gaddy & Dean, 2005). These guidelines can be applied within the regions under study to assist with managing change and building community resilience, as more education opportunities were repeatedly acknowledged by respondents. This can involve expanding the variety of on-campus courses offered at the universities in Mackay. Additionally, the Whitsunday vocational education and training institution (TAFE) can affiliate itself with reputable universities to deliver a limited number of undergraduate and postgraduate courses. Expanding education institutions will also support guidelines for economic diversification (refer to Section 6.4.1), as more skills and expertise will be available.

The disaster resilience literature places emphasis on the strength of the social system, as it can dictate the resilience of other systems within the community. A notable guideline within this body of literature to build social resilience and emotional stability is to develop and improve social infrastructure and services (Colten et al., 2008; Jordan & Javernick-Will, 2013). For instance, Jordan and Javernick-Will (2013) highlight the need for establishing
core services, including medical and support systems, during periods of high stress and change to provide the basic foundations to manage change. Jordan and Javernick-Will’s (2013) study suggests that action cannot be effectively taken if social wellbeing is not established. Colten et al. (2008) and Fitzpatrick, Molloy and Haigh (2014) support this guideline to manage change and build resilience, yet they emphasise that infrastructure must also focus on bringing the community together. That is, community groups and partnership initiatives, such as those which foster cooperative action, are central for managing and overcoming personal and collective change. For the Mackay and Whitsunday regions, focus should be on reducing medical wait times, making medical services more affordable, and establishing community support services and programs for community groups, such as providing mental health support for the wives of FIFO workers. It was also frequently suggested by respondents that developing a recycling program in the Whitsunday region would improve both the social and environmental system.

From the resident responses, resilience was also thought to be strengthened by improving and developing new social infrastructure. Both regions suggested more affordable recreational facilities for the youth population, such as a cinema in Cannonvale or Airlie Beach or community creative arts programs for each region. Infrastructure and facilities are often linked to improving social systems to align with the needs and requirements of the community (Frischmann, 2012; Gittell & Vidal, 1998). However to build social resilience, the present research highlighted the need to encourage positive change within development plans aimed at making each region more liveable. This finding supports previous studies which identify that a lack of social infrastructure can contribute to and intensify social issues. That is, it can inhibit the ability to strengthen vulnerable areas, restrict the community’s ability to manage future changes, or create new problems by having
inadequate facilities and services available to address community needs (Bec et al., 2016; Egan, 2007; Pelling, 2003).

Furthermore, the findings of this research suggest that improving the social system provides residents with the motivation, support and capabilities to address other issues in the community. This substantiates existing literature which notes that addressing issues in the social system can provide the foundations for addressing challenges in other areas of the community (Ryan & Deci, 2000; van Liere & Dunlap, 1980). For instance, Sturmer and Snyder (2010) found that community groups which had social support were happier with their social lives, and ultimately were more likely to volunteer or participate in activities which helped to tackle community issues such as environmental degradation.

From the proposed guidelines for building resilience in the social system, the outcomes of these guidelines also alluded to improving emotional stability, morale, and cohesion within the community. Sampson, Morenoff and Gannon-Rowley (2002) detail the intricate relationship between social issues and the health, wellbeing and connectedness of a community and its members. This relationship connects to social capital within the change management literature which draws upon the various dimensions of the social system that are required to manage change. In particular, it highlights the interconnectedness of social dimensions and how vulnerabilities can affect the entire system (Inkpen & Tsang, 2005; Liao & Welsch, 2005; Schuller, Baron & Field, 2000). The role of community learning and education is paramount to the management of social capital (Kilpatrick, Field & Falk, 2003). Some of the key characteristics of social capital include the notion of shared resources as well as network development, which stem from cooperation and cohesion among community stakeholders (Gittell & Vidal, 1998; Schuller et al., 2000). This connection with social capital supports the guidelines presented in Section 6.4.3, as well as aligning with the
discussion of Research Objective Two. The following section draws together each of the research objectives and discuss these within the context of the overarching research aim.

### 6.5 Chapter summary

The overarching aim of this research was to examine the resilience of regional communities in order to provide direction for building resilience to long-term structural change driven by the tourism and resources sectors. This chapter has presented a discussion of the three objectives of this research, connecting with existing literature to progress knowledge in the field of resilience and address the aim of this research. To achieve the overarching aim, first the concept of resilience must be measured to support resilience applications to long-term structural change. Having the ability to measure resilience assists to understand resilience in this capacity and determine the current level of resilience within the regions under study. Chapter Six began by discussing Research Objective One in Section 6.2, which was to develop an instrument to measure resilience to long-term structural change. This section revealed that multiple instruments were required to measure different facets of community resilience, resulting in three scales developed to measure the residents’ perceptions of change, a scale to measure the emotional stability of residents, and an index to measure the community resilience across the broader community system. Section 6.2 further revealed that items within the instruments were supported by the resilience and change management literature (particularly pertaining to social capital), with a number of items directly drawn from existing measurement tools. The development of the instruments presents a methodological contribution, as the literature was void of a tool to specifically measure resilience to long-term structural change driven by the tourism and resources sectors.
Next, Chapter Six discussed Research Objective Two in Section 6.3. The second research objective sought to determine levels of resilience of different segments within communities undergoing long-term structural change driven by the tourism and resources sectors. Examining the resilience of different community segments provided insight into how each community was being impacted by change. This ultimately exposed vulnerable or less resilient areas of the community, contributing to the overarching aim, by providing the context to inform resilience applications in each region. Using the instruments devised for Research Objective One, Section 6.3 discussed the findings pertaining to the resilience of community segments in relation to the literature. This was particularly in relation to community development and change management theories such as ABCD, CDD and Sustainable Development. It was revealed that the findings of the present research in many cases substantiated previous research, with the demographic variables influencing perceptions of change consistent with existing literature. However, by connecting the change management literature specifically on social capital with community development and resilience, this research identified a link between community resilience and the emotional stability of community members.

Finally, to achieve the overarching aim of this research, guidelines are required to build resilience in each region. Chapter Six discussed Research Objective Three, which was to identify guidelines for harnessing community resilience to address long-term structural change driven by the tourism and resources sectors. The guidelines presented aligned with the dimensions of community resilience and substantiated the characteristics of resilient communities that were presented in Figure 6 of the literature review (refer to Section 2.3.6.1, page 44). Furthermore, additional guidelines were informed by existing approaches in the change management literature. The guidelines present a new perspective on how resilience can be harnessed within tourism and resourced-based regions undergoing long-
term structural change. This chapter thereby addresses the overarching aim of this thesis, which is to examine the resilience of regional communities in order to provide direction for building resilience to long-term structural change driven by the tourism and resources sectors.

The discussion of the results illustrates how this research has made core contributions to existing knowledge in this area. This includes theoretical advancement by expanding the concept of resilience though new applications. Additionally, this research has contributed to knowledge by presenting a connection between different bodies of knowledge, change management, emotional stability and resilience.
7 CHAPTER SEVEN: CONCLUSION

7.1 Introduction

Long-term structural change is becoming a prominent feature within many Australian regions, particularly stemming from fluctuations in the tourism and resources sectors (Connolly & Lewis, 2010). Resilience has developed as a readily adopted change management strategy for regional communities, especially in the context of short-term change, such as natural disasters and hazard management (Adger et al., 2005; Maguire & Hagan, 2007; Paton & Johnson, 2001). However, as discussed in Chapter Two, limited knowledge exists for building resilience to address long-term structural change, primarily due to the complexity of the term resilience and the multiple resilience interpretations that exist (Hill et al., 2008; Simmie & Martin, 2010). Although the literature outlines a number of community responses to long-term structural change (Comfort et al., 2004; Ruhanen, 2012; Linnenluecke et al., 2012), limited knowledge exists for taking purposive and reflexive action to change driven by the tourism and resources sectors. Thus, the overarching aim of this research was to examine the concept of resilience and how it can be harnessed to address long-term structural change driven by the resource and tourism sectors in Australia.

Resilience theory, stemming from a socio-ecological perspective, is the underlying premise of this research. A detailed review of the resilience literature, particularly focusing on the dimensions of community resilience, has provided a solid platform for this research. Utilising a dialectic philosophical approach, a mixed mode research design was employed as the most appropriate methodology for achieving the aims and objectives of this research. First, this chapter explicitly identifies the key contributions of this research to existing knowledge and practice, before detailing the practical implications. Next, this chapter outlines the limitations of this research, prior to suggesting recommendations for areas of
future research. Finally, the chapter summarises the outcomes of this research and concludes the thesis.

7.2 Contributions to the body of knowledge

This research has contributed to the existing body of knowledge on resilience by enhancing the conceptual understanding of community resilience to long-term structural change. Adapting a socio-ecological approach, the study expands the understanding of resilience as a mechanism for managing change within the development of communities by recognising the process of structural change. This contribution represents an advance to discourse in change management, particularly in the field of regional development, by introducing resilience thinking to understand the process of change and to ways to best manage change. The present research has also contributed to the literature on the relationship between community resilience, perceptions of change and emotional stability. This has subsequent implications for the practical aspects of regional planning, development, and policy making, particularly for long-term planning. Adopting a focus on long-term structural change further extends and builds conceptual clarity surrounding resilience theory and creates new opportunities for its application.

Another notable contribution the research has made to knowledge is through the development of an instrument to measure resilience to long-term structural change. The instruments enable socio-ecological resilience to be measured across and within the community system, which is an underrepresented area in resilience research. This is a novel contribution to the resilience literature and provides the foundations for future research to measure resilience across different community systems at the local level to achieve specified regional development objectives. Furthermore, the instrument developed to measure community resilience to structural change was connected to existing scales which allowed...
for assessment of emotional stability and resident perceptions of change. Building additional scales to support the community resilience index presents an innovative approach to measure resilience, by incorporating the collective and individual dimensions of resilience. Additionally, the process of developing the resilience index contributes to the scale development literature. Although the process stemmed from existing studies, the combination of approaches applied in this research was unique and adds considerable value to how residents’ respond to long-term structural change driven by the tourism and resources sectors, particularly in a regional context.

The findings which resulted from applying the instruments also contribute to knowledge. Building on existing literature, it was found that emotional stability was a key determinate of resilience, revealing a strong correlation between the two constructs. Additionally, this research identified key community groups with lower resilience levels in a tourism and resource-based region. This contributes to knowledge by providing insight into the varying levels of resilience for different community groups and the groups which are most affected or vulnerable to long-term structural change.

The research further contributes to the body of knowledge by identifying guidelines for communities to enhance resilience and ultimately manage long-term structural change. The literature presents strategies to build resilience within communities. However, strategies are often context specific and focus on building capabilities for specific outcomes of change. That is, existing strategies are designed to address specific forces of change, such as climate change. As such, existing change management approaches do not necessarily make a community resilient to other forces of change. Subsequently, this research has demonstrated that it is possible to overcome policy silos by identifying guidelines to enhance resilience to the two sectors primarily responsible for driving change in each of the case study regions. Despite the guidelines identified in this research being specific to the case study regions, the
premise of these guidelines is potentially applicable beyond the focus of tourism and resource-based communities. The guidelines may also be applicable for other forces of change, as they provide the foundation for building community resilience to address multiple forces of change.

Furthermore, the research also contributes to existing knowledge through the comparison of two geographically similar regions. Although the tourism and resources sectors are active in both regions, one region has a prominent tourism sector and one has a prominent resources sector underpinning the regional economy. The findings emerging from this research provide a clearer understanding into how the regional economic structure can influence the resilience of the community, eliciting insights into the differences between tourism and resource-based regions.

7.3 Contributions to practice

In addition to the contributions this research has made to existing knowledge, this research has also contributed to practice. For local government planning and policy, the findings from this research inform policy decision making by providing insight into how particular economic strategies can impact community resilience and conversely how a community can become resilient to particular economic change. A number of the proposed guidelines presented in Chapter Five have been applied within a number of different regional contexts to address change. However, in practice, strategies have been found to be largely unsuccessful (Keast et al., 2007; Sharpley, 2002). Nevertheless, the instruments devised to measure resilience, as well as associated factors such as emotional stability and perceptions of change; enable strategies to focus on ‘next practice’. Next practice focuses on reinvigorating strategies and embracing innovation to look ahead and establish ways for
ideas and strategies to be more successfully utilised (Nidumolu, Prahalad & Rangaswami, 2009).

More specifically, the results of the research suggests a need to monitor the emotional stability and resilience levels in a community, particularly those undergoing rapid structural economic change. This thesis has also offered a tool by which this monitoring could be undertaken. The role of employment in providing emotional stability and thereby delivering resilience was a key finding of this research. This contributes to practice by identifying key areas which can be targeted to improve the emotional stability of individuals. Additionally, the role of emotional stability and resilience levels in delivering positive perceptions of change was also exposed within this research. These results are important for practice, as it suggests that governments need to ensure a community has high levels of emotional stability and resilience prior to implementing structural changes, as these influence the success of change.

Furthermore, the results of the cluster analysis (refer to Section 4.5.2) revealed that the community needs to be informed to be resilient. The high level of ‘Don’t know’ responses in Cluster 1 of the resilience cluster resulted in low levels of resilience. Asymmetry of information has largely been attributed to vulnerable groups or individuals, where more well-informed parties are able to take effective action and manage economic change (Woodhouse, 2006). Thus, having accessible and robust information can build social capital. Moreover, this research suggests that greater local employment within the resources sector can improve the transparency of information and improve perceptions of the resources sector operations.

This research has also contributed to informing resources sector practices for building resilience within resource-based regions. It was established that FIFO employment structures are detrimental to a community’s resilience levels, as it takes away jobs, reduces
communication, decreases business and community benefits, breaks down the community cohesion, and decreases trust between FIFO employees, resources sector companies and the local community.

7.4 Implications of the research

The findings of this research also have practical implications for regional development, change management and policy making, particularly at the local level in regions dependent on the tourism or resources sectors. Firstly, the resilience framework developed within this research details a proactive approach to building resilience in regional communities, enabling the implementation to be gradual (Bec & Dredge, 2014; Becken, 2013; Newman & Dale, 2005). Consequently, this enables stakeholders to build community resilience as a change management strategy for long and short-term planning (Becken, 2013). Additionally, the instruments developed within this research have practical value for other regions experiencing long-term structural change, particularly driven by the tourism and resources sectors. The measures established within the instruments are not specific to one regional context, enabling instruments to be used to measure long-term structural change within other regions to provide insight on vulnerable areas of the community and guide the management of the regional changes.

Furthermore, investigating the resilience of communities undergoing long-term structural change driven by the tourism and resources sectors provides insight into the changes experienced from multiple sectors. This enables the types of change induced by each sector to be identified, as well as the severity, to understand and manage potentially vulnerable areas. Therefore, this research presents useful information pertaining to the resilience of the Mackay and Whitsunday communities for local government stakeholders and policy makers to manage the changes driven by the tourism and resources sectors across
the state. The findings also have further implications for managing and planning for change. For instance, both regions had a degree of negativity surrounding change. However, this was not necessarily due to the change itself, but rather a perceived lack of planning for the change, as well as an absence of readily available information regarding the changes that each region was currently experiencing and may occur in the future. This suggests that the development of up-to-date plans recognising the changes and potential future change are needed.

Additionally, more readily available information for local residents is needed, such as making information related to the tourism and resources sectors more publically accessible and making the impacts to the community clear. Furthermore, establishing open community plans that are frequently reviewed provides up to date information and feedback channels, whilst also enabling patterns to be continuously analysed to inform short and long-term planning. This encourages more inclusive change management and planning, which engages and shares responsibility across community stakeholders (Leach et al., 2002). Knowledge sharing, forward thinking, and continuous review and assessment in regards to short and long-term planning are key characteristics of community resilience, as they encourage coordination among stakeholders and strengthen the capabilities of the community (Davoudi et al., 2012; Walker et al., 2002; Zautra et al., 2008).

### 7.5 Research limitations and constraints

There are several limitations and constraints associated with this research. The first limitation is the use of resilience theory as the theoretical lens which underpins the approach to manage long-term structural change within regional communities. As discussed in Chapter Two, resilience was considered the most appropriate theory to understand change within the community and to provide the effective mechanisms to manage the change.
However, it must be acknowledged that other theories could have been used to address and manage long-term structural change within a region (Laitner, 2000).

Moreover, a subsequent possible limitation of this research is that only two, similar regions were investigated, which may restrict the generalisability of the findings across different community systems. Nevertheless, selecting only two case study regions was necessary for the management and viability of the research. Additionally, the two selected case studies cannot be considered as a representative of all tourism and resource-based regions in Australia. There is the potential criticism that Mackay is not a valid representative of a resource-based region, as it is not directly involved with mining activity, such as resource extraction or processing. However, Rolfe et al. (2007) state that a large number of resource-based regions are only indirectly linked to the resource extraction and processing activities of the sector. Furthermore, Rolfe et al.’s (2007) study found that Mackay’s proximity to the mining areas means that many of the impacts which are felt within these communities, also extend to Mackay. Nonetheless, the two case studies expanded the findings beyond one specific case study context, providing insight into structural change within tourism and resource-based communities.

Time was also a limitation of this research, as only a cross-sectional viewpoint was obtained. The research took place within regions currently undergoing structural change. However, a more extensive assessment of community resilience could have been achieved through a longitudinal study, examining the resilience of community member’s pre and post structural change (Wang & Pfister, 2008). This research was also restricted by only exploring the resident perceptions of change, without specifically distinguishing key stakeholder perceptions, such as decision makers, business owners, representatives from the tourism and resources sectors, and government employees. Specifically recognising the perceptions of these residents may have contributed and strengthened the understanding of
the change management strategies currently being employed to address long-term structural change (Byrd et al., 2009). Furthermore, examining perceptions can also be a limitation to the research, as it may not be an accurate reflection of reality (Jussim, 1991). Yet, using perceptions to assess impacts of change and measure resilience is supported by previous literature (Adger, 2006; Buys et al., 2012; Nelson et al., 2007).

The method employed to identify the guidelines for building resilience may also have restricted the results. Using quantitative tools to collected qualitative data in a one-off survey can limit the depth of information and inhibit responses (Denzin & Lincoln, 1994). However, given the time constraints of the research, data could only be collected over a short period and having open-ended questions in the survey was deemed the most effective strategy for mitigating this potential limitation. Lastly, this research may have been limited by researcher bias or misinterpretation. However, the research was guided by experts in the field and efforts were made to reduce the possible bias, such as validating the findings against secondary data sources, specifically studies with similar aims and objectives. Limitations exist within all research. Yet, as discussed in this section, several steps have been taken to mitigate the limitations associated with this research, resulting in a reputable study.

### 7.6 Recommendations for future research

A number of areas for further inquiry have emerged from this research. Most notably, this research has provided the foundation for expanding applications of resilience across other community systems. Further research in this area is warranted, particularly to further test the resilience instruments that were developed within the present research. The dimensions outlined within the framework can also extend to communities and regions undergoing structural change driven by other sectors. Evolutionary economic geography can
also be used a framework to explain the structural change that has occurred in regional economies. A discussion of key issues emerging within this research, such as economic path dependence, can be further explained by applying this framework, encouraging greater understanding and direction for managing key issues.

Future research could also expand the number and sectors of case studies, given that this research only explored two tourism and resource-based regions. That is, research could use the instruments to build resilience to structural change driven by other economic sectors. It would also be valuable to investigate a region that is not currently undergoing structural change, to understand how the structures and institutions of the community operate and whether community resilience is a fluid concept under such circumstances. Furthermore, research should apply the instruments to communities that are classified by parameters other than spatial geography, such as belief systems, to understand how concepts, such as resource sharing, are interpreted and contribute to resilience within different community classifications.

The present research has explored the perceptions of residents without drawing attention to the perceptions of key stakeholders. Future research should undertake in-depth interviews to explore the perceptions of change of decision makers, local government employees, business owners, representatives from the tourism and resources sectors, and other key stakeholders, to strengthen the understanding of the change management strategies currently being employed to address long-term structural change. Research should also consider conducting a qualitative study to uncover the community networks and social capital that contribute to building resilience within the community system. Another avenue for future research could reassess the resilience index which was developed in the present research. The resilience index was based on resident perception, which presents subjective measures. Further research could advance the measures and include objective indicators of
resilience, ultimately strengthening the instrument. Research could also adapt the instruments developed and use the indicators identified through the Delphi process to measure community resilience to other forces of change.

Although the guidelines uncovered in the research can be considered preliminary, they provide the basis for harnessing resilience to manage change in other community systems. Yet, more research is warranted to assess the efficacy of proposed guidelines and further explore the role of scenario planning for building resilience to long-term structural change. Further research is needed to advance these guidelines to devise more in-depth and comprehensive strategies that are specific for the context of the community and the change/s that communities are exposed to, especially at different geographic scales. This includes developing specific strategies that build resilience among vulnerable or less resilience community segments. Longitudinal research is also needed to assess resilience before, during, and after change has occurred to determine system vulnerabilities and assess the community’s ability to respond, adapt and reconfigure to change. This could also inform more comprehensive strategies for building or maintaining community resilience. For instance, the present research identified trade labour employees as being more resilient, as a result of their skills being more transferrable across industries. Future research could explore strategies for increasing the transferability in the labour market in regions undergoing change to skills of other industries. Finally, research in this area could explore the barriers inhibiting the adoption of strategies.

7.7 Chapter summary

Chapter Seven has concluded the research by highlighting the contributions of this research to knowledge and practice. Specifically, these contributions include, but are not limited to:
• Expanding the understanding of resilience as a mechanism for managing change within the development of communities by recognising the process of structural change

• Advancing the change management discourse, particularly in the field of regional development, by introducing resilience thinking to understand the process of change and to ways to best manage change.

• Identifying the intricate link between the concepts of resilience, emotional stability and perceptions of change in the process of managing change.

• Developing instruments to measure community resilience, emotional stability and perceptions of change.

• Identifying guidelines for communities to enhance resilience and ultimately manage long-term structural change.

This chapter has also discussed the limitations and constraints of the research and presented recommendations for future research. This research aimed to examine the concept of resilience and how it can be harnessed to address long-term structural change driven by the resource and tourism sectors in Australia. In doing so, the findings of this research have made a contribution to theory, method and practice. This research has contributed to the existing body of knowledge on resilience by enhancing the conceptual understanding of community resilience to long-term structural change. Additionally, the research has also contributed to the literature on the relationship between community resilience, perceptions of change and emotional stability. The key methodological contribution was the development of an instrument to measure community resilience to long-term structural change. Additionally, the study has implications for practice for change management and policy making, specifically long-term planning and the management of vulnerable community groups. The results present the foundations for future research to measure
community resilience and expand guidelines to build community resilience to different types of change and within different community systems.

As noted throughout the thesis, change is constant within regional communities, with economic structural change becoming prominent for many Australian regions. This research has justified the use of resilience theory as a suitable approach to address and manage this change within a community system. Whilst change driven by the resources sector was perceived as being more prominent than change driven by tourism, it was found that both sectors were affecting the resilience of the community in similar ways. For instance, both sectors were found to be perpetuating economic path dependency. Additionally, less resilient groups within both communities were found to be those who were less involved and less informed about the changes being experienced within the regions, as well as those who were less emotionally stable. Overall, this research highlights the need for long-range planning, with progressive monitoring, to proactively manage change. This enables a community to adapt and positively respond to change, whilst utilising resources in an effective and sustainable manner.
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### Appendix A: Resilience and tourism studies

<table>
<thead>
<tr>
<th>Author(s) and Year</th>
<th>Location/Geographic context</th>
<th>Aim of the Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farrell and Twining-Ward (2004)</td>
<td>N/A</td>
<td>Explores the knowledge that can be gained from related complex adaptive systems, and how this knowledge can be applied (and useful) to managing tourism systems.</td>
</tr>
<tr>
<td>Handmer and Choong (2006)</td>
<td>Phuket, Thailand</td>
<td>Examines the dynamics of the local economy both formal and informal, and suggests that maximum benefit would be gained by putting more effort into the informal</td>
</tr>
<tr>
<td>Paton, Gregg, Houghton, Lachman, Lachman, Johnston and Wongbusarakum (2008)</td>
<td>Thailand</td>
<td>Explores the potential of existing models to predict resilience in non-Western populations, particularly in Thailand, and aid capacity building in post-disaster situations</td>
</tr>
<tr>
<td>Calgaro and Lloyd (2008)</td>
<td>Khao Lak, Thailand</td>
<td>Explores the root cause of destination vulnerability for the successful implementation of regional recovery plans, and for building long-term resilience against future shocks</td>
</tr>
<tr>
<td>Smith and Henderson (2008)</td>
<td>Laguna Phuket, Thailand</td>
<td>Explores the issues of importance related to informal tourism commerce</td>
</tr>
<tr>
<td>Coghlan and Prideaux (2009)</td>
<td>Great Barrier Reef, Australia</td>
<td>Explores the relationship between a resilient ecosystem, as being the foundation for a resilient tourism industry</td>
</tr>
<tr>
<td>Wegner, Allison and Tremblay (2009)</td>
<td></td>
<td>Examines the applicability of a 'resilience' approach and the management framework, 'resilient futures process', to the tourism context</td>
</tr>
<tr>
<td>Cochrane (2010)</td>
<td>Asia (Sri Lanka, Laos and Indonesia)</td>
<td>Identifies factors underpinning resilient systems and apply resilience to complex tourism systems</td>
</tr>
<tr>
<td>Lambert, Hunter, Pierce and MacLeod (2010)</td>
<td>N/A</td>
<td>Reviews how climate changes may affect the sustainability of whale-watching tourism operators from a resilience perspective</td>
</tr>
<tr>
<td>Stickland-Munro, Allison and Moore (2010)</td>
<td>N/A</td>
<td>Investigates the impacts of protected area tourism on communities and use a socio-ecological resilience framework to manage the changes</td>
</tr>
<tr>
<td>Biggs (2011)</td>
<td>Reef Tourism Destinations, Australia</td>
<td>Explores the resilience of vulnerable coral reefs, within the tourism sector, to large disturbances</td>
</tr>
<tr>
<td>Biggs, Hall and Stoeckl (2011)</td>
<td>Phuket, Thailand</td>
<td>Explores the resilience of vulnerable tourism sectors, namely coral reefs, to natural disasters</td>
</tr>
<tr>
<td>Authors (Year)</td>
<td>Location</td>
<td>Focus</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
<tr>
<td>Ruiz-Ballesteros (2011)</td>
<td>Agua Blanca, Ecuador</td>
<td>Investigates how sustainability and sustainable development can be achieved through creating resilient systems</td>
</tr>
<tr>
<td>Eakin, Benessaiah, Barrera, Cruz-Bello and Morales (2012)</td>
<td>Chiapas coffee community, Mexico</td>
<td>Explores the impacts of and responses to natural disasters, particularly hurricanes, within the Chiapas coffee community, with the objective of illuminating linkages between vulnerability and resilience.</td>
</tr>
<tr>
<td>Becken (2013)</td>
<td>Queenstown-Wanaka, New Zealand</td>
<td>Develops a resilience framework for tourist destinations with a particular focus on climatic disturbances or stress, and their impacts on tourism activity sub-systems.</td>
</tr>
<tr>
<td>Espiner and Becken (2013)</td>
<td>Franz Josef and Fox Glacier, New Zealand</td>
<td>Evaluates the susceptibility to change of geographically isolated destinations at multiple scales which could undermine the economic and social longevity.</td>
</tr>
<tr>
<td>Orchiston (2013)</td>
<td>Southern Alps, New Zealand</td>
<td>Investigates the physical outcomes of a large Alpine Fault earthquake on the tourism industry, and investigate operator perceptions of risk, their perceived level of preparedness, and the factors that influence the resilience of tourism businesses</td>
</tr>
</tbody>
</table>
# Appendix B: Methods in community resilience studies

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Location/ Setting</th>
<th>Aim of the Study</th>
<th>Methods</th>
<th>Sample</th>
<th>Sampling Technique</th>
<th>Scale and Attributes</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachrach and Zautra</td>
<td>Rural community near Phoenix, Arizona</td>
<td>Understand the psychological adaptations that enable people to deal with community stressors, and lead to community involvement</td>
<td>Quantitative: 99 surveys</td>
<td>70 community residents; 29 “involved residents”</td>
<td>Random representative sampling</td>
<td>-demographic characteristics -residents opinions and concerns - ways of coping (34 items) -sense of community (7 items) -self-efficacy (7 item-Mastery Scale- Pearlin &amp; Schooler, 1978), used with Rosenberg’s (1965) Self-esteem scale - appraisal -community involvement -demoralization (26 items)</td>
<td>path analysis</td>
</tr>
<tr>
<td>Paton, Millar and Johnston</td>
<td>New Zealand</td>
<td>Explore risk management principles to promote community resilience to a range of potential hazard effects</td>
<td>Quantitative: Questionnaire</td>
<td>Permanent residents</td>
<td>Not Stated</td>
<td>-used scale developed by Bachrach &amp; Zautra (1985), with the addition of a social support variable</td>
<td>Correlation analysis, regression analysis</td>
</tr>
<tr>
<td>Tobin and Whiteford</td>
<td>Chimborazo and Tungurahua, Ecuador</td>
<td>Explore community resilience and the perceptions of risk and human health issues associated with an ongoing disaster</td>
<td>Mixed: Interviews; field-based observation; focus groups; questionnaires</td>
<td>Interviews: Government officials, relief workers, leaders and decision-makers Observation, questionnaire, focus groups; volcano victims</td>
<td>Purposive and snowball sampling</td>
<td>Not stated</td>
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<tr>
<td>Kimhi and Shamai</td>
<td>Communities in the eastern part of Israel-Lebanon boarder</td>
<td>Investigate the relationship between perceived community resilience and the effect of stress and life satisfaction</td>
<td>Quantitative: Questionnaire</td>
<td>Community residents</td>
<td>Convenience and random sampling</td>
<td>-7 items for community resilience -12 items for level of concern -6 items for others stress -19 items for stress symptoms</td>
<td>Factor analysis and multivariate analysis</td>
</tr>
<tr>
<td>Authors</td>
<td>Location</td>
<td>Research Question</td>
<td>Methodology</td>
<td>Participants</td>
<td>Sampling Method</td>
<td>Analysis Method</td>
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<tr>
<td>Tse and Liew</td>
<td>Asian community of Glen Innes, Auckland, NZ</td>
<td>Explore the meaning and manifestations of community resilience within the Asian community of New Zealand, to enhance health, well-being and quality of life</td>
<td>Qualitative: Participant observation</td>
<td>Group leaders and facilitators involved with community development</td>
<td>Not Stated</td>
<td>Thematic analysis</td>
<td></td>
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<tr>
<td>Bushnell and Cottrell</td>
<td>Thuringowa, Queensland</td>
<td>Investigate the attitudes, expectations and needs of a community in regard to bushfire risk, to build community resilience</td>
<td>Mixed: Focus groups; 263 surveys (mail)</td>
<td>Focus group: members of local RFB’s and community groups Survey: community members</td>
<td>Random sampling</td>
<td>Analysed descriptively, chi-square tests</td>
<td></td>
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<tr>
<td>Hegney, Buijstra, Baker, Rogers-Clark, Pearce, Ross, King and Watson-Luke.</td>
<td>Southern-Eastern Queensland</td>
<td>Develop, implement and evaluate a model that enhances psychological wellness and resilience in rural people and communities</td>
<td>Qualitative (Participatory Action Research): 10 interviews; 1 focus group</td>
<td>Community members who were seen as community leaders, and/or seen to be resilient</td>
<td>Purposive sampling: Identified through a formal network group</td>
<td>Thematic analysis</td>
<td></td>
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<tr>
<td>Derrett</td>
<td>Northern Rivers, NSW: 4 festivals</td>
<td>Examine how festivals represent a human ecosystem that fosters and can maintain resilience within the community</td>
<td>Qualitative: Participant observation; interviews; focus groups</td>
<td>Key stakeholders</td>
<td>Not Stated</td>
<td>Not stated</td>
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<tr>
<td>Kulig, Edge and Joyce</td>
<td>Alberta, Western Canada</td>
<td>Employs and compares different research methods to explore resilience within communities</td>
<td>Mixed: 82 interviews; 210 household surveys; database analysis</td>
<td>Community members</td>
<td>Purposive sampling</td>
<td>-15 items</td>
<td>Cross-tabulation and chi-square analysis (Survey)</td>
</tr>
<tr>
<td>Buchmann</td>
<td>Trinidad, Cuba</td>
<td>Investigate the role of Cuban home gardens, in relation to political change and economic crisis, for building resilience within the community</td>
<td>Qualitative: 25 interviews; participant observation</td>
<td>Garden owners and cultivators</td>
<td>Snowball sampling</td>
<td>Not stated</td>
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<tr>
<td>Cinner, Fuentes and Randriamahazo</td>
<td>Madagascar</td>
<td>Develop and implement a framework in which the type of socioeconomic data that are regularly collected as part of coral reef management can be used to explore some key aspects of social</td>
<td>Mixed: 264 surveys administered as interviews</td>
<td>Survey: local households Interviews: head of the household and key informants</td>
<td>Random sampling (to select household to survey) Purposive sampling (interviews)</td>
<td>Not stated</td>
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<tr>
<td>Authors (Year)</td>
<td>Location</td>
<td>Methodology</td>
<td>Findings</td>
<td>Sample Size/Participants</td>
<td>Data Collection</td>
<td>Data Analysis</td>
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<tr>
<td>Magis (2009)</td>
<td>Forest communities in the US</td>
<td>Resilience</td>
<td>Develop a theoretically and empirically based definition of community resilience and an associated measurement instrument</td>
<td>Organisations concerned with forest sustainability, academics, community organisers, foresters, physical and social scientists, bureaucrats and policy makers</td>
<td>Purposive and targeted sampling</td>
<td>Content analysis (Affinity diagram)</td>
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<tr>
<td>Maybery, Pope, Hodgins, Hitchenor and Shepard (2009)</td>
<td>Eight rural communities of the northern Riverina region, NSW, Australia</td>
<td>Resilience</td>
<td>Operationalise a model of resilience, risk and well-being to examine the community assets important for the resilience of small, inland rural communities</td>
<td>Community members</td>
<td>Purposive sampling</td>
<td>- items built upon Mowbray et al (2007) - PWI used to measure well-being</td>
<td>Statistical analysis</td>
</tr>
<tr>
<td>Shava, O’Donoghue, Krasny and Zazu (2009)</td>
<td>Sebakwe, Zimbabwe</td>
<td>Resilience</td>
<td>Explore the interrelationship between rural farming communities and traditional argo-ecosystems in establishing resilient characteristics</td>
<td>Farmers with knowledge of traditional food plants</td>
<td>Purposive sampling</td>
<td>Narrative analysis, domain analysis</td>
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<tr>
<td>Buikstra, Ross, King, Baker, Hegney, McLachlan and Rogers-Clark (2010)</td>
<td>Southern-Eastern Queensland</td>
<td>Resilience</td>
<td>Explore community and individual resilience to develop a framework that could enhance mental health practice by fostering synergies between individual and community factors</td>
<td>Recognised community members within each sector, and/or community members who are seen as resilient</td>
<td>Purposive and snowball sampling</td>
<td>Content analysis</td>
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<tr>
<td>Larsen, Calgaro and Thomalla (2011)</td>
<td>Krabi Provence, Thailand</td>
<td>Resilience</td>
<td>An examination of post-disaster recovery and disaster risk reduction efforts in tourism dependent communities</td>
<td>Key regional-level stakeholders, government agencies, NGO’s, community-based organisations, and community members</td>
<td>Not Stated</td>
<td>Comparative analysis</td>
<td></td>
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<tr>
<td>Maggi, Roberts, MacLennan and Angiulli (2011)</td>
<td>Vernon, Merritt, &amp; Kamloops, Canada</td>
<td>Resilience</td>
<td>Explore the role of childcare, as a means of social capital, and its contribution to community resilience</td>
<td>Teachers, children, and parents of children of childcare centres</td>
<td>Not Stated</td>
<td>Descriptive analysis, hierarchical linear regression analysis, comparative analysis</td>
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<tr>
<td>Ruiz-Ballesteros (2011)</td>
<td>Agua Blanca, Ecuador. Community-based</td>
<td>Resilience</td>
<td>Investigate how sustainability and sustainable development can be achieved through</td>
<td>Interviews: community members and leading local figures</td>
<td>Purposive sampling</td>
<td>Comparative analysis</td>
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<tr>
<td>Tourism Destination</td>
<td>Creating Resilient Systems</td>
<td>Observation; Interviews; 4 Focus Groups; 57 Resource Surveys (Conducted as an Interview)</td>
<td>Focus Groups: Long-Standing Community Members (Over 40); Surveys: All Households</td>
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<td>Schwarz, Bene, Bennett, Bosco, Hilly, Paul, Posala, Sibiti and Andrew (2011)</td>
<td>Solomon Islands (3 Coastal Communities)</td>
<td>Assess Multiple Dimensions of Vulnerability Within a Community and Identify Factors Affecting Households’ Perception About Their Capacity to Cope With Shocks</td>
<td>Decision-Makers Within Community Households</td>
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<td>Quantitative: Questionnaires (Administered as Interviews)</td>
<td>Random Sampling</td>
<td>Multivariate Probit Analysis</td>
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<tr>
<td>Wyche, Pfefferbaum, Pfefferbaum, Norris, Wissnielski and Younger (2011)</td>
<td>Oklahoma, USA</td>
<td>Investigate the Contribution of First-Responder Community Groups to Disaster Recovery Efforts and Community Resilience</td>
<td>Staff from Local City and County Agencies Who Volunteered at Camp Gruber to Help Hurricane Katrina Survivors</td>
<td>Snowball Sampling</td>
<td>Grounded Theory Approach, Comparative Analyses</td>
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<tr>
<td>Gomez-Baggettun, Reyes-Garcia, Olsson and Montes (2012)</td>
<td>Donana, Spain</td>
<td>Examine the Role of Traditional Ecological Knowledge and Shared Systems of Beliefs in Building Long-Term Social-Ecological Resilience to Environmental Extremes.</td>
<td>Qualitative: 33 Interviews; Focus Groups; Systematic Review of Historical Archives</td>
<td>Interviews &amp; Focus Groups: Local Informants With Direct Experience in Traditional Resource Systems</td>
<td>Purposive and Snowball Sampling</td>
<td>-Analysed Within Existing Frameworks (Namely Agrawal, 2008) (Interviews and Focus Groups) - Historic Climatology Protocol to Reconstruct Climatic Events (Historical Climatology)</td>
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<tr>
<td>Researcher(s) and Location</td>
<td>Title and Location</td>
<td>Methodology</td>
<td>Data Collection</td>
<td>Sampling</td>
<td>Data Analysis</td>
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<td>McManus, Walmsley, Argent, Scott, Bourke, Martin, Pritchard and Sorensen (2012)</td>
<td>Explore rural resilience by comparing the economic, social and environmental issues perceived as important by farmers in maintaining their local towns</td>
<td>Mixed: 115 questionnaires (administered as interviews)</td>
<td>Local farmers</td>
<td>Random sampling</td>
<td>Regression analysis modelling</td>
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<tr>
<td>Smith, Moore, Anderson and Siderelis (2012)</td>
<td>Develop a framework to define the process of social resilience by examining human communities level of dependence on the availability and production of natural resources, and exploring how the presence of specific types and patterns of social interaction create resilience</td>
<td>Mixed: Systematic review of historical data; 18 interviews</td>
<td>Interviews: local community members heavily involved in community affairs. Historical data: longitudinal data available from the Bureau of Economic Analysis, US Department of Labor, and US Decennial Census</td>
<td>Purposive sampling</td>
<td>-resource dependency: total employment within a specific sector -social capital: number of voluntary member organisations per capita - social resilience: median household incomes</td>
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<tr>
<td>Taylor, Wells, Howell and Raphael (2012)</td>
<td>Explore the role of social media as psychological first aid as a support to community resilience building</td>
<td>Mixed: 10 interviews; 1146 surveys</td>
<td>Interviews: individuals who had set up and administered community Facebook sites relating to recent flooding in Queensland Survey: social media users</td>
<td>‘Uncontrolled’ snowball sampling</td>
<td>Not stated</td>
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<tr>
<td>Holladay and Powell (2013)</td>
<td>Investigate the conditions needed to build and enhance the resilience and sustainability of community-based tourism in small island nations</td>
<td>Mixed: 213 questionnaires (administered as interviews)</td>
<td>Community members</td>
<td>Systematic random sampling: every third house; Simple random sampling: at centralised points</td>
<td>-DeVellis (2003) 8-step development process -36 resilience items (4 domains: social, institutional, economic, ecological)</td>
<td></td>
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<tr>
<td>Skerratt (2013)</td>
<td>Explore and query the key characteristics of resilience from the ‘proactive human agency’ research</td>
<td>Qualitative: Group interviews</td>
<td>Community land trust boards</td>
<td>Purposive sampling</td>
<td>Thematic analysis</td>
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Appendix C: Case study selection phases

Phase 1: State and Territory wide analysis

The selection process started at a national scale, where the tourism and mining industries were assessed according to how significant each industry was for each Australian state or territory (see Figure 21). The level of significance was determined by the direct contribution each sector made to the state or territory’s economy. The purpose of this analysis was to consider both sectors equally, thus an ideal state or territory was one whereby the tourism and mining industries generated equal, or similar, economic dependency. Inequality between the two sectors could result in policy implications from government, which may tend to favour one particularly industry.

To further refine the selection process and to enhance the accuracy of each industry’s position within the state or territory, the size of each industry was charted. The size was based on the number of people directly employed in the industry. Similar to the first assessment, a state or territory’s relevance to this research was determined by the equal size of both industries within the state or territory (see Figure 22). From these two assessments it can be identified that the tourism and resources sectors equally contribute to the states of South Australia and Queensland, with both assessments reflecting similar results.
Figure 24: State and Territory economic dependency on the tourism and mining industries

Phase 2: Regional analysis

To identify specific regions that have active and sizeable tourism and mining industries, a quadrant graph was developed as a means to determine the number of industry
based businesses within the region (Figure 11). The information was obtained from the Australian Bureau of Statistics and Tourism Research Australia databases, identifying prominent tourism and mining regions within Australia. Within these databases, all economic activity directly and indirectly related to the exploration and mining of resources and other resource-related industries has been labelled as ‘mining’. Each quadrant was labelled to reflect high or low dependency on tourism and mining. From Phase 1, only regions from South Australia and Queensland were considered. The most applicable regions fall within the High Mining Low Tourism and the High Tourism Low Mining quadrants, as shown in Figure 26.

**Figure 26: Regional Dependency on Tourism and Mining**

![Regional Dependency on Tourism and Mining](image)

Source: Australian Bureau of Statistics (2012); Tourism Research Australia (2012)

**Phase 3: Case selection**

The focus of this research is built on the notion of a community and the different people and groups that make up the community. The High Mining High Tourism quadrant predominantly consisted of vast regions that spanned multiple towns, communities and
legislative borders making the community setting difficult to define. The size of these regions and the tyranny of distance between stakeholders decreased the applicability of these regions for this research and were not considered appropriate. Selecting regions with one dominant sector was appropriate for this research, as it is uncommon for Australian regions to lie within the High Mining High Tourism quadrant. Furthermore, as previously mentioned, the regions within the High Mining High Tourism quadrant were not appropriate based on the analysis from Phase 2.

Two regions were selected that were in opposite quadrants; that is, one region from the High Mining Low Tourism quadrant, and one region from the High Tourism Low Mining quadrant. Opposite quadrants were selected to compare regions with opposing sector dominance. This would contribute to identifying the imbalances between the two sectors, allowing insightful comparisons to be made between the communities and the two sectors. From this, Mackay and the Whitsunday region were selected as suitable case studies for this research. The appropriateness of these regions include, but are not limited to, the following characteristics: both regions have clear geographical boundaries, well-established local government planning schemes, regional development initiatives that focus on the tourism and resources sectors, and established local communities.
Appendix D: Mackay regional overview

Mackay is located on the eastern coast of Queensland, approximately 970km north of Brisbane, on the Pioneer River (Tourism Queensland, 2012a). There are primarily three sectors which underpin the economy: resources, agriculture and tourism. The region has diverse natural resources and is within close proximity to the mines (Mackay Regional Council, 2011). At June 2015, the population of Mackay was approximately 121,900 (Australian Bureau of Statistics, 2013a).

From 2005-2010, Mackay was one of the fastest growing regions in Queensland, managing to grow by almost 23% in the face of the Global Financial Crisis (Mackay Regional Council, 2011). In recent years this growth has abruptly stagnated and is heading towards a sharp decline a result of the decline in both the tourism and resources sectors (Pham et al., 2013b). Although both sectors are expected to regain their strength (Tourism Queensland, 2012a), this may be a gradual process and there is a need to educate the community on how to better prepare for similar circumstances in the future.

Tourism sector

Compared to many of its neighbouring regions, such as the Whitsunday region, Mackay’s tourism sector is small and still developing. The total number of visitors to the Mackay region was 692,000 for the period ending December 2013 (Tourism and Events Queensland, 2013b). Visitation to the Mackay region has steadily increased with the growth of tourism in surrounding areas, predominantly the Whitsunday region (Tourism Queensland, 2012a). In recent years the tourism sector has experienced considerable growth making it a recognisable contributor to Mackay’s economy, employing approximately 4% of Mackay’s workforce (Tourism Queensland, 2012a).

Mackay has the potential for a strong tourism industry given its coastal location, warm weather and close proximity to the world renowned Great Barrier Reef and Eungella
National Park. The strong resources sector presence presents an ongoing challenge for fostering a vibrant tourism sector aimed at leisure travellers, as industrial activity dominates the landscape. Business travellers currently dominate the market (more than 41%), driven by the growth of other industries namely the resources sector. Business travellers have also contributed the largest amount of revenue to the local economy compared with other tourist markets (Tourism and Events Queensland, 2013a). Despite the economic contribution, Mackay’s tourism sector has experience challenges with having the market dominated by business travellers. For example, Mackay has noted that tourism services and amenities, such as accommodation, transportation, and restaurants, are frequently subject to price increases and overpricing, making normal tourism operations unviable (Tourism Queensland, 2012a). Price inflation within the tourism sector can make a destination unaffordable for most leisure travellers (Bec et al., 2016). This is particularly evident within Mackay, which has resulted in a lack of affordable short-stay accommodation (Tourism Queensland, 2012a). Furthermore, tourism businesses outside of the accommodation and food and beverage sector, struggle to generate business, as it is uncommon for Mackay’s business tourist market to utilise other tourism services and attractions, such as day trip adventures (Pham et al., 2013a). With the dominance of the business traveller market, Mackay has found it difficult to attract leisure tourists, as it cannot compete with destinations whose pricing strategies are targeted towards for leisure travellers.

**Resources sector**

Mackay is not regarded as being a central area for mining production. However, its strategic proximity to large mining areas, major highways, and train lines, ensures its participation in the mining and resource-based activities of the surrounding regions. Mackay is also an accessible location for mining exports, with a large port, and has the capacity to
manage the influx of people as a result of the resources sector growth, through infrastructure and development prospects (Mackay Regional Council, 2011).

Mackay is considered the gateway to the Bowen Basin coal mining reserves of Central Queensland. These reserves are the single largest and most productive coal reserves in Australia. The Bowen Basin consists of 34 operational coal mines, extracting more than 100 million tonnes annually (Petkova et al., 2009). Much of the coal from the Bowen Basin remains in Australia with Japan and China as the largest export recipients. At the end of 2012, more than 13000 people (17%) in Mackay were employed in the resources sector, making it the largest employment sector in Mackay (Australian Bureau of Statistics, 2013b). Mackay has also become home to numerous Drive-In-Drive-Out (DIDO) and Fly-In-Fly-Out (FIFO) workers who can spend up to 50% of their time in the region. The influx of people to the region has also stimulated growth and expansion in other sectors including construction, retail, transportation, tourism and other business services, such as legal and accounting services (Petkova et al., 2009; Pham et al., 2013a).

There is uncertainty surrounding the current and future state of the resources sector, with future depictions radically varying. For example, Mackay has seen the closure of several mines in the Bowen Basin and surrounding regions in recent years (Validakis, 2012; Walker, 2013). Although the region is still a rich source of coal (Woods, 2011), there was a notable decline in projects during 2012 and 2013, with projections expecting this to continue for some time. Many projects have been suspended or postponed because the market value of minerals has experienced a sharp decline, making it unfeasible to continue operation until the valuation increases (Pham et al., 2013a; Whop, 2013). Given the prominence of this sector within Mackay’s economy, long-term and short-term challenges may be evident for the region.
Appendix E: Whitsunday regional overview

The Whitsunday region is located on Queensland’s central coast, approximately 1,100km north of Brisbane. The region was previously administered as two separate local government areas: the Shire of Bowen and the Shire of Whitsunday. Now amalgamated, the region comprises 74 islands in the Whitsunday passage and also includes the adjacent mainland coast of Australia. The Whitsunday Islands are in the heart of the World Heritage Listed Great Barrier Reef (GBR). This distinctively characterises the regions tourism attractions, with resorts operating off five islands. The mainland area encompasses the rural town of Proserpine, the mining town of Collinsville, and the coastal towns of Airlie Beach, Cannonvale and Bowen.

The local economy is driven by the tourism, resources and agriculture sectors. The residential population of the region at the end of 2012 was estimated to be 36,000 (Australian Bureau of Statistics, 2013a). In recent years the region has been characterised by low unemployment. At June 2014, unemployment in the region was less than 5%, compared with the state average of 6.1% and the national average of 5.8% (Australian Bureau of Statistics, 2014). The stereotypically categorised ‘wealthy’ sectors, such as the resources sector, have a growing presence within the Whitsunday region. This perception combined with the with a low unemployment rate, has resulted in high living costs and a lack of affordable housing (Whitsunday Regional Council, 2011). This characteristic has extended to the tourism sector, where the Whitsunday region is classified internationally as an upmarket destination, despite offering a variety of facilities and activities to accommodate a range of travellers (Chircop, 2012; Whitsunday Regional Council, 2011). The key challenge for the Whitsunday region is how to balance the two dominant sector- resources and tourism. Both sectors offer vast benefits, yet they often compete for resources and have opposing goals which makes it hard for the two sectors to co-exist within one region (Pham...
et al., 2013a). Furthermore, both sectors are subject to fluctuation, presenting potentially long-term challenges for the economy.

**Tourism sector**

Tourism in the Whitsunday region makes a significant contribution to the development of the regional economy, directly employing more than 34% of the workforce in the region (Tourism Queensland, 2012b). Tourism is estimated to contribute more than $300 million in revenue, the equivalent of approximately 6.5% of the regions GRP for the year ending December 2011 (Tourism Queensland, 2012b). The economic significance of tourism in the Whitsunday region is estimated to be more than 18%, making it the third highest region in Australia (Tourism Queensland, 2012b, 2012c). There are also many other service sectors which are dependent on tourism, such as retail.

The tourism market is driven by leisure travellers, seeking fun and relaxation (Tourism Queensland, 2012b). Although many other Australian destinations attract a similar target market, the Whitsunday region’s competitive advantage is attributed to its distinctive island settings, representing the sand, sun and exotic appeal. It also encompasses other iconic features and activities such as snorkelling in the GBR. The region is predominantly promoted for its pristine natural beauty, location to the GBR, spectacular landscapes and scenery, and the various water and marine activities/experiences that are available. Additionally, the region has become one of Australia’s most popular holiday destinations, receiving approximately 687,000 visitors for the year ending December 2013. Its reputation also spans the national and international market (Tourism and Events Queensland, 2013c).

In contrast to the Mackay region, tourism in the Whitsunday region has not been a steady incline in growth and popularity (Tourism Queensland, 2012b). The region has experienced many challenges that have significantly affected the community and the tourism
sector. These challenges comprise of changes within the global economy, natural disasters, and environmental concerns. As previously mentioned, tourism within Australian regions is largely dependent on the strength or weakness of the Australian dollar. Given that visitation to the region is largely for leisure purposes, Australia’s economy has largely impacted the visitation patterns. The Whitsunday region also faces more tangible challenges, such as the threat of natural disasters, as cyclones are common to the Northern Queensland region. Similar to cyclones, the environmental condition of the region can also present challenges for the tourism industry. Tourism within the Whitsunday region predominantly relies on the natural environment. Attributes, such as the GBR, form the basis of the tourism product. The recent concern over the health of the GBR, particularly stemming from increased activity in the resources sector, has raised concerns about tourism in the region.

Resources sector

Like Mackay, the Whitsunday region is not considered to be a mining town. However, the region is easily accessible to large coal mines (Ekert, 2012). This has made it an ideal location for many resources sector businesses and an attractive residential area for employees. Although the 2011 census showed that less than 1% of the population in the Whitsunday region worked within the resources sector (Australian Bureau of Statistics, 2011), in recent years there has been a significant influx of miners residing in the region, making it a key FIFO and DIDO location (Ekert, 2012; Whitsunday Times, 2013). The area is attractive to workers because of lower housing prices (although housing prices remain above the national average) than in nearer towns like Mackay. The region is also considered to be a more liveable area, being far enough away from the mining atmosphere, and offers an appealing lifestyle (Whitsunday Times, 2013). Consequently, developing the region as a key location for the resources sector community is supported by the Whitsunday Regional
Council, as it is a means of growing and diversifying the Whitsunday economy (Whitsunday Regional Council, 2011).

The resources sector within the region has often been viewed as ‘contributing from a distance’, as the region’s prominent involvement was through the FIFO and DIDO workers (Ekert, 2012). However, the presence of the resources sector is expected to increase and become more prominent within the Whitsunday region through increased production within the Collinsville area. Collinsville is a small mining town on the outskirts of the region. In previous years resources sector activity in this town has been low, however, a number of new coal mines are scheduled to open in the area in the coming years (Whitsunday Regional Council, 2011). This is expected to significantly stimulate the presence of the resources sector, and be more of a direct commodity for the region. There has also been recent discussion about proposed mining projects that will further eliminate this distance with the resources sector, and make its physical existence much greater and centralised within the Whitsunday region.
## Appendix F: Community resilience indicator studies

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<th>Discipline/s</th>
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<tbody>
<tr>
<td>1. Robertson, Harding and Morrison (1998)</td>
<td>Psychology; Sociology</td>
</tr>
<tr>
<td>5. Hahn, Villagran de Leon and Hidajet (2003)</td>
<td>Socio-ecology; Sociology</td>
</tr>
<tr>
<td>7. Carreno, Cardona and Barbat (2005)</td>
<td>Socio-ecology</td>
</tr>
<tr>
<td>11. Cutter, Barnes, Berry, Burton, Evans, Tate and Webb (2008a)</td>
<td>Socio-ecology; Sociology</td>
</tr>
<tr>
<td>12. Cutter, Barnes, Berry, Burton, Evans, Tate and Webb (2008b)</td>
<td>Socio-ecology; Sociology</td>
</tr>
<tr>
<td>24. van Oudenhoven, Mijatovic and Eyzaguirre (2011)</td>
<td>Socio-ecology</td>
</tr>
<tr>
<td>27. Graugaard (2012)</td>
<td>Economic; Psychology; Sociology</td>
</tr>
<tr>
<td>31. Holladay and Powell (2013)</td>
<td>Socio-ecology</td>
</tr>
</tbody>
</table>
### Appendix G: Initial indicator list from secondary analysis

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Air Quality is an issue for your region</td>
</tr>
<tr>
<td>2.</td>
<td>Businesses buy their products from locals</td>
</tr>
<tr>
<td>3.</td>
<td>Climate is an issue for your region</td>
</tr>
<tr>
<td>4.</td>
<td>Community/industry events are well planned and residents are adequately notified</td>
</tr>
<tr>
<td>5.</td>
<td>Community members have access to important information in their community</td>
</tr>
<tr>
<td>6.</td>
<td>Community preparedness and training</td>
</tr>
<tr>
<td>7.</td>
<td>Endowment of equipment, tools and infrastructure</td>
</tr>
<tr>
<td>8.</td>
<td>Energy use and availability is an issue for your region</td>
</tr>
<tr>
<td>9.</td>
<td>Fresh water quality and availability is an issue for your region</td>
</tr>
<tr>
<td>10.</td>
<td>Generally you feel that you can trust your neighbours</td>
</tr>
<tr>
<td>11.</td>
<td>Housing improvement and human settlement relocation from prone-areas is evident within the region</td>
</tr>
<tr>
<td>12.</td>
<td>Individual opinions and feedback are heard by governing bodies within the community</td>
</tr>
<tr>
<td>13.</td>
<td>It is difficult to start up a new business in this region</td>
</tr>
<tr>
<td>14.</td>
<td>Knowledge is integrated and shared amongst community members and government bodies</td>
</tr>
<tr>
<td>15.</td>
<td>Local leaders adjust quickly to changing problems</td>
</tr>
<tr>
<td>16.</td>
<td>Local leaders work well together</td>
</tr>
<tr>
<td>17.</td>
<td>Locals do not have to wait on national leaders to make decisions for your community</td>
</tr>
<tr>
<td>18.</td>
<td>Members of your community are trustworthy and keep their agreements</td>
</tr>
<tr>
<td>19.</td>
<td>Migration levels of people within your community are high</td>
</tr>
<tr>
<td>20.</td>
<td>Natural disasters/hazards are frequent within the region</td>
</tr>
<tr>
<td>21.</td>
<td>Open communication and information sharing is encouraged within your community</td>
</tr>
<tr>
<td>22.</td>
<td>Ozone depletion is an issue for your region</td>
</tr>
<tr>
<td>23.</td>
<td>People in &lt;case study&gt; support each other</td>
</tr>
<tr>
<td>24.</td>
<td>Preservation of forest resources is an issue for your region</td>
</tr>
<tr>
<td>25.</td>
<td>Preservation of marine life is an issue for your region</td>
</tr>
<tr>
<td>26.</td>
<td>Preservation of threatened species is an issue for your region</td>
</tr>
<tr>
<td>27.</td>
<td>Public and private assets are regularly reinforced and retrofitted</td>
</tr>
<tr>
<td>28.</td>
<td>Rehabilitation and reconstruction planning</td>
</tr>
<tr>
<td>29.</td>
<td>Research and innovation is used to understand and improve the resilience of your community</td>
</tr>
<tr>
<td>30.</td>
<td>Safety standards and construction codes are frequently undated and enforced</td>
</tr>
<tr>
<td>31.</td>
<td>Simulation, updating and testing of inter institutional response is undertaken</td>
</tr>
<tr>
<td>32.</td>
<td>Small businesses in this region are generally successful</td>
</tr>
<tr>
<td>33.</td>
<td>The community leaders have as much power here as national leaders</td>
</tr>
<tr>
<td>34.</td>
<td>The long-term quality and supply of natural resources is an issue for your region</td>
</tr>
<tr>
<td>35.</td>
<td>There are a number of generations interacting within the region</td>
</tr>
<tr>
<td>36.</td>
<td>There are environmental protection regulations in place and enforced</td>
</tr>
<tr>
<td>37.</td>
<td>There are environmental strategies in place in your region</td>
</tr>
<tr>
<td>38.</td>
<td>There are clear leaders amongst your community</td>
</tr>
<tr>
<td>39.</td>
<td>There are emergency and relief services within your community</td>
</tr>
<tr>
<td>40.</td>
<td>There are more businesses in &lt;case study&gt; community now</td>
</tr>
<tr>
<td>41.</td>
<td>There are more homes in &lt;case study&gt; community now</td>
</tr>
<tr>
<td>42.</td>
<td>There are more roads in &lt;case study&gt; community now</td>
</tr>
<tr>
<td>43.</td>
<td>There are non-government, non-profit and/or faith-based organisations in your community</td>
</tr>
<tr>
<td>44.</td>
<td>There are not enough cultural or leisure activities in the region</td>
</tr>
<tr>
<td>45.</td>
<td>There are opportunities for education, training and learning within your community</td>
</tr>
<tr>
<td>46.</td>
<td>There are organised and coordinated emergency operations</td>
</tr>
<tr>
<td>47.</td>
<td>There are public/recreational facilities and services within your community</td>
</tr>
<tr>
<td>48.</td>
<td>There are regular community meetings</td>
</tr>
<tr>
<td>49.</td>
<td>There are strong business links between local organisations</td>
</tr>
<tr>
<td>50.</td>
<td>There is a continuation of traditional practices, beliefs, and customs</td>
</tr>
<tr>
<td>51.</td>
<td>There is a diverse economy and workforce in your region</td>
</tr>
<tr>
<td>52.</td>
<td>There is equal and active community participation/inclusion by vulnerable, disadvantaged or minority groups in your community</td>
</tr>
<tr>
<td></td>
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<tr>
<td>---</td>
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</tr>
<tr>
<td>53.</td>
<td>There is a high level of dependency on natural resources in your region</td>
</tr>
<tr>
<td>54.</td>
<td>There is a high rate of local crime where you live</td>
</tr>
<tr>
<td>55.</td>
<td>There is a high turnover of the population</td>
</tr>
<tr>
<td>56.</td>
<td>There is access to critical facilities and services, such as health and medical services, hospitals, nursing homes, fire stations, police stations, ambulances, and hotels/motels, in your community</td>
</tr>
<tr>
<td>57.</td>
<td>There is emergency response planning and implementation of warning systems</td>
</tr>
<tr>
<td>58.</td>
<td>There is open communication and networking amongst members of your community</td>
</tr>
<tr>
<td>59.</td>
<td>There is public information and community participation in planning for risks and vulnerabilities</td>
</tr>
<tr>
<td>60.</td>
<td>There is risk consideration in local land use and planning</td>
</tr>
<tr>
<td>61.</td>
<td>There is training and education on risk management</td>
</tr>
<tr>
<td>62.</td>
<td>This region has a close knit community</td>
</tr>
<tr>
<td>63.</td>
<td>Unemployment in your region is low</td>
</tr>
<tr>
<td>64.</td>
<td>Waste generation and disposal is an issue for your region</td>
</tr>
<tr>
<td>65.</td>
<td>You are a member of a local community group</td>
</tr>
<tr>
<td>66.</td>
<td>You are happy with your current lifestyle and do not want it to change</td>
</tr>
<tr>
<td>67.</td>
<td>You attend community meetings</td>
</tr>
<tr>
<td>68.</td>
<td>You can ask others in the &lt;case study&gt; community for help when needed</td>
</tr>
<tr>
<td>69.</td>
<td>You could further contribute to maintaining and preserving the local environment</td>
</tr>
<tr>
<td>70.</td>
<td>You feel like a member of &lt;case study&gt; community</td>
</tr>
<tr>
<td>71.</td>
<td>You have access to credit/loans in your region</td>
</tr>
<tr>
<td>72.</td>
<td>You have access to health, housing and private sector insurance in your region</td>
</tr>
<tr>
<td>73.</td>
<td>You mainly buy your products from locals in your community</td>
</tr>
<tr>
<td>74.</td>
<td>You regularly participate in community activities</td>
</tr>
<tr>
<td>75.</td>
<td>Your community can cope with long-term economic changes</td>
</tr>
<tr>
<td>76.</td>
<td>Your community can implement new processes, technology and changes quickly</td>
</tr>
<tr>
<td>77.</td>
<td>Your community can recover from short-term disasters quickly</td>
</tr>
<tr>
<td>78.</td>
<td>Your community is able to access funds for dealing with short and long term disasters</td>
</tr>
<tr>
<td>79.</td>
<td>Your community is able to access insurance coverage for major private and public assets</td>
</tr>
<tr>
<td>80.</td>
<td>Your community is adaptable and able to adjust to changes easily</td>
</tr>
<tr>
<td>81.</td>
<td>Your community plans for disasters, loss, hazards, vulnerabilities and risk</td>
</tr>
<tr>
<td>82.</td>
<td>Your personal health is generally excellent</td>
</tr>
<tr>
<td>83.</td>
<td>There are long-term plans aimed at ensuring a diversified economy in this region</td>
</tr>
<tr>
<td>84.</td>
<td>There are long-term resource sector plans or community plans for your region that aim to manage the resources sector development</td>
</tr>
<tr>
<td>85.</td>
<td>There are long-term tourism plans or community plans for your region that aim to manage tourism development</td>
</tr>
<tr>
<td>86.</td>
<td>Your household is reliant on income from the resources sector</td>
</tr>
<tr>
<td>87.</td>
<td>Your household is reliant on income from the tourism sector</td>
</tr>
</tbody>
</table>

(Adger, 2000; Ainuddin & Routray, 2012; Bergamini et al., 2013; Buikstra et al., 2010; Burton, 2012; Cardona, 2005; Carpenter et al., 2001; Carreno, Cardona, and Barbat 2005; Cinner et al. 2009; Cutter et al., 2008a; Cutter et al., 2008b; Cutter, Burton, and Emrich 2010; Darnhofer, Fairweather, and Moller 2010; Davidson et al., 2013; Esnard, Sapat, & Mitsova, 2011; Graugaard, 2012; Hahn, Villagran de Leon, & Hidajat, 2003; Holladay & Powell, 2013; Jordan & Javernick-Will, 2013; Kulig et al., 2008; Maguire & Hagan, 2007a; Mayunga 2007; Paton et al., 2001; Peacock et al., 2010; Renschler et al., 2010; Robertson, Harding & Morrison, 1998; Ross, Cuthill, Maclean, Jansen, & Witt, 2010; Sherrieb, Norris & Galea, 2010; Twigg, 2007; van Oudenhoven, Mijatovic & Eyzaguirre, 2011; Zautra et al., 2008)
## Appendix H: Delphi studies used for indicator selection

<table>
<thead>
<tr>
<th>Author/s</th>
<th>Purpose of Study</th>
<th>Administered: Online Platform, Electronic or Hardcopy</th>
<th>Indicators Grouped in Themes/Categories</th>
<th>Measures: Likert, Binary, Ranking</th>
<th>Qualitative Component</th>
<th>No. of Rounds</th>
<th>Determining Point of Conclusion</th>
<th>No. of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campbell, Cantrill and Roberts (2000)</td>
<td>Identify prescribing indicators that have face validity for measuring quality or cost minimisation</td>
<td>Not stated</td>
<td>Yes</td>
<td>Binary and Likert (9 point)</td>
<td>Yes</td>
<td>2</td>
<td>Consensus: median of 7.8 or 9 without disagreement</td>
<td>79</td>
</tr>
<tr>
<td>Miller (2001)</td>
<td>Develop indicators that can be used by consumers to assist in their choice of Holidays</td>
<td>Not stated</td>
<td>Not Stated</td>
<td>Binary and Likert (5 point)</td>
<td>Yes</td>
<td>2</td>
<td>Stability: slight or no change in standard deviation and mean score</td>
<td>74</td>
</tr>
<tr>
<td>Snyder-Halpern (2001)</td>
<td>To achieve expert panel consensus for OITIM innovation readiness sub-dimensions and their assessment indicators</td>
<td>Hardcopy</td>
<td>Yes</td>
<td>Likert (4 point)</td>
<td>Yes</td>
<td>2</td>
<td>Not stated</td>
<td>34</td>
</tr>
<tr>
<td>Lindsay, Schull and Bronskill (2002)</td>
<td>Develop and apply a systematic approach to identify and define valid, relevant, and feasible measures of emergency department clinical performance</td>
<td>Electronic and Hardcopy</td>
<td>Yes</td>
<td>Likert (9 point)</td>
<td>No</td>
<td>3</td>
<td>Consensus: central tendency (median/mean score), quartiles &amp; frequency distributions</td>
<td>20</td>
</tr>
<tr>
<td>Beattie and Mackway-Jones (2004)</td>
<td>Identify performance indicators to reflect the quality of patient care in the emergency department</td>
<td>Electronic and Hardcopy</td>
<td>Yes</td>
<td>Likert (9 point)</td>
<td>Yes</td>
<td>3</td>
<td>Consensus: 80% or more scoring 6 or above</td>
<td>33</td>
</tr>
<tr>
<td>Brennan Ramirez, Hoehner, Brownson, Cook, Orleans, Hollander, Barker, Bors, Ewing, Killingsworth, Petersmark, Schmid and Wilkinson (2006)</td>
<td>Identify key indicators of activity-friendly communities that can assess and improve opportunities for regular physical activity</td>
<td>Not stated</td>
<td>Yes</td>
<td>Likert (5 point)</td>
<td>No</td>
<td>3</td>
<td>Consensus: mean score of at least 3.5</td>
<td>25</td>
</tr>
<tr>
<td>Choi and Sirakaya (2006)</td>
<td>Develop indicators to measure community tourism development within a sustainable framework</td>
<td>Electronic and Hardcopy</td>
<td>Yes</td>
<td>Likert (5 point)</td>
<td>Yes</td>
<td>3</td>
<td>Consensus: mean score of 3.5 or higher</td>
<td>37</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Research Question</td>
<td>Methodology</td>
<td>Consensus Measure</td>
<td>Consensus Level</td>
<td>Stability Measure</td>
<td>Consensus and Stability</td>
<td>N</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Ospina, Bond, Schull, Innes, Blitz and Rowe (2006)</td>
<td>Identify the level of consensus among a group of Canadian emergency department experts on the importance of a set of indicators to document emergency department overcrowding</td>
<td>Electronic</td>
<td>No (low number of indicators)</td>
<td>Likert (7 point)</td>
<td>Yes</td>
<td>2</td>
<td>Consensus: group median of 6</td>
<td>38</td>
</tr>
<tr>
<td>Tsaur, Lin and Lin (2006)</td>
<td>To develop a reasonable method to evaluate the sustainability of an ecotourism site</td>
<td>Not stated</td>
<td>Yes</td>
<td>Likert (5 point)</td>
<td>No</td>
<td>2</td>
<td>Stability: no significant change in mean scores</td>
<td>12</td>
</tr>
<tr>
<td>Kuo and Chen (2008)</td>
<td>Construct key performance appraisal indicators for mobility of the service industry</td>
<td>Not Stated</td>
<td>Yes</td>
<td>Likert (10 point)</td>
<td>Yes</td>
<td>2</td>
<td>Consensus: geometric mean</td>
<td>31</td>
</tr>
<tr>
<td>Cole, Donohoe and Stellefson (2013)</td>
<td>Critically examine the eDelphi technique</td>
<td>Online platform</td>
<td>N/A</td>
<td>Likert (5 point)</td>
<td>Yes</td>
<td>3</td>
<td>Consensus and Stability</td>
<td>58</td>
</tr>
<tr>
<td>Gill, Leslie, Grech and Latour (2013)</td>
<td>Elicit the opinions of national experts on critical care course graduate standards</td>
<td>Online platform</td>
<td>Not stated</td>
<td>Likert</td>
<td>Yes</td>
<td>3</td>
<td>Stability: little or no change between rounds</td>
<td>105</td>
</tr>
<tr>
<td>Jordan and Javernick-Will (2013)</td>
<td>Determine indicators of community recovery to measure predisaster resilience and post-disaster recovery</td>
<td>Not stated</td>
<td>Yes</td>
<td>Likert (5 point)</td>
<td>Yes</td>
<td>3</td>
<td>Consensus and Stability: average deviation from median fell below one point</td>
<td>11</td>
</tr>
</tbody>
</table>
Appendix I: Example invitation letter

Dear Professor X,

My name is Alexandra Bec from Southern Cross University, Australia. I am a PhD candidate, supervised by Dr Brent Moyle, Dr Char-Lee McLennan, Professor Betty Weiler and Professor Robyn Keast.

My Doctoral research explores the concept of resilience and how it can be harnessed within communities undergoing long-term structural change driven by the tourism and resource sectors. A core objective of my research is to develop a set of indicators that can be used to measure community resilience. To devise the best possible list of indicators, I am conducting a Delphi study with world renowned experts in resilience to help determine the most appropriate indicators. This Delphi study is an expert panel review of the indicators, consisting of an online survey to collect opinions and feedback, with at least one follow-up round of questioning.

Due to your work on resilience, particularly in socio-ecological and community systems (X, X and X), I would like you to participate in this Delphi Study during November 2014. Participation will involve two short survey rounds, with each survey taking approximately 10 minutes. Upon receiving the survey link, you will have two weeks to complete the survey.

All I need from you at this stage is a very brief (yes/no) email response to the following question: Would you be willing to participate in this Delphi study?

For more information about this research project, please find attached a project summary.

Thank you in advance for your consideration and for your response to this request.

Kind Regards,

Alexandra Bec

This research has been approved by the Southern Cross University Human Research Ethics Committee, approval number ECN-14-176. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee: ethics.lismore@scu.edu.au
## Appendix J: Delphi questionnaire round one results

<table>
<thead>
<tr>
<th>Deleted Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Air quality is an issue</td>
</tr>
<tr>
<td>2. Community members have access to credit/loans</td>
</tr>
<tr>
<td>3. Crime is an issue</td>
</tr>
<tr>
<td>4. Cultural activities are available</td>
</tr>
<tr>
<td>5. It is difficult to start up a new business</td>
</tr>
<tr>
<td>6. Preservation of threatened species is an issue</td>
</tr>
<tr>
<td>7. Public and private infrastructure are continuously improved</td>
</tr>
<tr>
<td>8. Recreational facilities and services are available</td>
</tr>
<tr>
<td>9. Stakeholders regularly attend community meetings</td>
</tr>
<tr>
<td>10. The community has a high number of incidents of disease or illness</td>
</tr>
<tr>
<td>11. There are non-government, non-profit and/or faith-based organisations</td>
</tr>
<tr>
<td>12. Waste generation and disposal is an issue</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators to Reassess</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Businesses buy products from local suppliers</td>
</tr>
<tr>
<td>14. Community leaders are clearly identifiable</td>
</tr>
<tr>
<td>15. Community members buy products from local suppliers</td>
</tr>
<tr>
<td>16. Community members have access to health, housing and private sector insurance</td>
</tr>
<tr>
<td>17. Climate is an issue</td>
</tr>
<tr>
<td>18. Environmental protection regulations and strategies have been implemented</td>
</tr>
<tr>
<td>19. Fresh water quality and availability is an issue</td>
</tr>
<tr>
<td>20. Hazards and disasters are recognised and planned for</td>
</tr>
<tr>
<td>21. Emergency and relief services are reliable and efficient</td>
</tr>
<tr>
<td>22. Energy use and availability is an issue</td>
</tr>
<tr>
<td>23. Different generations in the community work and learn together</td>
</tr>
<tr>
<td>24. Community members support each other</td>
</tr>
<tr>
<td>25. Community members support and participate in local activities</td>
</tr>
<tr>
<td>26. Local leaders are autonomous</td>
</tr>
<tr>
<td>27. Infrastructure and settlements within prone areas are improved or relocated</td>
</tr>
<tr>
<td>28. Households are reliant on income from the tourism sector</td>
</tr>
<tr>
<td>29. Households are reliant on income from the resources sector</td>
</tr>
<tr>
<td>30. Safety and construction standards are frequently reviewed and enforced</td>
</tr>
<tr>
<td>31. Small businesses are economically viable</td>
</tr>
<tr>
<td>32. Research is conducted to explore innovative ways to manage change</td>
</tr>
<tr>
<td>33. Preservation of marine life is an issue</td>
</tr>
<tr>
<td>34. Preservation of forest resources is an issue</td>
</tr>
<tr>
<td>35. The community can implement new processes, technology and changes quickly</td>
</tr>
<tr>
<td>36. The community develops effective partnerships based on trust</td>
</tr>
<tr>
<td>37. The long-term quality and supply of natural resources is an issue</td>
</tr>
<tr>
<td>38. The community can access insurance coverage for major public and private assets</td>
</tr>
<tr>
<td>39. The community can access funds for dealing with short-term disasters</td>
</tr>
<tr>
<td>40. There are long-term resources sector plans or community plans that aim to manage</td>
</tr>
<tr>
<td>the resources sector development</td>
</tr>
<tr>
<td>41. There are long-term tourism plans or community plans that aim to manage tourism</td>
</tr>
<tr>
<td>development</td>
</tr>
<tr>
<td>42. There are opportunities for education, training and learning</td>
</tr>
<tr>
<td>43. There are planning strategies in place for rehabilitation and reconstruction</td>
</tr>
<tr>
<td>44. Stakeholders are regularly informed about changes affecting the community</td>
</tr>
<tr>
<td>45. There are opportunities to discuss community changes in an open forum with other</td>
</tr>
<tr>
<td>stakeholders</td>
</tr>
<tr>
<td>46. There are strong business links between community organisations</td>
</tr>
<tr>
<td>47. The opinions and feedback from community members are heard by governing bodies</td>
</tr>
</tbody>
</table>
48. There is a high turnover of the population
49. There is access to critical facilities and services (health and medical services, hospitals, nursing homes, fire stations, police stations, ambulances)
50. There is emergency response planning
51. There is preparedness and training for long-term change
52. There is preparedness and training for short-term change
53. Unemployment is low
54. There is a high level of dependency on natural resources

Appropriate Indicators

55. Community members have access to important information about the community
56. Community members feel they can trust each other
57. Community members participate in risk and vulnerability planning
58. Knowledge is integrated and shared amongst community stakeholders
59. Local leaders adjust quickly to change
60. Local leaders work well together
61. Open communication and information sharing is encouraged
62. The community can adapt and adjust to changes easily
63. The community can cope with long-term economic changes
64. The community can recover from short-term disasters quickly
65. The community plans for disasters, loss, hazards, vulnerabilities and risk
66. There is a diverse economy and workforce
67. There are long-term plans aimed at ensuring a diversified economy
68. There is an adequate assessment of risk within land use and planning
Appendix K: Resident survey

1. What is your postcode?

2. Please specify the region which you are a part of:

3. How long have you lived in the region?
   - Less than 1 year
   - 1-2 years
   - 3-5 years
   - 6-10 years
   - 11-20 years
   - 21-30 years
   - More than 30 years
   - Don’t know

4. Using the statement below, please rate how prominent change is in your life:

   Change (either positive or negative) is very evident in my life:

   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree
   - Don’t Know
   - Not Applicable

   For the following questions, please mark the circle closest to your view.

5. How do you perceive change in your region?

   An opportunity
   - Small
   - Positive
   - Adaptive
   - Insignificant
   - Passive
   - Unpleasant
   - Gloomy
   - Growing

   A threat
   - Large
   - Negative
   - Inflexible
   - Overwhelming
   - Forceful
   - Pleasant
   - Exciting
   - Declining

Please turn over
6. How do you perceive change driven by the resources sector in your region?

<table>
<thead>
<tr>
<th>An opportunity</th>
<th>A threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Adaptive</td>
<td>Inflexible</td>
</tr>
<tr>
<td>Insignificant</td>
<td>Overwhelming</td>
</tr>
<tr>
<td>Passive</td>
<td>Forceful</td>
</tr>
<tr>
<td>Unpleasant</td>
<td>Pleasant</td>
</tr>
<tr>
<td>Gloomy</td>
<td>Exciting</td>
</tr>
<tr>
<td>Growing</td>
<td>Declining</td>
</tr>
</tbody>
</table>

7. How do you perceive change driven by tourism in your region?

<table>
<thead>
<tr>
<th>An opportunity</th>
<th>A threat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Adaptive</td>
<td>Inflexible</td>
</tr>
<tr>
<td>Insignificant</td>
<td>Overwhelming</td>
</tr>
<tr>
<td>Passive</td>
<td>Forceful</td>
</tr>
<tr>
<td>Unpleasant</td>
<td>Pleasant</td>
</tr>
<tr>
<td>Gloomy</td>
<td>Exciting</td>
</tr>
<tr>
<td>Growing</td>
<td>Declining</td>
</tr>
</tbody>
</table>

8. Please rate the following statements about your region:

<table>
<thead>
<tr>
<th>The region...</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Don’t Know</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can access funds for dealing with short-term disasters</td>
<td>○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○</td>
<td></td>
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<td></td>
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<tr>
<td>Can access insurance coverage for major public and private assets</td>
<td>○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Can adapt and adjust to changes easily</td>
<td>○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○</td>
<td></td>
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</tr>
<tr>
<td>Can cope with long-term economic changes</td>
<td>○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○</td>
<td></td>
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</tr>
<tr>
<td>Can recover from short-term disasters quickly</td>
<td>○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○</td>
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</tr>
<tr>
<td>Conducts research to explore innovative ways to manage change</td>
<td>○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The region...</td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td>Don’t Know</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Has a diverse economy and workforce</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<tr>
<td>Has a high level of dependency on natural resources</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<tr>
<td>Has a high turnover of the population</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<tr>
<td>Has access to health, housing and private sector insurance</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Has leaders who adjust quickly to change</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Has strong leaders who work well together</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Has long-term plans aimed at ensuring a diversified economy</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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</tr>
<tr>
<td>Has long-term plans that aim to manage the resources sector development</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Has long-term plans that aim to manage tourism development</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Has opportunities for education, training and learning</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Has opportunities to discuss and share information about long-term changes</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Integrates and shares knowledge amongst stakeholders</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Is made up of people who support each other</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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</tr>
<tr>
<td>Is made up of people who trust each other</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Is regularly informed about changes affecting the community</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Is reliant on income from the resources sector</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<tr>
<td>Is reliant on incomes from the tourism sector</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Participates in risk and vulnerability planning</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Plans for disasters, loss, hazards, vulnerabilities and risk</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Prepares and trains for long-term change</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
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<td></td>
</tr>
<tr>
<td>Prepares and trains for short-term change</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Works well together across internal and external bodies</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Please turn over
10. Considering structural change within the region, can you identify any community responses that can be implemented to manage this change?


I would now like to know more about YOU:

11. To what extent do you agree or disagree with the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Don't Know</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am an optimistic person</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>I am a nervous person</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>I get stressed easily</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>I often feel depressed</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>I experience frequent mood swings</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>I am capable of coping with most of my problems</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>Overall, I am happy with my lifestyle</td>
<td>○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○</td>
</tr>
</tbody>
</table>

12. Are you currently employed?

○ Yes ○ No (proceed to question 14)

13. Which sector do you work in? (Please select all that apply)

- [ ] Tourism
- [ ] Resources sector
- [ ] Agriculture
- [ ] Retail/service sector
- [ ] Education
- [ ] Transport
- [ ] Manufacturing
- [ ] Construction
- [ ] Technology
- [ ] Health Care
- [ ] Other (please specify)
14. If you are not currently employed in the tourism or resources sector, are you involved in or somehow connected to these sectors? Please select all that apply and specify your relationship with this sector (e.g. your partner is employed or you have previously been employed in this sector)

- Tourism
- Resources sector
- Not connected to either sector

15. What is your gender?
- Male
- Female

16. Which age range do you fall within?
- 15–19 years
- 20–29 years
- 30–39 years
- 40–49 years
- 50–59 years
- 60–69 years
- 70 or more years

17. What is your highest level of education?
- Primary school
- Secondary school
- University degree
- Postgraduate degree
- Trade/vocational training
- Other (please specify)

18. Which lifestyle group best describes you?
- Single, no children
- Couple, no children
- Young family (youngest child less than 6 years)
- Middle family (children 6–15 years)
- Mature family (children over 15 years)
- Mature couple, no children at home
- Mature single, no children at home

19. Are you a member of a community group? (e.g. an organised social group)
- Yes (please provide details)
- No

Please turn over
**20** Were you born in Australia?
- Yes
- No (please specify)

**21** Do you identify as an Aboriginal or Torres Strait Islander?
- Yes
- No

**22** Do you own your own home?
- Yes
- No

**23** What is your approximate annual gross household income (i.e. before tax)?
- Under $40,000
- $40,000–$69,999
- $70,000–$99,999
- $100,000–$149,999
- $150,000–$199,999
- Over $200,000
- Don’t know/Prefer not to answer

**24** What do you consider to be unique about your region?
- 
- 
- 
- 
- 
- 

**25** Are there any other comments or concerns about your region that you would like to mention?
- 
- 
- 
- 
- 
- 

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**Thank you for participating in the survey!**

Would you like a summary of the results of this research?
- Yes (please provide your email or home address so the results can be sent)
- No
Appendix L: Survey invitation letter

Have YOUR say about the resilience of your region!

Dear resident,

My name is Alexandra Bec, a PhD candidate at Southern Cross University. This letter invites your participation in a survey for the research project: *Harnessing Resilience for Tourism and Resources-based Communities*. This is part of a PhD degree.

For this project, my aim is to examine community resilience to long-term structural change driven by the tourism and resource sectors. Resilience is the ability to manage change within the region. Being resilient means the community and its members will not be dictated by the impacts of change. Instead, the community is able to address and manage different forms of change to achieve desirable outcomes for the community. The tourism and resource sectors within Mackay and the Whitsundays are changing. This presents a need for resilience to be examined within these regions.

To achieve this aim, it is important that I explore and understand resident’s opinions about change in your region. Your opinion on change and resilience is important to ensure strategies for building or maintaining resilience are appropriate and reflect the values, opinions and goals of community members. **You must be at least 18 years of age to complete the survey.**

All information provided is confidential. To ensure that privacy is maintained, I will not use any identifying data in any published documents. Returning the completed questionnaire means that you agree to participate in the research and consent to the research data gathered for this study being published.

I am aware that some questions in this survey may be of a personal or sensitive nature. This information is being collected for the purpose of identifying different community groups, to ensure all community groups are represented in this research.

Please complete the questionnaire and send back in the return mail envelope provided. Alternatively, you can complete the survey online at: [https://scuau.qualtrics.com/SE/?SID=SV_1YbkftXVTMfTyGp](https://scuau.qualtrics.com/SE/?SID=SV_1YbkftXVTMfTyGp)

I appreciate you taking the time to complete this questionnaire.

Kind Regards,

**Alexandra Bec**  
PhD Candidate  
Southern Cross University  
Gold Coast Campus  
Locked Mail Bag 4, Coolangatta  
QLD 4225, Australia  
E: abec10@scu.edu.au  
M: +61 411642615

This research has been approved by the Southern Cross University Human Research Ethics Committee, approval number ECN-14-260. If you have any complaints or reservations about the ethical conduct of this research, you may contact the Committee: ethics.lismore@scu.edu.au