An Exploration of the Influence of Local Knowledge on Industry Sustainability towards Regional Sustainable Development: A Case Study of the Fishing Industry in the Eyre Peninsula Region

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Table of Contents

List of Figures

List of Tables

Abstract

This thesis explores how local knowledge influences industry sustainability towards regional sustainable development. The rationale behind this research begins with the observation that despite the plethora of studies on knowledge management, our understanding of how it influences the longevity of an industry in a way that supports sustainable development of regions is inadequate in the management literature. This research explores these issues by investigating the fishing industry in the Eyre Peninsula region. This investigation is worthy because there is currently no documentation of how knowledge affects sustainability of this industry in a way that supports social, economic and environmental wellbeing of the region. The purpose of this research is to provide in-depth understanding of how knowledge embedded and situated within industry influences its sustainability and supports regional sustainable development. This was achieved by using interpretive qualitative case study design, and embedded analysis of 54 interviews with main actors across the fishing industry.

The findings revealed that the kinds of local knowledge that influence industry sustainability are generational, institutional, collective, professional, scientific, technological and industrial. This knowledge is acquired through multiple learning processes such as on-the-job learning, experience, experiments, formal education, social networks and observations. Knowledge was largely contributed through social processes such as industry associations, meetings and discussions, conferences, seminars and workshops, networks and cross-fertilisation, social interaction and relationships, cooperation and collaboration and informal conversations. The findings demonstrated that local knowledge affects industry sustainability by influencing strategic priorities, organisational actions and commercial activities. The findings

showed that the sustainability of the industry can contribute to environmental integrity, social equity and economic prosperity of the Eyre Peninsula region.

This study makes a theoretical contribution to existing literature by developing a local knowledge-based view of industry sustainability. In doing so this has linked knowledge management and industry sustainability literature. This study has advanced a social perspective on industry sustainability by showing that pathways to industry sustainability are a socio-dynamic process of knowledge acquisition, contribution and application. The study has provided an institutional perspective on industry sustainability by illustrating that different institutions affect industry sustainability. The study has developed an industry-based view of regional sustainability by demonstrating that a sustainable industry can sustain a region.

The findings of this study have practical implications for industry managers and policymakers. They suggest that industry managers could advance knowledge management activities by improving the quality of social processes. Policymakers could assess how normative, regulative and cognitive aspects of their institutional arrangements influence sustainability of the fishing industry. Though these institutions and their arrangements constitute an important source of knowledge and exert pressure, their impacts on sustaining the long-term future of the region and its fishing industry must be properly gauged.

Declaration of Originality

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

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Definitions

Knowledge	Defined as a resource with inherent capabilities, which has tacit and explicit influence on firms and industries and their related regions and communities.
Knowledge Acquisition	Defined as the different learning processes and activities that generate new knowledge and information.
Knowledge Contribution	Involves the process of sharing and combining knowledge towards individual and collective benefit.
Local Knowledge	Defined as a mix of historic and modern skills, ideas, experience, expertise, and information, which are deeply rooted in a specific local industry that is situated within a region or a community.
Industry Sustainability	Defined as the ability of an industry as an organisation of firms to sustain its long-term future by integrating environmental integrity, economic prosperity and social equity in a way that supports its operating environment.
Regional Sustainable Development	Defined as the ability of a region to attain an acceptable level of social, economic and environmental wellbeing for present and future generations.
Sustainability	Defined as the continuous existence of an ongoing system, with a desirable long-term future state for other related systems, that is socially, economically and environmentally sustainable.
Sustainable Development	Defined as a form of development that provides an acceptable level of social, economic and environmental wellbeing for present and future generations.

Chapter 1. Introduction

1.1. Background

This thesis explores how local knowledge influences industry sustainability towards regional sustainable development. The thesis argues that sustainability may be inconceivable without leveraging a mix of historic and modern skills, ideas, experience, expertise and information, which are deeply rooted in local industries – local knowledge. Sustainability, in this research, means the continuous existence of an ongoing system, with a desirable long-term future state for other related systems that is socially, economically and environmentally sustainable. Knowledge is described here as a resource with inherent capabilities, which has tacit and explicit influence on a firm or industry, and its related regions and communities.

Knowledge has become crucial to employee and organisational productivity (Drucker 1999) and enhances performance in ever-changing and competitive business environments (Grant 1996a). Thus combining, integrating and recombining knowledge is the source of dynamic capability (Teece & Pisano 1994). Knowledge determines the actions that underpin every intention and activity (Pfeffer, Jeffrey & Sutton 1999). It is a source of gained and sustained competitiveness (Spender 1994) and key to effective competition (Demarest 1997). The ways in which firms and industries create new services, products and processes are influenced by knowledge (Nonaka, Toyama & Konno 2000). And best practice is informed by knowledge (Styhre 2003). The micro foundation of every sustained firm and industry performance is built on knowledge (Teece 2007). These observations from the literature demonstrate that knowledge drives

continuous transformation within firms and industries (Adams, Brusoni & Malerba 2011). This is simply because the survival and evolution of business organisations as social, economic and environmental systems are unlikely without knowledge (Jorna, Hadders & Faber 2009).

In this thesis, industry sustainability is defined as the ability of an industry as an organisation of firms to sustain its long-term future by integrating environmental integrity, economic prosperity and social equity in a way that supports its operating environments. Although we know that in the twenty-first century knowledge is indispensable for sustained competitiveness of firms, exactly how such knowledge influences sustainability of industries has been a gap in our understanding. Thus, how local knowledge influences industry sustainability remains an overlooked research area.

Nobody wants industries and firms to collapse, not even academics, policymakers or citizens who disagree with their level of contribution and responsibility, as our very future depends on their longevity, combined with a capacity to nurture the complex social, natural and economic systems in which they are embedded. Sustainability is a pertinent subject to explore because industry collapse affects everyone, across all regions. The ability of an industry to sustain itself for the long-term is not only a voluntary commitment, but represents the hopes and expectations of a region, as its future may depend on sustainable development (Potts 2010).

In this thesis, regional sustainable development, also known as regional sustainability, is operationalised as the ability of a region to attain an acceptable level of social, economic and environmental wellbeing for present and future generations. Regions are expected to support the social, economic and environmental wellbeing of people living in local communities (Nijkamp, Laschuit & Soeteman 1992). Industries are also

expected to contribute to the global aspiration of meeting social, economic and environmental needs of the current and future generations (WCED 1987). Nevertheless, an understanding of exactly how industries leverage their local knowledge in a way that supports sustainable regional development has been elusive and largely undocumented. This is partly because sustainable development research at the regional level has received limited attention (McGrath, Armstrong & Marinova 2004), even though local and regional communities continue to depend on industries for their livelihoods (Wallner 1999).

The rationale behind this research is the realisation that despite the plethora of studies, our understanding of knowledge management and how it influences the ability of an industry to sustain its long-term future by integrating environmental integrity, economic prosperity and social equity is woefully limited. This thesis seeks to address this gap in the literature by addressing the research problem: how local knowledge influences industry sustainability towards regional sustainable development. The purpose of this research is to understand how knowledge embedded and situated within a local industry influences and sustains regional development.

This thesis focuses on the fishing industry in the Eyre Peninsula region as an appropriate research context, providing empirical data that explores the research problem. The fishing industry is an interesting case because it is an information-rich context with diverse actors and sectors with many years of fishing experience, skills and expertise. The Eyre Peninsula region is locally, nationally and internationally recognised as the seafood frontier of Australia (RDA 2016). The region and the industry are interconnected social phenomena. This connection is essential to the investigation and understanding of how knowledge embedded within fishing sectors affects

sustainability of the fishing industry in a way that supports the sustainable development of Eyre Peninsula as a region.

1.2. Significance of the Research Problem

1.2.1 Local Knowledge

In this research, local knowledge is defined as a mix of historic and modern skills, ideas, experience, expertise and information, which are deeply rooted in a specific local industry that is situated within a region or a community. Studies have suggested that local knowledge constitutes skills, experiences and expertise embedded within a specific industry (Almeida & Kogut 1999; Ibrahim, Fallah & Reilly 2009). Local knowledge has disparate meanings across different fields of study from anthropological (Gertz 1983; Cruikshank 2014; Sillitoe 1998), sociological (Kloppenburg 1991; Turnbull 2003), geographical (Malecki 2000a; Malmberg et al. 1996), organisational (Diez-Vial & Montoro-Sanchez 2014; Yanow 2004) and fishery (Johannes, Freeman & Hamilton 2000; Mackinson & Nottestad 1998) perspectives. The point of convergence in these fields of study is that local knowledge is embedded and situated within a specific place or context. This knowledge could be located in a firm, an industry, a community or in an organisational context (Yanow 2004). It has even been argued that all knowledge is local because it can only be understood within a specific context (Gertz 1983). Following this line of thinking, local knowledge can also be described as a knowledge resource, deeply rooted in a place-based industry or firm within a region or community.

Managing and understanding knowledge in organisations have been the focus of bourgeoning research for decades. There is an abundance of scholarly works on

knowledge which have broadened our understanding of how organisations acquire, develop, share, contribute, integrate and apply knowledge (Grant 1996a; Nonaka & Takeuchi 1995; von Krogh, Nonaka & Aben 2001). We know there are different perspectives on knowledge and that a unitary view of knowledge is unavailable in the literature (Earl 2001; Nonaka & Peltokorpi 2006). We also know that different kinds of knowledge have been identified and that each is unique (Blackler 1995; Lam 2000; Nonaka 1994). Over the years, scholars have also explored different ways in which knowledge can be acquired (Inkpen 1998, 2000). Extensive research has been done on how organisations can share and contribute knowledge (Wasko & Faraj 2000; Ye, Feng & Choi 2015). The literature on the strategic value of knowledge in organisations is flourishing, and predominantly recognised as an indispensable resource for gaining and sustaining competitive advantage in firms and industries (Gold, Malhotra & Segars 2001; Grant 1996b). All these perspectives contribute to an understanding of the inherent value of knowledge situated within the fishing industry.

The actors in this industry have years of experience, skills and expertise (Mackinson & Nottestad 1998). Nevertheless, and despite the growing recognition that knowledge is an invaluable resource for industries and firms, the management of knowledge within the fishing industry is disappointing. This is attributed to the fact that the value of this knowledge has been questioned in many regions (Mackinson & Nottestad 1998; Neis 1992). Most fisheries wittingly or unwittingly ignore the value of their knowledge and they eventually collapse (Johannes et al. 2000). This suggests that sustainability of the fishing industry in the Eyre Peninsula region may depend on how well sectors and actors leverage their local knowledge.

Despite the skills, expertise and experience developed within the fishing industry in Australia, and because of its continuous existence since the 1870s (Nell 2001) to date,

exactly what kinds of knowledge, how it is acquired, its contribution, and how it influences sustainability remain largely unknown. Our understanding of the connection between knowledge classification, acquisition, contribution and application and industry sustainability for this study is limited to the fishing industry in the Eyre Peninsula region. This research seeks to address that limitation and contribute to our understanding of how the knowledge embedded within the Eyre Peninsula's fishing industry influences its sustainability.

1.2.2 Industry Sustainability

In this thesis, industry sustainability refers to the ability of an industry, as an organisation of firms, to sustain its long-term future by integrating environmental integrity, economic prosperity and social equity in a way that supports its operating environments. The notion of industry sustainability grew out of societal concerns for industries to adopt strategies and practices that are socially, economically and environmentally sustainable (Azapagic & Perdan 2000). Scholars are still looking for ways to understand how industries can fully commit to their obligations towards sustainability. Sustainable businesses, corporations and industries are common notions in the current literature.

In this research, sustainability refers to the continuous existence of an ongoing system with a desirable long-term future state that is socially, economically and environmentally sustainable for other related systems. The term sustainable development or sustainability in the literature is largely concerned with the environmental, economic and social impacts of businesses, corporations and industries (Amini & Bienstock 2014; Hahn et al. 2017). What is currently missing in the literature

is an exploration of the relationship between sustainable development and industry sustainability. It is essential to address this gap because industry sustainability and sustainable development may be assumed to be positively related. Though this view has gained much currency (Russo 2003; Starik & Rands, 1995), it should be noted that pursuing sustainable development may sometimes affect the long-term future of an industry. The current investigation aims to improve our understanding of how the commitment to sustainable development leads to industry sustainability.

Following on from the realisation that sustainable development is not an end in itself (Hopwood, Mellor & O'Brien 2005); several attempts have been made to understand how businesses, corporations and industries can pursue sustainability in a way that supports this global development agenda. The literature expresses divergent views. For example, there are scholars who believe that corporations and businesses can be sustained by ethics (Barkemeyer et al. 2014; Takala & Pallab 2000). Others argue that corporations can be sustainable by being strategic in their approach towards sustainability (Ferraro, Pfeffer & Sutton 2005; Margolis & Walsh 2003). Some scholars have proposed that businesses must consider the three elements of sustainability as integrated, interconnected and interrelated (Baumgartner 2014; Gladwin, Kennelly & Krause 1995). A current argument in the literature suggests that knowledge is important for sustainability management in businesses (Hörisch, Johnson & Schaltegger 2015; Pogutz & Winn 2016). Building on these studies, the underlying argument in this thesis is that the ability of an industry, as a collection of businesses, to flourish sustainably is tied to the harnessing and leveraging of local knowledge. Businesses cannot achieve sustainability unless their behaviours, actions, decisions and solutions are based on knowledge (Faber et al. 2010; Robinson et al. 2006).

Exploring industry sustainability is essential within the fishing industry. Current debate on this issue is escalating. Conclusions regarding the unsustainability of global fisheries are clear enough and from the perspective of ecological conservation, sustainability of global fisheries is threatened (Pauly et al. 2002; Pauly, Watson & Alder 2005). Reports have also cautioned that some Australian fisheries are suffering from constant fluctuation in fish stocks and economic performance, which may undermine their future (Flood et al. 2014; Skirtun et al. 2012). Although reports on the inevitable decline of fisheries have been challenged (Beddington, Agnew & Clark 2007); to address its long-term future, several calls have been made to explore critical issues, including local knowledge (Johannes, Freeman & Hamilton 2000), social capital (Gutierrez, Hilborn & Defeo 2011), co-management (Pomeroy & Williams 1994), institutional frameworks (Hilborn, Orensanz & Parma 2005) and sustainability consciousness (Pauly & Watson 2003). Given that lack of knowledge (and incomplete knowledge) poses a real problem for sustainability transitions (Grunwald 2007) and further explains why fisheries often collapse (Johannes et al. 2000); this thesis explores how local knowledge influences industry sustainability of the fishing industry in the Eyre Peninsula region.

1.2.3 Regional Sustainable Development

Regional sustainable development is defined here as the ability of a region to attain an acceptable level of social, economic and environmental wellbeing for present and future generations. For the sake of conceptual clarity, regional sustainable development and regional sustainability are used interchangeably. It has been shown that within the context of appropriate institutional policies, industries can contribute to regional development (Markusen 1994a, 2003). Although industries seem to adopt new relationships with the ecosystems in which they are embedded to make a significant

contribution to regional socioeconomic development (Markusen 1994b; Potts 2010), the contribution made by industries to sustainable development has been disputed for decades (McManus 2008).

Industries and regions may share the same geographical boundaries (Markusen 1994b), but the literature exhibits mixed views on whether they share similar development trajectories. There are those who are unsure about the contribution of industries towards regional development because they do more harm than good (Gray, Golob & Markusen 1996; Wixe & Andersson 2017). Polèse and Shearmur (2006) believe that, without industries, regions are nothing but empty spaces which are bound to decline over time.

The pursuit of economic prosperity, social equity and environmental integrity by industries can make a significant contribution to regional sustainable development. Although this is obvious and has become a societal expectation for decades, exactly how knowledge sustains industries in a way that supports the sustainable development of their regions is under-researched. This research seeks to demonstrate the interface between industry sustainability and regional sustainable development by using evidence from the fishing industry on Eyre Peninsula.

Regional Australia is being confronted by two major issues – social inequity and regional sustainability (Eversole 2015). Eyre Peninsula has some fishing sectors whose contribution to social wellbeing cannot be discounted. For example, the social impacts of the oyster sector on rural and scattered local economies are clear (Pierce & Robinson 2013). The region and the state receive social benefits including quality of life from its fishing industry (Pickworth, Schirmer & Cassey 2006). The aquaculture sector of this industry promises enormous economic returns and gentle environmental impacts (EconSearch 2009). Despite these benefits, there is still a lack of empirical evidence

and qualitative analysis regarding how whole of industry sustainability and not just individual sectors in the region contribute to sustainable development (Mazur & Curtis 2006).

1.3. Research Questions and Objectives

The overall objective of this thesis is to explore how local knowledge influences sustainability of an industry in a way that supports sustainable development of a region. To address the research problem and contribute to the existing body of knowledge, this study is guided by five research questions which arise out of the research issues discussed in the previous section. Key issues explored in each research question will guide the literature review.

1.3.1 Research Question 1

What kinds of local knowledge influence sustainability of the fishing industry?

The fishing industry has multiple sectors with diverse experts and practitioners. These industry sectors have a remarkably long history because they have existed since the 1870s (Nell 2001). It seems reasonable to expect that these many years of fishing might have generated valuable knowledge evident in the different kinds of skills, expertise and experience of practitioners and experts. Each sector has its own specialists with varied skills, experience and expertise that generate different kinds of knowledge (Grant & Berkes 2007), but exactly what knowledge influences industry sustainability remains undocumented. Although several scholarly works have shown that there are different taxonomies and classifications of organisational knowledge (Blackler 1995; Lam 2000; Nonaka 1994), there is still a gap in our understanding of which types of knowledge sustain the long-term future of an industry.

1.3.2 Research Question 2

How is the knowledge acquired that contributes to sustainability of the fishing industry?

In this study, knowledge acquisition is defined as learning processes and activities that generate new knowledge and information. A great deal of research has been conducted on knowledge acquisition (Inkpen 1998; Ryu et al. 2005; Yli-Renko, Autio & Sapienza 2001). These studies have shown different ways through which organisations can obtain and access knowledge (Inkpen 1998, 2000). Thus, we seem to know a lot about how knowledge, in general, is acquired in organisations, but there is still a gap in our understanding of how the knowledge that influences industry sustainability is acquired. Although the fisheries experts may generate different categories of knowledge that are essential for locating and catching fish (Grant & Berkes 2007); there is currently no study that examines how the knowledge that influences sustainability of the fishing industry in the Eyre Peninsula region is acquired.

1.3.3 Research Question 3

How is the knowledge contributed towards sustainability of the fishery industry?

In this study, knowledge contribution involves the process of sharing and combining knowledge for individual and collective benefit. The diverse sectors within the fishing industry in the Eyre Peninsula region have different knowledge backgrounds due to their different fishing specialisations (e.g. finfish, crustaceans and molluscs). Within each specialisation there are different fishing groups such as Southern Bluefin Tuna, Rock Lobster, and Oyster, to name a few. This industry has many specialised actors along its value chain, because within each of these specialised sectors are also different value chain actors with different knowledge foundations. Although fisheries are imbued with knowledge generated by experts (Grant & Berkes 2007), exactly how these experts contribute knowledge to sustainability of the industry is largely undocumented. Even

though the literature suggests that organisations too have different ways of sharing and contributing their knowledge (Wasko & Faraj 2000; Ye, Feng & Choi 2015), exactly how the knowledge that influences industry sustainability is contributed is also less understood. This means that our understanding of how a range of value chain actors from different sectors contribute knowledge towards industry sustainability is limited.

1.3.4 Research Question 4

In what ways does the knowledge influence sustainability of the fishing industry? Sustainability, in this thesis, means the continuous existence of an ongoing system, with a desirable long-term future for other related systems that are socially, economically and environmentally sustainable. While the unsustainability of global fisheries may, perhaps, be blown out of proportion (Beddington, Agnew & Clark 2007), the industry is still considered ecologically unsustainable (Pauly et al. 2002; Pauly, Watson & Alder 2005). Although local knowledge has been proposed as one of the possible remedies to prevent the fishing industry from collapsing (Johannes, Freeman & Hamilton 2000), exactly how this knowledge influences industry sustainability remains under-researched. The current literature is replete with research on the strategic value of knowledge including developing industry and firm capabilities, and achieving sustainable competitiveness and enterprise performance (Gold, Malhotra & Segars 2001; Grant 1996b; Teece 2000). Despite the inherent value of knowledge to organisations, our understanding of how knowledge affects industry sustainability is limited. And while experts may cultivate different knowledge for locating and catching fish and improving performance (Grant & Berkes 2007; Mackinson 2001), exactly how this knowledge nurtures the sustainability of the industry is undocumented.

1.3.5 Research Question 5

How does the sustainability of the fishing industry influence sustainable development in the Eyre Peninsula region? Sustainable development is operationalised here as a form of development that provides an acceptable level of social, economic and environmental wellbeing for present and future generations. Regional Australia is confronted with a range of social, economic and environmental issues (Eversole 2015). It is also evident that fishing sectors in the Eyre Peninsula region support local and regional communities through their socioeconomic impacts (EconSearch 2009). But there remains a lack of empirical evidence and qualitative analysis about how the whole fishing industry contributes, over time, to sustainable development in the Eyre Peninsula region (Mazur & Curtis 2006). More noteworthy is lack of clarity about the interface between regions and industries in relation to sustainable development because research suggests mixed feelings (Gray, Golob & Markusen 1996; Wixe & Andersson 2017).

1.4. Theoretical Background

1.4.1 Social Capital Theory

This research draws, in part, on social capital, as theorised by Nahapiet and Ghoshal (1998), to explain how knowledge is acquired and contributes to industry sustainability. Social capital is defined here as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal 1998, p.243). This theory has increasingly received attention in the study of knowledge creation, acquisition, contribution and sharing (Nahapiet & Ghoshal 1998; Wasko & Faraj 2005; Yli-Renko, Autio & Sapienza 2001). The underlying assumption of social capital is that

networks of relationships constitute a valuable resource for social actions (Bourdieu 1986). This theory suggests that human capital, including knowledge, is the most valued resource embedded within social networks of relationships, interactions and connections (Coleman 1988). Here, social capital is considered a useful theoretical lens because knowledge is an outcome of social processes and practices (Berger, Luckmann & Zifonun 2002; Brown & Duguid 2001; Cunliffe 2008). More importantly, social capital is regarded as an essential factor in understanding the fishery's success, because industry actors can tap valuable knowledge resources embedded within social relations and networks (Gutierrez, Hilborn & Defeo 2011).

Despite its popularity in understanding knowledge activities and processes, social capital theory has been largely applied at inter-firm level (Inkpen & Tsang 2005), to individuals (McFadyen & Cannella 2004), regional community (Putnam, Leonardi & Nanetti 1994), nationally and globally (Fukuyama 1995), to networks (Burt 1997) and to organisational activities (Nahapiet & Ghoshal 1998). However, social capital has received less attention at industry level (Wouter & Elfring 2008; Walker, Kogut & Shan 1997). This gap in the research provides an opportunity to consider social capital in order to understand how social processes within the fishing industry foster knowledge acquisition and contribute to sustainability.

Nahapiet and Ghoshal (1998) proposed that social capital has structural, relational and cognitive dimensions. Structural social capital reveals that knowledge is created and accessed through patterns of interaction and connection between actors within social networks (Nahapiet & Ghoshal 1998). Such structural connections occur in constant interactions, in networks and in cooperation within social structures (Tsai & Ghoshal 1998). This structural element of social capital shows that through social networks actors can interact, connect and access valuable knowledge and information (McFadyen

& Cannella 2004). Eyre Peninsula's fishing industry has different structures and networks. Structural social capital is useful because it provides an understanding of how social networks influence how different actors and industry sectors acquire and contribute knowledge towards sustainability of the fishing industry.

Relational social capital indicates that knowledge is created and accessed through personal relationships and friendships developed through trust, norms, obligations and identification (Nahapiet & Ghoshal 1998). This indicates that the strength of any interpersonal relation has a stronger impact on knowledge processes than the number of relations (McFadyen & Cannella 2004). This suggests that the social processes that foster knowledge acquisition and contribution depend on structural connections and interpersonal relationships strengthened by trust and trustworthiness of the actors involved (Gambetta 2000; Leana & Van Buren 1999). Such structural and relational practices based on trust are the basis for sharing and acquiring complex and tacit knowledge (Chowdhury 2005; Levin et al. 2004). As a multi-industry with diverse structures, this fishing industry has multiple business actors. There may be interpersonal relationships and friendships developed over time involving industry interactions and transactions. The relational social capital is also essential to investigate how these interpersonal relationships enable different sectors and actors to share, acquire and combine their knowledge towards sustainability of the fishing industry.

Cognitive social capital empathises that knowledge is created and obtained through shared codes, language and narratives (Nahapiet & Ghoshal 1998). This suggests that common goals are important in knowledge processes because they create a wider sense of community within social structures and networks (Kwon & Adler 2014). Also, common values and goals are central to cognitive social capital, which are vital to developing trust that enable actors to acquire, access and share knowledge (Tsai &

Ghoshal 1998). These shared goals and values create a collective interest and understanding among different actors (Wasko & Faraj 2005). The long-term existence of the fishing industry means that its sectors and actors have developed shared codes, languages and narratives such as accumulated stories, histories and routines from their lived experiences. These shared narratives among fishing sectors develop shared agendas and interests (van Vliet 1998). Such capital may help explain how a sense of collective interest influences actors and sectors to acquire, contribute and integrate their knowledge towards sustainability of the fishing industry.

1.4.2 New Institutional Theory

This research further draws on the sociological perspective of new institutionalism to better understand the role of institutions in sustaining the fishing industry on the Eyre Peninsula. In this thesis, institutions refer to regulative, normative and cultural-cognitive structures that provide stability and meaningful social life (Scott 2013). The new institutionalists have always supported the sociological view of knowledge construction within institutions (Berger & Luckmann 1966; Mizruchi & Fein 1999). The sociological perspective is essential because it permits a qualitative inquiry that seeks to understand the social construction of reality and meaning. This research seeks to understand how institutions and their pressures and structures affect sustainability of Eyre Peninsula's fishing industry.

The main assumption behind new institutionalism is that paramount social structures shape how organisations and their processes tend to acquire meaning and achieve stability over time (DiMaggio & Powell 1983; Scott 1995b). The theory further suggests that the underlying premises of rational behaviours and actions are socially

constructed and therefore subject to change (Meyer & Rowan 1977; Meyer & Scott 1983). New institutionalism explains that rational actions are also cultural because they are produced through interaction and are not directly influenced by structural conditions (DiMaggio & Powell 1983). This suggests that what happens within institutions matters more than structure. New institutionalism emphasises that institutional forces are useful to understand the connections between institutional processes and organisations (Scott 2008). This means that organisations in their attempt to achieve continuity have to deal with different pressures through their interactions with others within the same institutional environment (Meyer & Rowan 1977; Zucker 1977).

There are three main reasons why this research adopts the sociological underpinnings of new institutionalism in exploring how sustainability of the fishing industry is either facilitated or inhibited by its institutions, and related pressures and structures. First, institutions are essential to protect natural resources and the environments which the different ecosystems depend on (Hoffman 1999). Worldwide fisheries are the most strictly regulated industry because their continuous existence depends on the exploration and exploitation of marine-based resources (Garcia et al. 1999; Garcia & Newton 1994). This suggests that the future of fisheries and marine resources depends on institutions (Garcia & Grainger 2005). Despite the many institutions that exist within the sector, exactly how they influence sustainability of the fishing industry on Eyre Peninsula is relatively unknown.

Second, it is well established that organisations evolve over time in a way that affects their continuity and stability (Suddaby 2010; Suddaby & Greenwood 2009). Thus, institutions that regulate the fishing industry continue to evolve to ensure both the industry and the ecosystem support each other. For example, the fishing industry has undergone and continues to undergo institutional change which produces enormous

pressure (Grafton et al. 2008). This transformation is expected to make them sustainable in the true sense of ecological sustainability (Pauly, Watson & Alder 2005). Exactly how emerging pressures from institutional change affect sustainability of the fishing industry over time has received limited empirical attention, particularly in the Eyre Peninsula region.

Third, organisational stability and continuity is directly and indirectly influenced by social structures which is needed to regulate and develop rational behaviours and actions (Scott 2013). The interactions and interconnections within social structures are considered essential for creating, sharing and developing knowledge (Nahapiet & Ghoshal 1998). This explains the sociology of knowledge construction within institutions (Berger & Luckmann 1966; Mizruchi & Fein 1999). Rational behaviours and actions as advocated by new institutionalists (Meyer & Rowan 1977; Meyer & Scott 1983) are fundamentally shaped by knowledge (Faber et al. 2010). This suggests that institutions are social structures and networks which produce and are embedded with knowledge (Patrucco 2003). Despite different institutional structures (Garcia et al. 1999; Garcia & Newton 1994), exactly how they support sustainability of the fishing industry, particularly in the Eyre Peninsula region, is largely undocumented. This research consequently seeks to provide an industry perspective on current conversations that seek to explain why and how organisations and their structures evolve, and how they deal with associated pressures (Suddaby 2010; Suddaby & Greenwood 2009). In this thesis, the fishing industry, as an organisation of sectors, may change or create structures to foster knowledge acquisition and contribute to long-term sustainability.

1.5. Methodology

This research employed an interpretive qualitative case study approach to explore how local knowledge influences industry sustainability towards regional sustainable development. Given this research sought to understand knowledge processes and their influence on industry sustainability, which is fundamentally a social phenomenon, a qualitative methodological framework was considered an appropriate research strategy (Denzin & Lincoln 2000). To investigate key issues, including local knowledge, industry sustainability and regional sustainable development, an exploratory study based on an interpretive orientation was adopted. Thus, an exploratory study adopting interpretive orientation allowed both the researcher and the researched to interact and generate a deeper understanding of the issues being investigated (Ritchie & Lewis 2003).

Following qualitative research traditions consistent with interpretive orientation, relativism and social constructionism stances were applied to guide the research process. These stances were preferred because knowledge is an outcome of social processes, which is better understood by constructing meaning from multiple realities and perspectives (Creswell 2013). Social interaction was considered useful for gathering multiple perspectives from diverse actors within the fishing industry. Interacting with key actors was deemed appropriate for making sense of their viewpoints. Such interaction provided access to the actors' social worlds to construct the meaning of the research problem from their shared perspectives and lived experiences.

Using the fishing industry in the Eyre Peninsula region as a research context, a qualitative case study methodology was considered suitable to investigate the research problem (Denzin & Lincoln 2005; Yin 2013). In-depth understanding of the research

problem will require a fair representation across diverse subcases and rich information gathering. In order to better understand and explain the issues under investigation (Patton 2002; Yin 2013), some representative sectors (hereafter subcases) were selected. These subcases represented classifications such as molluscs, crustaceans and finfish within the fishing industry in the Eyre Peninsula region. Subcase 1 represented the Southern Bluefin Tuna sector (finfish). Subcase 2 represented the South Australian Northern Zone Rock Lobster sector (crustaceans). Subcase 3 represented the South Australian Oyster sector (molluscs). These subcases were purposively selected to represent the main case study, which is Eyre Peninsula's fishing industry, because they were the influential sectors within the industry at the time of this study.

Following well-established ethical procedures of the University of Adelaide, participants from across the three subcases were contacted and selected. Approximately 54 participants were purposively selected. They constituted key strategic actors across the industry's value chain including producers, processors, retailers, wholesalers, policymakers, and representatives from industry associations and regional agencies. These actors were invaluable to this research because they had been actively involved in the fishing industry and associated business activities for years. These actors with considerable fishing experience and expertise were information-rich participants.

To gather evidence, this research employed in-depth interview process. Semi-structured face-to-face interviews were used to collect evidence from the three subcases. The interviews were conducted on a per subcase basis. This approach ensured key research issues were informed from the perspectives of interviewees. This interview strategy also led to the revision of some of the investigative questions based on interviewees' suggestions as interviews progressed. This was essential from the study's

philosophical and theoretical perspectives, which permitted constant engagement with participants to direct the research focus (Guba & Lincoln 1994).

This research adopted embedded analysis using a five-step thematic approach to analyse the interview data, as recommended by Creswell (2013). The first step involved data organisation. Interview files were uploaded to NVivo software (version 11) application for transcription. The second step was the coding process which required self-immersion by constantly reading and memoing the transcripts. The third step involved description and classification of transcripts into themes and codes consistent with research questions and objectives. The fourth step entailed interpretation and discussion of case evidence and findings. The fifth step involved representation and visualisation of case evidence using tables. The analysis was concluded when the case evidence added nothing new to what was already known (Bowen 2008).

1.6. Expected Significant Contributions

The expected significant contributions of this research are mainly theoretical and practical. This research will make a novel contribution to theory by developing a local knowledge-based approach towards industry sustainability. The study might argue that an industry's ability to sustain its long-term future is inconceivable without leveraging its embedded and situated knowledge. It could also highlight how industry collectives acquire, contribute and apply their knowledge towards industry sustainability. This research will advance a social perspective on industry sustainability by showing how collectives of fishing experts interact, share and integrate their knowledge towards a common interest in sustaining the long-term future of their industry. The study will provide an institutional perspective on industry sustainability, by illustrating how

different institutions determine sustainability or otherwise of an industry, by providing valuable knowledge and resources. This study will extend the notion of industry sustainability into the regional sustainability literature by demonstrating that the long-term future of both industry and regions are inherently linked.

Key practical implications of this study might include the development of an industry knowledge integration approach by showing that managers could encourage collectives of experts to share and combine their rich stories, insights and lived experiences which might be useful sources of knowledge for sustaining the fishing industry. The results might show managers the inherent value of formal and informal social processes by revealing that they foster excellent knowledge acquisition, contribution and application. They could formalise informal social interactions, personal friendships, and business relationships because they might be relevant for acquiring and contributing deep knowledge for developing and sustaining the industry. The findings from this research might help managers recognise the inherent value of their locally-developed knowledge by showing how it underpins their strategic priorities, organisational actions and commercial competitiveness towards sustainability of the fishing industry. This study could help managers realise direct and indirect connections between their industry sectors, the wider fishing industry and Eyre Peninsula by demonstrating that their economic prosperity, social equity and environmental integrity are major sources of sustainable livelihoods for local communities and in turn sustainable development for the region. The results from this study will also reveal to policymakers, industry associations and government agencies the repercussions of institutional processes and arrangements and how this impacts sustainability of the fishing industry. This research might also make public that although institutions are essential sources of knowledge

and information; associated institutional pressures may be detrimental to sustaining the long-term future of the fishing industry in the Eyre Peninsula region.

1.7. Organisation of the Thesis

This thesis is organised into five chapters. Chapter 1 introduces the background of the thesis. It discusses the significance of the research problem by showing how key issues are related. The chapter frames the research questions and objectives, and identifies existing gaps in the literature. It introduces the theoretical background of the thesis. The methodological framework, the expected significant contributions of this research, the structure of the thesis and the operationalisation of key terms are all presented in this chapter.

Chapter 2 is the literature review. It refers to the theoretical investigation of this thesis which seeks to provide and synthesise what has been done before and what can be added to advance the understanding of how local knowledge influence industry sustainability towards regional sustainable development. The chapter focuses on and investigates key issues such as local knowledge, industry sustainability and regional sustainable development. The theoretical perspectives of social capital and new institutional theories are also reviewed to construct a robust theoretical framework. This chapter concludes by showing how theoretical investigation of key research issues addresses the research problem.

Chapter 3 is the research methodology. The methodological framework of this study describes the empirical procedures involved in gathering case evidence to answer the research questions to deeply understand the research problem. These empirical procedures include the research context, research philosophy, methodological

framework, case selections, research design, ethics approval, participants' selection and evidence gathering and analysis procedures. The activities during fieldwork are also detailed in this chapter.

Chapter 4 is the findings and discussion. Key research issues using emergent themes and sub-themes from the data analysis are addressed. This chapter answers key research questions using relevant emerging themes and narratives. Discussion of key empirical findings draws on existing theories and concepts from the literature to offer reasons with explanations to answer the research questions. It further explains how the main objectives of this thesis are achieved, which helps addresses the research problem by connecting theories with empirical evidence.

Chapter 5 is the summary and conclusion. Contributions, implications and recommendations based on key findings from this research are presented. This chapter provides theoretical and practical contributions based on empirical findings. Theoretical and methodological underpinnings of this study are detailed. Possible limitations of this study are also discussed and avenues for future research are recommended.

Chapter 2. Literature Review

2.1. Introduction

This chapter examines relevant literature on knowledge management, industry sustainability and regional sustainable development. The chapter is divided into six sections. The first section introduces the theoretical investigation of this research. The second section explores the knowledge management literature. It identifies the existing perspectives on knowledge, the classifications of knowledge, acquisition of knowledge, and the contribution of knowledge in organisations. The third section highlights relevant definitions, importance of and approaches to industry sustainability. To better understand industry sustainability, this section examines relevant literature on corporate, business and industrial sustainability. The fourth section reviews the literature on regional sustainable development, sustainable development and sustainability. The fifth section elaborates on the theoretical perspectives of this research. It reviews the literature on social capital theory and new institutional theory to understand how knowledge and institutional processes influence industry sustainability towards regional sustainable development. The sixth section describes the theoretical framework of this study which is developed by integrating current thoughts, arguments and perspectives on key issues being explored. The seventh section concludes this chapter.

2.2. Knowledge

Local knowledge is operationalised in this research as a mix of historic and modern skills, ideas, experience, expertise, and information, which are deeply rooted in a specific local industry that is situated within a region or community. Many scholars have attempted to define knowledge but these have resulted in inconsistent results, and eventually the term has become contestable (Earl 2001). In this research, knowledge is defined as a resource with inherent capabilities, which has tacit and explicit influence on firms and industries, and their related regions and communities.

Knowledge is a dynamic human process justifying personal belief to arrive at the truth (Nonaka 1994; Nonaka & Takeuchi 1995). Knowledge can also influence future actions (Carlsson et al. 1996). This definition suggests that local knowledge capabilities within the fishing industry are useful for driving future actions. It is recognised as "a mix of human experiences, values, contextual information and expert insights which are useful for evaluating and incorporating new experiences and information" (Davenport & Prusak 1998, p.5). These definitions suggest that knowledge is a multifaceted concept with multi-layered meaning (Nonaka 1994). The relational and location-specific aspects of the term mean that without social interaction, it is difficult to construct and interpret knowledge (Brown & Duguid 2001). From these definitions, there seems to be no consensus on the meaning of knowledge for now. These multiple conceptualisations suggest there are different perspectives on the content and usefulness of knowledge.

Exploring local knowledge is important for the following reasons. The way knowledge is managed and maintained forms the basis of any kind of development in firms, industries, organisations and society (Laszlo & Laszlo 2002). The commercial success and performance of a firm requires knowledge that works and even works better (Demarest 1997). The ability of firms to integrate, create and apply their specialised and

unique knowledge is considered a strategic resource to prosper in a competitive and dynamic business environment (Grant 1996a). Knowledge is perceived as a source of worker productivity towards increased organisational performance (Drucker 1999).

Knowledge is an acquired capability to maintain the firm's prosperity and sustain competitive advantage (Gold, Malhotra & Segars 2001; Grant 1996b). It is a significant resource for economic growth and development activities within industries (Adams, Brusoni & Malerba 2011). Firms can efficiently and effectively create new products and improve existing ones by harnessing their specialist knowledge (Nonaka, Toyama & Konno 2000). These various roles of knowledge all suggest that local knowledge can affect the long-term sustainability of the fishing industry in the Eyre Peninsula region.

To understand the influence of local knowledge on industry sustainability towards regional sustainable development, this section locates the research problem in a sound theoretical context. Current conversations on these issues will be reported to understand which knowledge influences industry sustainability. It further reveals how this knowledge is acquired and contributes to industry sustainability. The following subsections detail the various perspectives, classifications, acquisition and contribution of knowledge to industry sustainability.

2.2.1 Perspectives on Knowledge

Knowledge—the most commonly used term in management and organisational theories—is characterised by multiple conceptualisations (Earl 2001; Nonaka & Peltokorpi 2006). Existing definitions and conceptualisations reveal different perspectives on knowledge. This suggests lack of a single perspective on knowledge (Nonaka & Peltokorpi 2006). These conceptualisations of knowledge suggest varying

insights which are useful for understanding the influence of local knowledge on sustainability of the fishing industry. Perspectives from various scholars describe knowledge as a multifaceted resource, action-oriented, practice-driven and with organisational capability. These perspectives are discussed below.

The first perspective is that knowledge is a multifaceted resource (Nonaka 1994). Davenport and Prusak (1998) mentioned that knowledge is a combination of framed human experiences, values, contextual information and expert insights. Alavi and Leidner (2001) indicated that knowledge consists of facts, procedures, concepts, interpretations, ideas, observations and judgments. Knowledge is also considered as consisting of information and skills (Nonaka & Takeuchi 1995). This suggests that knowledge has many facets which make it difficult to define (Earl 2001). The different components of knowledge reflect enormous resources available to the fishing industry. The multiple resource view of knowledge is important, because it may help us understand the facets of knowledge that influence sustainability of the fishing industry.

The second perspective suggests that knowledge is action-oriented because it is developed from the art of knowing and doing (Argyris 1993; Pfeffer, Jeffrey & Sutton 1999). The premise of this notion is that though knowledge may be intangible, it is realised through organisational actions (Kogut & Zander 1992). Both organisational and individual actions are underpinned by knowledge (Argyris 1993; Pfeffer, Jeffrey & Sutton 1999). There is a renewed call to consider the intricate link between knowledge and action (Van Kerkhoff & Lebel 2006). A firm's ability to compete, survive and perform depends on its collective actions developed from integrating knowledge (Nonaka, Umemoto & Senoo 1996). Spiegler (2003) argued that knowledge is a springboard to develop reasonable and productive actions. Actionable knowledge is the basis for describing, solving and resolving complex real-world industry problems

(Tsoukas 1996). The progress of an industry and firms depends on knowledge because it informs future actions (Carlsson et al. 1996). This action viewpoint is central to understanding how the integration of knowledge within the different fishing sectors may develop collective action towards long-term sustainability of the fishing industry.

The third perspective is that knowledge is practice-driven (Nag, Corley & Gioia 2007; Spender 1994). This notion contends that knowledge is embedded in practice (Styhre 2003), the reason being that consciously or unconsciously, there is a spillover effect between knowing, doing and practising (Gherardi 2000). This view proposes that knowledge has the capacity to influence and be influenced by practice (Pickering 1992). The main argument here is that it is difficult to separate knowledge from practice (Spender & Grant 1996). Failure to recognise the link between knowledge and collective practice is thus the basis of a firm's failure and poor performance (Nag, Corley & Gioia 2007). This failure impedes a firm's ability to gain and sustain competitive advantage (Spender 1994). Knowledge emanating from practice is considered an essential input for the current industrial and post-industrial production systems (Strati 2007). This suggests that industries can see the value of their knowledge when they put into practice what they learn and know (Lundvall & Johnson 1994). This view helps us to understand how knowledge embedded within the different sectors may develop and influence best fishing practice towards sustainability of the fishing industry.

The last perspective is organisational capability (Gold, Malhotra & Segars 2001; Teece, Pisano & Shuen 1997). The idea here is that having knowledge equips firms with the ability and capacity to leverage, harness and integrate other forms of information and skills (Gold, Malhotra & Segars 2001). The premise is that knowledge develops capabilities when firms integrate old and new routines, processes and assets derived

through learning (Easterby-Smith & Prieto 2008; Teece, Pisano & Shuen 1997). This perspective suggests that individual, collective and organisational capabilities are underpinned by knowledge (Tsoukas & Vladimirou 2001). Economic outcomes are generated by capabilities through knowledge integration (Lundvall & Johnson 1994). Gaining and sustaining competitive advantage is possible by developing combined capabilities through a firm's knowledge (Kogut & Zander 1992). Bērziša et al. (2015) proposed that industries develop when firms possess knowledge capabilities. This view is central to understanding how knowledge integration by the fishing sectors may develop collective capabilities towards sustainability of the fishing industry. This perspective further provides an understanding of the inherent value of the different classifications of knowledge that can influence sustainability.

2.2.2 Classifications of Knowledge

Many scholars agree there are different kinds of knowledge (de Jong & Ferguson-Hessler 1996; Hitt, Ireland & Lee 2000; Nonaka 1994). Notwithstanding that these different types of knowledge provide different organisational benefits (Haas & Hansen 2007) and underpin organisational survival (Nonaka 1994; Nonaka, Toyama & Nagata 2000), we do not yet know which facets of knowledge influence industry sustainability. There may also be different kinds of knowledge within fisheries (Grant & Berkes 2007), but exactly which of these are essential for sustaining the industry is currently unknown. Within the literature, the kinds of knowledge that influence industry sustainability are currently under-explored. To redress this gap in the literature, this research investigates the fishing industry in the Eyre Peninsula region to understand which kinds of knowledge influence sustainability.

The literature on different classifications of knowledge is reviewed and synthesised. Exploring these classifications is important if we are to understand the different kinds of knowledge in organisations (Hitt, Ireland & Lee 2000). This provides an impetus to explore and understand how these different kinds of knowledge may contribute to sustainability of the fishing industry. Adams, Brusoni and Malerba (2011) suggested that industry knowledge can be characterised by different dimensions, loci, forms and domains. The analysis of the literature provides an avenue to structure the different dimensions, loci, forms and domains of knowledge in a way that contributes to an understanding of the research problem. It can help identify the kinds of local knowledge that influence sustainability of the fishing industry in the Eyre Peninsula region. The different classifications of knowledge are discussed below.

2.2.2.1 Dimensions

The dimensions of knowledge refer to broad categories of human knowing classified as either explicit or tacit (Nonaka 1994). Polanyi (1966) indicated that explicit knowledge is easy to articulate, distribute and codify, consisting of those sources of knowing that are easily expressed in words and numbers (Nonaka 1994). This dimension is easily available and accessible (Nonaka, von Krogh & Voelpel 2006). For example, this knowledge is documented and stored in work manuals, books, databases, formal processes, procedures, rules and guidelines, and directives and agendas (Davenport & Prusak 1998). It is also embedded in artefacts and symbols (Holsapple & Joshi 2002). Explicit knowledge is delivered through formal learning programs, prints, electronics and media (Smith 2001). This is managed with the help of technological and organisational infrastructures like software and hardware repositories (Zack 1999b), and is relatively easy to acquire, create and share without complex human interactions

(Nonaka 1994). This dimension is essential because it demonstrates that fostering formal social processes may enable development of explicit knowledge relevant to sustainability of the fishing industry.

Tacit knowledge explains that "we know more than we can tell" (Polanyi 1966). This phrase is probably the beginning of the discussion on the tacit dimension of knowledge. It explains an aspect of human knowledge that is relatively unspeakable (Brown & Duguid 2001). Tacit knowledge is the deepest form and complex in nature (Nonaka 1994). This knowledge is not easy to articulate, distribute and codify (Nonaka 1994; Nonaka & Takeuchi 1995). It is obtained from people's personal and lived experiences (Lam 2000). It also includes knowledge handed down from different generations because it is personal (Liebowitz et al. 2007). Bratianu and Orzea (2010) suggest that this knowledge is embedded in personal interactions, arts and craftsmanship. It is also deeply rooted in people's beliefs, values, norms and experiences (Polanyi 1966). Polanyi (1962) argued that due to its personal character, tacit knowledge is obtainable through a natural process which embraces personal knowing and social interactions. The "sticky" nature of this knowledge means it is shared and articulated through social practices and within communities of practice (Brown & Duguid 2001; Lave 1991). This dimension is important because it shows that informal social processes may develop tacit knowledge relevant to sustainability of the fishing industry.

The importance of these dimensions of knowledge cannot be underestimated. Studies have shown that both dimensions stimulate new ideas to create new knowledge (Nonaka, von Krogh & Voelpel 2006). Integrating both tacit and explicit knowledge develops combined capabilities for firms and industries (Kogut & Zander 1992). They further enrich collective and collaborative actions when solving complex organisational problems (Wasko & Faraj 2005). The ideas that emerge from tacit knowledge due to

personal exposure and lived experiences; and the ability to access and share those experiences with others, are critical for developing firms' capabilities towards regional innovation, entrepreneurship and competitiveness (Cooke 2004; Malecki 2000). This is central to understanding socioeconomic prosperity in regions (Andersson & Karlsson 2007). Exploring these dimensions of knowledge is essential, because it can provide an understanding of how these different types of knowledge contribute to sustainability of the fishing industry.

2.2.2.2 Loci

The loci of knowledge describe where knowledge resides in organisations (Krogh 2009). In an organisation, knowledge resides in individuals and collectives (Blackler 1993). Individual knowledge is held and located in people (Krogh 2009). Developing this knowledge involves the processes of individual reflections, decisions, actions, thinking and planning (Brown & Duguid 2001; Krogh 2009). This knowledge is accumulated through lifelong learning experiences of individual experts and practitioners (Nonaka, von Krogh & Voelpel 2006). Individual knowledge adds richness and depth to organisations as it is developed through years of continuous personal reflection and practical experience (Polanyi 1962). The assumption is that individuals do the learning and thinking and not organisations (Weick & Roberts 1993). This makes sense because the ideas, intentions, insights and experiences in organisations are embedded within people (Lundmark & Klofsten 2014). This is vital because it shows that the knowledge that influences sustainability of the fishing industry may be embedded within individual experts and practitioners over time.

Individual knowledge is relevant because of its richness and depth as people are reflective practitioners who critique and are critiqued by others, which enrich their learning and knowledge (Cunliffe 2009). Lundmark and Klofsten (2014) concluded that knowledge from individuals makes creative contributions by providing new ideas and solutions towards research and development activities, as well as creating new products and services. This suggests that ignoring individual worker's knowledge means hindering organisational productivity and performance (Drucker 1999). Exploring individual knowledge is vital to understand how the fishing industry leverages the unique knowledge of its individual experts and practitioners to exploit business and commercial opportunities which in turn may contribute to sustainability.

Collective knowledge is located between individuals and within organisations (Hecker 2012). Such knowledge referred to as organisational knowledge is more than the sum of combined individual knowledge (Hecker 2012). This knowledge includes those in organisational routines, norms, schemes and past experiences shared by members of an organisation (Zander & Kogut 1995). It is developed by gathering and integrating individual knowledge including other organisational knowledge assets (Spender 1998). Some of the different ways by which collectives develop this knowledge include informal conversations, friendly organisational culture, formal meetings, collaboration and social interaction (Kimmerle, Cress & Held 2010; Tsoukas & Vladimirou 2001). This knowledge represents the combination of individual ideas, expertise and experience as its loci are collectives and organisations (Krogh 2009). Hecker (2012) suggested that organisations should know more than the sum of its individuals and collectives. This means that collective knowledge is incomplete without organisational artefacts. This is important because it suggests that the fishing industry may develop

collective knowledge by integrating ideas, insights and experiences of sectors and actors across the value chain.

Collective knowledge is critical because it facilitates the process of renewing ideas and creating new knowledge for organisations (Nonaka & Takeuchi 1995). Ideas and perspectives gleaned from groups and individuals are significant sources of collective knowledge (Tsoukas & Vladimirou 2001). And this knowledge further provides an avenue to mobilise rich insights and ideas from a group of experts, which is useful for collective problem solving (Krogh 2009). This knowledge fosters social cohesiveness, connectedness and renewal, especially in regional industries (Moulaert & Nussbaumer 2005) such as the fishing industry in the Eyre Peninsula region. This is particularly useful because it reveals how collectives of fishing experts and practitioners might contribute and integrate their knowledge to sustain the fishing industry in a way that supports sustainable development of the region.

2.2.2.3 Forms

Forms of knowledge explain how knowledge is structured, organised and stored in organisations (Allen, James & Gamlen 2007; Conklin 1996). The synthesis of the literature suggests two major forms of knowledge—formal and informal (Barrutia et al. 2014; Conklin 1996). Formal knowledge is obtained from formal sources of organising (Barrutia et al. 2014). This knowledge is organised, stored and documented in organisational manuals, reports, documents, white papers, plans, memos and designs (Conklin 1996). It is formal because it is easily documented and captured through formal processes, systems and structures (Barrutia et al. 2014; Conklin 1996). The knowledge is developed from formal interactions, collaborations, contacts and networks

between firms and industries (Dori & Tal 2000; Hebinck & Hanyani-Mlambo 1996). Formal routines such as reporting structures, meetings, seminars, workshops, conferences, communication guidelines and inter-firm arrangements and agreements are some important sources of storing, documenting and sharing this knowledge (Conklin 1996). This suggests that this knowledge is explicit as it is developed, acquired and shared through formal experiences, processes and structures (Chyi Lee & Yang 2000). Formal knowledge structures and processes may contribute to sustainability of the fishing industry.

Informal knowledge is obtained from less formal sources (Barrutia et al. 2014). The informal nature of this knowledge suggests that it is relational and context-specific, as its meaning and interpretation depend on social contexts (Bond et al. 2010). This knowledge is obtained by sharing ideas, facts, assumptions, meaning, questions, decisions, guesses, stories and viewpoints during informal social relationships, interactions and networks (Allen, James & Gamlen 2007). The current argument in the literature is that knowledge can be obtained through both formal and informal social structures, processes and activities (Allen, James & Gamlen 2007). Through formal work relationships and interactions, people can share and discuss informal work-related issues which deepen their understanding, perspective and ideas of formal events (Conklin 1996).

The process of developing, acquiring and contributing formal knowledge fosters deep and previously unspoken experiences, expertise, perspectives and insights (Dahl & Pedersen 2004). Studies have shown that this knowledge is acquired and shared through informal gatherings, informal conversations, interpersonal communication, informal interactions, network, meetings, discussions, personal contacts, social events, friendship ties and relationships (Allen, James & Gamlen 2007; Conklin 1996). This suggests that

the outcome of these informal activities is knowledge that is tacit and informal (Chyi Lee & Yang 2000). Relational and social processes are useful for developing informal knowledge which might be relevant to our understanding of sustainability of the fishing industry.

The relevance of this knowledge is that its development fosters social relationships and interactions. This is because people interact either formally or informally to acquire and share new ideas and insights (Allen, James & Gamlen 2007). The need to innovate requires firms and industries to leverage their informal knowledge, but more importantly to combine both formal and informal knowledge (Grimpe & Hussinger 2013). Even more so, formal and informal knowledge are essential for enhancing and enriching innovation experiences in regional and industry communities (Barrutia et al. 2014). Formal and informal social mechanisms provide an avenue for firms to gather deep and rich insights and creative ideas towards product development activities (Lawson et al. 2009). Formal and informal knowledge may support organisational, strategic and commercial activities of the fishing industry in a way that supports sustainability.

2.2.2.4 Domains

Domains include specific knowledge content (Byosiere & Luethge 2008). It involves data and information embedded in relevant groups, organisations and people who control knowledge (von Krogh, Nonaka & Aben 2001). These relevant people and groups are described as custodians of their own experiences, who develop different kinds of knowledge to achieve individual and collective objectives (von Krogh, Nonaka & Aben 2001). This suggests that these domains of knowledge are acquired and

developed by groups, organisations and people. The content of these domains of knowledge include those from key groups, organisations and people such as professionals, stakeholders, sectors, technologies, institutions, regions and industries. These domains add richness and depth as they are developed and sourced from different contexts. Each domain is discussed in subsequent paragraphs.

Professional knowledge is developed through years of continuous professional education, training and learning (Eraut 1994; Hudson 1997). This knowledge is important because it is theoretical and practical (Eraut 1994). This makes it useful for solving practical, conceptual and complex professional and industry problems (Rusaw 1995). Studies have shown that this knowledge is valuable because of its deep and rich expression of experiences, actions and professional practice (Bromme & Tillema 1995; Lindberg & Rantatalo 2015). The depth and richness of this knowledge comes from professional wisdom, common-sense and judgements acquired through years of practice and reflective learning (Hoyle & John 1995). It is also fostered by professional networks and industry associations whose prime responsibilities are not only to strengthen professional practice and competence but also inculcate sound work ethics and shared member values (Greenwood, Hinings & Suddaby 2002; Karseth & Nerland 2007). This suggests that the strength of this knowledge comes from training and orientation received by professionals in their connections with credible and reputable associations (Gorman & Sandefur 2011). Experts and practitioners within fishing sectors can develop knowledge through their professional and trade associations which may affect industry sustainability.

Stakeholder knowledge is developed by key organisational actors whose actions and decisions have direct and indirect effects on the continuous existence of an organisation (Metaxiotis & Ergazakis 2008). This knowledge is rich and valuable because it is

obtained from the wisdom and judgements of experienced stakeholders (Bourne & Walker 2005). Knowledge development requires integration of insights, rich information and perspectives from multiple and diverse stakeholders (Gray et al. 2012). This suggests that stakeholder knowledge will be dynamic and complex. This is because the decisions, practices and policies in organisations are informed by viewpoints and insights from diverse stakeholders (Garrett, MacMullen & Symes 2012). Industry and institutional standards, directives and regulations are also determined by perspectives and experiences of key internal and external stakeholders (Bekker, Hoffman & Jooste 2011; Qatan, Bose & Mothershaw 2015). The mix of creative ideas and lived experiences from stakeholders outside and inside an organisation means this knowledge is useful for supporting firms in solving complex sustainable development issues, especially in the regions (Bacher, Gordoa & Mikkelsen 2014; Lawley & Birch 2014). The ability to sustain the fishing industry in a way that in turn supports sustainable development in the Eyre Peninsula region can thus be influenced by the wisdom, judgements and rich perspectives of key stakeholders.

Sector knowledge consists of highly specialised skills, expertise and experiences embedded within a sector of an industry (Krafft, Quatraro & Saviotti 2014). This knowledge includes information and perspectives from networks of industry associations and institutions (Malerba 2005). An industry may be a collection of sectors with different knowledge domains. This knowledge is essential, because the performance and competitiveness of an industry depend on it (Malerba 2004). These specialised skills and ideas influence economic growth and development of sectors and industries (Adams, Brusoni & Malerba 2011). They provide creative solutions and innovative ideas to solve complex problems within industries, with serious implications for supporting regions (Andersson & Ejermo 2004). This knowledge is also useful for

creating and capturing market value (Gloet & Samson 2015). Although industry sectors may have different specialisations, they also are characterised by a common knowledge base (Malerba 2004). The combined knowledge of different specialised fishing sectors may influence sustainability of the fishing industry.

Technological knowledge is embedded in and developed by technical processes and structures that combine pieces of information (Antonelli 2000). This knowledge is rooted in technologies including the intranet, electronic platforms, directories, repositories, software, hardware, computers and technical infrastructures (Díaz-Díaz, Aguiar-Díaz & De Saá-Pérez 2008). The current proliferation of modern technologies ensures that this knowledge is an integral and unavoidable part of organisational resources (Díaz-Díaz, Aguiar-Díaz & De Saá-Pérez 2006). It is context-specific which means that its interpretation is based on location (Balconi 2002). This knowledge creates, stores and shares other forms of knowledge and information (Stevenson 2004). Technological knowledge is significant because it is a source of competencies and capabilities in firms (Antonelli 1999). This knowledge can increase organisational productivity (Chen & Yang 2005) which further contributes to firms' continuous performance improvements (SubbaNarasimha, Ahmad & Mallya 2003). Knowledge creates economic value for firms when it transforms and improves existing products and services (McEvily & Chakravarthy 2002). Integrating this knowledge with other organisational processes and operations is crucial for industry development (Kumaraswamy & Shrestha 2002). This understanding is useful as it provides an opportunity to explore how the knowledge embedded in and developed through technologies contributes to sustainability of the fishing industry.

Institutional knowledge is embedded within institutions (Hardin 2009). It is acquired through engaging, interacting and assimilating formal and informal rules and

constraints over time (Chetty, Eriksson & Lindbergh 2006). This knowledge is embedded in normative, regulative and cultural-cognitive institutions of an organisation (Javernick-Will & Scott 2010). Normative institutional knowledge is embedded in values, norms, standards, conventions and work ethics. Regulative institutional knowledge is embedded in rules, laws, sanctions and incentives. Cultural-cognitive knowledge is also embedded in shared beliefs, histories and symbols that frame the awareness and decisions of organisations. Meyer and Rowan (1977) claimed that institutions are social structures and through years of socialisation they can construct knowledge. This suggests that this knowledge is constructed through social processes because institutions and the interactions within them can generate new insights and perspectives (Berger & Luckmann, 1991). This is essential because it shapes the behaviour and conduct of firms and their relevant actors (Chetty, Eriksson & Lindbergh 2006). It further improves legitimacy and stability of firms (Suchman 1995). It directs industries towards becoming responsible and accountable (Bebbington 1990). It has been shown that the continuity and formation of new industries are possible when entrepreneurs leverage this knowledge (Aldrich & Fiol 1994). Institutional knowledge could be obtained through local, national and regional institutions (Ebbin 2002). The knowledge embedded in regional institutions can also support the development of regional industries (Lagendijk & Cornford 2000; Rodríguez-Pose 2013). The knowledge rooted in local, regional, state and national institutions in the Eyre Peninsula region may influence sustainability of the fishing industry.

Regional knowledge is a combination of skills, expertise and competencies developed by firms, industries and institutions situated in regional communities (Malecki 2000b). This knowledge includes the perspectives and information from diverse regional actors (Asheim & Coenen 2005). It is also embedded within cultures and symbols as industries

help create brands, images, artefacts and histories as well as aesthetic qualities, feelings and desires for regional products and services (Asheim, Boschma & Cooke 2011; Asheim & Coenen 2006). Regions inherently do not generate knowledge except that created by firms, industries and institutions (Cooke 2004). Industries play a key role in the development of knowledge and skills in regions (Markusen 1994b). The quality and quantity of this knowledge are assessed by the availability of human capital through labour mobility across different regional industries (Sharpe & Martinez-Fernandez 2007). This suggests that the interpretation of this knowledge not only depends on its geographical location (Weterings & Ponds 2009), but industry dynamics, as people move in and out of different firms with their skills and expertise (Sharpe & Martinez-Fernandez 2007). The knowledge of an industry and its region are thus interconnected (Krätke 2010). This connection helps build and unify regional and industry identities (Frenken, von Oort & Verburg 2007). Studies have shown that this knowledge develops commercial and innovative capabilities and further contributes to product development, including engineering works, shipbuilding, boatbuilding, and advanced industrial machines and technologies (Asheim & Coenen 2006; Cooke 2005). This literature demonstrates that Eyre Peninsula regional knowledge may affect sustainability of the fishing industry.

Industry knowledge represents a combination of skills, expertise and experiences embedded within firms' internal and external knowledge sources (Zack 1999a). Internal knowledge sources include human capital, behaviours, attitudes, procedures, software and equipment, documents, databases and online repositories. External knowledge sources include existing publications, research institutions, government agencies, professional associations and inter-firm interactions, as well those from consultants, vendors and knowledge brokers (Zack 1999a). Industries can generate scientific

knowledge by collaborating with research institutions (Jensen et al. 2007; Liebeskind et al. 1996). Firm-level institutions are another source of knowledge, including regulations, rules, legislation, policies, norms, codes of conduct and value systems (Appleyard 1996). Industries develop knowledge through people, processes, infrastructures and technologies (Carrion, González & Leal 2004). This knowledge is also created through knowledge-related interactions within, between and among firms (Schartinger et al. 2002). This is because such interactions encourage experts and specialists to willingly contribute their knowledge towards collective industry activities (Adams, Brusoni & Malerba 2011). The development of this knowledge creates a social atmosphere (Doloreux, Shearmur & Guillaume 2015). This social atmosphere enables industry experts, specialists and practitioners to combine knowledge and develop strategic capabilities to gain and sustain competitiveness (Grant 1996a). Innovative activities that drive economic growth and development in regional industries are enhanced by this knowledge (Asheim & Coenen 2005, 2006). This literature demonstrates how the combination of the knowledge acquired and developed by the diverse sectors of the fishing industry affects its long-term sustainability. The next section explores the literature to better understand how the knowledge that influences sustainability of the fishing industry may be acquired.

2.2.3 Knowledge Acquisition

In this thesis, knowledge acquisition is defined as learning processes and activities that generate knowledge and information. Learning is a process of acquiring knowledge (Argote 2011; Argyris & Schön 1996; Brown & Duguid 1991; Eraut 2000). Knowledge acquisition is important because knowledge obtained through learning underpins sustained industry competitiveness (Maskell & Malmberg 1999). This provides an

opportunity to understand inter-firm learning behaviours through either competition or collaboration (Inkpen 1998, 2000). Despite the growing literature on the convergence between learning, knowledge and sustainability theories, this connection is relatively under-investigated (Argote & Miron-Spektor 2011; McElroy 2003). The more neglected issue is how the knowledge that influences business sustainability is acquired (Pogutz & Winn 2016), as the sustained existence of business organisations depends on how they learn (Kim 1998).

The literature on the various forms of learning, including formal and informal learning, individual and collective learning, experiential and experimental learning and social and observational learning, are explored and discussed in this section. Organisations learn in different ways (Argote 2012), and the individuals and collectives within also differ considerably in the way they learn and the rate at which they learn (Epple & Argote 1996). Since industries acquire knowledge through learning (Argyris & Schön 1996), this thesis examines the learning literature to understand how different individuals and collectives within the fishing sectors learn and acquire knowledge towards sustainability.

2.2.3.1 Formal and Informal Learning

Formal and informal learning are important processes of acquiring knowledge (Dibella, Nevis & Gould 1996). Formal learning is institutionally sponsored, classroom based and highly structured (Marsick & Watkins 2001, 2015). This suggests that a formal process of knowledge acquisition involves a prescribed learning framework, an organised learning event or package, the presence of a designated teacher or trainer, award of a qualification or credit and external outcomes (Eraut 2000). During this

formal learning process, explicit and abstract knowledge are transmitted from a trainer who knows, to the trainee who does not know (Brown & Duguid 1991). There is also a component of formal education where an individual acquires propositional or academic knowledge from an educational institution (Malcolm, Hodkinson & Colley 2003). This learning process also occurs in learning centres where vocational and training courses are offered, and individuals are equipped with practical knowledge and skills (Svensson, Ellström & Åberg 2004). There are instances where learners and trainees are removed from their day-to-day work to engage in lectures, discussions, simulations, role plays and other instructional activities which help them acquire more theoretical insights (Enos, Kehrhahn & Bell 2003). In addition to gaining access to established expert knowledge (Malcolm, Hodkinson & Colley 2003); this formal learning experience enables individuals to act knowledgeably, effectively, deliberately, strategically and reflectively during problem solving situations (Svensson & Åberg 2001; Svensson, Ellström & Åberg 2004). The fishing industry may be influenced by practical, theoretical, explicit and abstract knowledge acquired through formal learning processes.

Informal learning is predominantly unstructured, experiential and non-institutional (Marsick & Volpe 1999). Such learning is the most common way of acquiring knowledge, skills and competencies (Boud & Garrick 1999; Marsick & Watkins 2015). This is because people prefer interacting and sharing ideas informally (Araujo 1998). Such learning occurs in institutions and organisations where the learner controls the learning process and experience (Marsick & Watkins 2015). It involves some degree of intentional process where the learning occurs as individuals pursue and reflect on their day-to-day activities. This means that the learning process is influenced by individual choices and preferences (Marsick & Volpe 1999). Acquiring knowledge through

informal learning requires both action and reflection where people have to be involved in day-to-day activities and then reflect on what happened and recollect the lessons learned (Watkins & Marsick 1992). This suggests that the knowledge acquired through informal learning is deep and rich because it is obtained through critical reflection on personal experiences (Marsick & Volpe 1999). Informal learning happens during self-directed, networking, coaching, mentoring and trial-and-error activities. The informality of this learning experience requires social processes, whereby people can interact and relate and in the process, acquire new skills, experiences and information (Enos, Kehrhahn & Bell 2003; Marsick & Watkins 2015). These social processes offer opportunities for individuals to acquire tacit knowledge (Watkins & Marsick 1992). This informal learning situation can develop into a community of practice where practitioners acquire and generate new knowledge (Boud & Middleton 2003). Sustainability of the fishing industry may be influenced by the knowledge acquired through informal social processes of inter-sector interactions and the network of fishing experts.

2.2.3.2 Individual and Collective Learning

Individual and collective learning are the common levels of learning in organisations (Yanow 2000) and generate most of the knowledge in organisations (Hecker 2012). Individual learning occurs when a person acquires skills from carrying out an action, and knowledge from learned experience (Kim 1998). This learning involves cognitive activity whereby individuals process and reflect on their own experiences to acquire knowledge (Tetrick & Da Silva 2003). Simon (1991) suggested that the effectiveness of this learning activity depends on contextual factors such as the structure, information, communication and control processes. Individuals may learn in an industry where there

are fewer control systems, organic structures, easy flow of information and strong communication channels. The absence of contextual restrictions enables individuals to learn (Antonacopoulou 2006). Although this learning happens at the individual level, it can also take place within collectives where people gain personal lessons through their interactions with others (Wang & Ahmed 2003). This level of learning is crucial because it fosters a dynamic creation of appropriate knowledge, where an organisation can strategically utilise the creative skills and rich information of individuals (Nonaka 1994; Nonaka & Takeuchi 1995). It further enables individuals to bring in knowledge and information from a firm's external business environment (Dodgson 1993). This literature suggests that sustainability of the fishing industry may be influenced by knowledge learnt by individual actors, as individual learning is essential for organisational survival (Casey 2005).

Collective learning is a cumulative and interactive process where knowledge is acquired within groups or within firms and across spaces between groups and firms (Capello 1999). Collective implies that a team or a group of individuals is merging and emerging while performing tasks, which may not be defined by a formal description of work structures (Brown & Duguid 1991). This learning experience is cumulative because knowledge accumulates over time and interactive because it requires members to relate to generate new knowledge within groups. This reveals that collective learning is social and relational as it depends on members' ability to come together, interact and relate (Capello & Faggian 2005). Due to its social, relational and interactive nature, it generates knowledge that is partly tacit and partly explicit (Lawson & Lorenz 1999; Maskell & Malmberg 1999). Though collective learning depends on social processes, it is structured, planned and managed because it requires some level of cognitive processes where people in collectives share, reflect and evaluate their ideas and

experiences which help acquire new knowledge (Garavan & McCarthy 2008; Knapp 2010). Organisational survival and success may depend on such learning (Knapp 2010). The innovative processes and activities of small businesses require creative ideas from collective thinking (Capello 1999; Mitra 2000). Collective knowledge generated in fishing sectors and by actors can be essential for sustaining the fishing industry in the Eyre Peninsula region.

2.2.3.3 Experiential and Experimental Learning

Experiential learning describes the process of creating knowledge through the transformation of experience (Kolb 1984). The central idea is that all learning processes involve human experience (Kolb, Boyatzis & Mainemelis 2001). Learning from experience requires learning by doing, which is a recursive process of reflecting on one's actions as work unfolds (Keen & Mahanty 2006). It involves immersion in the previous experiences to construct meaning of the present experience, which generates new insights and further enhances current and future learning (Kayes 2002). There are four different ways people acquire new information and knowledge by learning from experience (Kolb 1984). The first is that people acquire new information through concrete experiences which require them to use their senses and immerse themselves in the actual reality. The second is that people acquire new knowledge through critical thinking, analysis and planning their own experiences. This shows that experiential learning integrates one's previous experiences to construct new meaning and knowledge through cognitive and perceptual analyses (Corbett 2005). The third is that some people prefer to transform experiences into new information by simply observing and reflecting on the experiences of others. The fourth and final way is that there are people who learn better by just jumping into experiences and becoming actively involved. The

knowledge acquired from these experiential learning styles is tacit and personal (Armstrong & Anis 2008).

Learning from these experiences is essential because knowledge acquired through them is essential for identifying and exploiting entrepreneurial and business opportunities (Corbett 2005). Knowledge gained from experiences is crucial for industries that seek to develop critical capabilities and refine marketing strategies geared towards export performance (Morgan et al. 2003; Sinkula, Baker & Noordewier 1997). This literature suggests that the lived experiences of actors within each of the fishing sectors are an important source of knowledge that can improve domestic and foreign market activities, as well as commercial competitiveness, which may influence the long-term sustainability of the fishing industry.

Experimental learning, also known as trial-and-error learning, occurs when concepts and theories are applied in real-life situations to acquire new knowledge (Raelin 1997). The idea behind experimental learning is that people learn from mistakes and persist in assessing errors to acquire new knowledge (Mayo 1996). Learning through experiments involves trying new ideas, initiating actions, embarking on trial-and-error learning and delegating or performing additional tasks and responsibilities (Fahey & Prusak 1998). This tells us that people acquire new knowledge by turning new insights into concrete reality. The most common example is the research collaboration between industries and universities. This is where industries work with research institutions, scientific communities and university laboratories to experiment with their business ideas and theories to generate new knowledge towards research and development activities (Lee 2000; Tether & Tajar 2008). Organisations and individuals learn effectively from an experiment when there is available feedback, where the accuracy between actions and responses are compared and knowledge is acquired by learning from analysis and

feedback (Huber 1991). This suggests that knowledge acquired from experiments is tacit and explicit, because it is obtained from people's personal accounts, as well as formal analysis of what works and does not work (Raelin 1997).

Learning from experiments occurs either naturally or intentionally where organisations and individuals purposively conduct experiments towards knowledge acquisition (Fahey & Prusak 1998). Experimental learning is vital because it enhances the adaptive capabilities whereby organisations can constantly experiment with their ideas to improve adaptation (Huber 1991). Organisations enhance adaptability either by generating better and richer ideas (Elkjaer 2004) or developing and commercialising new technologies by testing existing ideas (Van De Ven & Polley 1992). This literature reveals how the different sectors within the fishing industry experiment with their ideas in a way that generates new knowledge and technologies for product development activities that may affect industry sustainability.

2.2.3.4 Social and Observational Learning

Social learning emphasises interacting with relevant others to acquire new skills and information (Bandura 1977). This learning process involves an iterative reflection where people continuously reflect on the value of what they know and how they came to know, a process that is necessary to construct a deeper and richer understanding of a social phenomenon (Keen, Brown & Dyball 2005). Social learning is also a process of cooperation between people and the outcomes from that cooperation (Berkes 2009). This suggests that social learning may occur when the actors of an industry interact and share ideas and insights in a way that generates new knowledge and common understanding. This learning requires relational practice where people meet, share and

reflect on their experiences and in the process, acquire richer experiences and deeper meaning of their own experiences and those of others (Blackmore, Ison & Jiggins 2007). Social practice such as formal and informal meetings, seminars, forums, social interactions and networking are valuable ways to foster knowledge acquisition (Blackmore 2007).

Learning not only involves the acquisition of knowledge, but also the ability to act in a socially acceptable way (Brown & Duguid 2001). Learning is common in social collectives where people talk to, interact with, share and reflect on past experiences with meaningful others (Capello 1999). Formal or informal closeness and interactions during social learning enable acquired tacit knowledge (Yli-Renko, Autio & Sapienza 2001). Managing natural resources, including fisheries, is best done through social learning processes whereby collectives can interact and share ideas and experiences that provide an opportunity to acquire new knowledge, information and expert advice (Berkes 2009; Garrett, MacMullen & Symes 2012). Since most learning processes are inherently social and collective (Teece & Pisano 1994), it is important to understand how social processes and practices in the fishing sectors foster knowledge acquisition that supports sustainability of the fishing industry.

Observational learning describes the process of acquiring knowledge by observing the actions and behaviours of other people (Hoover, Giambatista & Belkin 2012). According to Bandura (1965), the ability to learn through observation requires four major processes—attention, retention, motor reproduction and motivation. In his explanation of these processes, Bandura theorises that people acquire information through observation by focusing on those performing the action or behaviours herein called attention. They must process and keep the information which connotes retention. They need also to enact what they observed or imitated, known as motor reproduction.

They must repeat the observed action or the behaviour by receiving rewards, referred to as motivation. This suggests that knowledge acquisition depends on environmental and personal conditions (Douglas Greer, Dudek-Singer & Grant 2006). This learning process is iterative, observing people's behaviours by thinking, perceiving and acting in the direction of the ongoing behaviours (Bandura, Grusec & Menlove 1966). This suggests that social and observational learning are both strongly related because in both cases there is the need to observe others to acquire knowledge.

This learning style has social and experiential aspects because during observational learning people learn from and interact with others (Hoover, Giambatista & Belkin 2012; Manski 1993). The knowledge acquired through observation is tacit because it is gained through personal experiences of observing relevant others (Nadler, Leigh & Van Boven 2003). It must be noted, however, that it is possible for people to imitate wrongly, because observation is a process of sensory reception which depends on the strength of one's perceptual ability and the source of observation (Eraut 2004). The most common and effective way to acquire knowledge in organisations (Coetzer 2007) is for actors within the fishing sectors to obtain their knowledge by observing successful and knowledgeable others. These knowledgeable industry actors and how they might contribute their knowledge towards sustainability of the fishing industry are discussed in the following section.

2.2.4 Knowledge Contribution

In this study, knowledge contribution involves the process of sharing and combining knowledge for individual and collective benefit - it encompasses the notion of knowledge sharing. Sharing knowledge is a social behaviour (Chow & Chan 2008)

which involves providing information and know-how through collaboration with others to develop new ideas, to solve problems and implement appropriate policies and procedures towards organisational survival (Cummings 2004). Examining knowledge contribution is worthwhile because sharing and integrating knowledge develop a firm's collective capabilities (Easterby-Smith & Prieto 2008; Gold, Malhotra & Segars 2001). Knowledge contribution is also vital for organisational survival (Cummings 2004), and can build industries by gaining, accessing and combining different knowledge (Chen 1997). Exploring knowledge contribution in the fishing industry is also essential because the term is largely explored in virtual and online communities (Wasko & Faraj 2005; Ye, Feng & Choi 2015), but rarely in real organisational settings (Wang & Noe 2010).

The literature reveals that there is no single way that organisations contribute knowledge because even within similar contexts knowledge is shared differently (Ciborra & Andreu 2001). The syntheses of the literature further reveal that there are three key ways through which organisations share and combine knowledge. The first is through social processes where people formally and informally relate and interact to share what they know (Brown & Duguid 2001). The second is through technological processes where individuals and organisations share their knowledge by using different kinds of technologies (Neches et al. 1991). The third is through organisational and managerial processes where both organisations and their managers provide appropriate support systems for individuals to share and combine knowledge (Cabrera & Cabrera 2005). This suggests that knowledge that influences sustainability of the fishing industry may be contributed in different ways, as discussed in the following subsections.

2.2.4.1 Social Processes

Social processes involve those practices that provide an avenue for people to talk, relate, interact and eventually share knowledge (Brown & Duguid 2001). This is essential because knowledge is constructed through social processes (Berger & Luckmann 1991). The knowledge shared through social processes is tacit and may be articulated through human interactions, relationships and friendships (Brown & Duguid 2001; Nahapiet & Ghoshal 1998). This suggests that how actors interact, relate and engage within the sectors is essential for contributing knowledge towards sustainability of the fishing industry. And there are different social practices through which people share knowledge (Brown & Duguid 2001).

One of the social practices is joining a community of practice where work-related groups and individuals share collective interests and problems and learn from each other's experiences (Lave & Wenger 1991). Examples of a community of practice are social and professional networking groups which are internally and externally created for people to capture, document and organise knowledge for common use (Brown & Duguid 1991, 2001). Sharing knowledge within these professional and social networks requires strong connections, because they not only improve sharing but access to quality information and knowledge (Hansen 1999). This tells us that the professional industry associations might be an important avenue for collectives of experts and practitioners to contribute rich experiences towards sustainability of the fishing industry.

Another common practice is to build formal and informal social networks which are necessary to create a positive social atmosphere for people to easily share and integrate knowledge (Lee 2011; Yang & Wu 2008). One of the most vital boundary conditions for building social networks is interpersonal trust (Nahapiet & Ghoshal 1998). People

can freely and willingly share their skills, expertise and knowledge via social networks, interactions, friendships and relationships when high levels of trust and closeness are evident (Chow & Chan 2008; Levin et al. 2004). Common goals, shared identities and networks are also critical boundary conditions which foster knowledge sharing (Chow & Chan 2008). This demonstrates that firms with common goals can share valuable trade secrets, patents, technologies and knowledge (Heiman & Nickerson 2004). This tells us that trust-based social practices within fishing sectors and professional associations might be an important opportunity for fishing experts and practitioners to contribute valuable knowledge towards sustainability of the fishing industry.

2.2.4.2 Technological Processes

Technological processes describe practices whereby people in organisations share knowledge by using different technologies and technical tools (Neches et al. 1991). The central argument is that although sharing knowledge during face-to-face interactions is drastically different from technology-aided interactions (Wang & Noe 2010), separating technology from knowledge is practically impossible (Tsui & Holsapple 2005). Despite the controversy surrounding the use of technology to share knowledge, current organisations cannot stop using technology to share what they know with others (O'dell & Grayson 1998). Thus, technology fosters tacit and explicit knowledge sharing (Chua 2003). These practices also lessen the cost of sharing tacit and personal knowledge (Hildrum 2009). There are different technological practices that support knowledge contribution and sharing (Chua 2003; Ramlee 2011; Wasko & Faraj 2000). To leverage the value of technology in sharing knowledge, organisations are now making huge investments in knowledge management systems (Alavi & Leidner 2001). These knowledge-based technological systems are useful for organisations that operate in

different geographical locations or are geographically dispersed to share ideas (Sole & Applegate 2000). This suggests that knowledge-driven technologies may be essential for geographically dispersed fishing sectors in the Eyre Peninsula region to interact and share experiences. Given the advantages of technological processes, actors and sectors can use modern technologies to share and communicate their views which may contribute to sustainability of the fishing industry.

Many scholars have examined different technologies that are useful for sharing and contributing knowledge in organisations. Some organisations use groupware, discretionary databases, intranet portals and workflow technology to share knowledge (Cabrera & Cabrera 2002). Others use list-serves, online directories, electronic discussion groups, electronic bulletin boards and online chat facilities to contribute ideas and information (Wasko & Faraj 2000). Organisations now encourage the use of internet and intranet portals, teleconferencing, video conferencing, electronic databases and knowledge repositories to share information (Ramlee 2011). The current use of social media and web tools is common in many organisations as knowledge sharing platforms (Panahi, Watson & Partridge 2013; Paroutis & Saleh 2009). This literature shows that the knowledge shared through communication technologies, and knowledge embedded in modern fishing technologies may contribute to sustainability of the fishing industry.

2.2.4.3 Organisational and Managerial Processes

Organisational and managerial processes represent the practices involved in setting up individuals and groups to share their expertise, skills and information (Cabrera & Cabrera 2005). These practices are essential because they foster knowledge sharing

among individuals and collectives (Jeon, Kim & Koh 2011). They are important for examining individual and group attributes that affect how people share what they know in organisations (Wang & Noe 2010). This suggests that knowledge sharing depends on the personalities and motives of those behind it (Cabrera, Collins & Salgado 2006). This further determines people's willingness to help others by sharing knowledge (Bock et al. 2005). Through these shared practices, organisations and their managers can facilitate collective knowledge development (Cabrera & Cabrera 2002). Through such management practices in the sectors, the fishing industry can gather and integrate collective knowledge towards long-term sustainability.

Organisational and managerial practices that share knowledge vary across organisations. Organisations can develop reward systems, training and development programs, flexible work designs, knowledge management technologies and knowledge management performance systems to foster knowledge sharing (Cabrera & Cabrera 2005). For example, through training and development, individuals and collectives can acquire, develop and share more competencies, capabilities and knowledge (Johannessen & Olsen 2003). Organisations can implement performance-based reward systems, formulate flexible policies on employee usage of information technology applications, and provide user-friendly information technology systems which facilitate knowledge sharing (Kim & Lee 2006). The culture of an organisation shapes the behaviours and assumptions of its people about how to create, share and apply knowledge (De Long & Fahey 2000). An organisation can also build a supportive knowledge culture whereby individuals and groups feel more comfortable to share what they know with others (Hansen, Nohria & Tierney 1999). This is important because knowledge culture makes people more enthusiastic about sharing what they know and know-how (Za´rraga & Bonache 2003). This translates into stronger collective

relationships in businesses where people become more concerned about the survival of their organisations, to the point of sharing private information and creative ideas (Schepers & van den Berg 2007). Knowledge culture requires less centralised and more organic organisational structures to function (Zhou & Fink 2003). This means that organisational knowledge structures also play a key role in knowledge sharing and development (Lyles & Schwenk 1992). Knowledge structure involves less centralised but more organic structures to encourage communication and interaction among individuals and collectives, which stimulate people to share knowledge and learn (Lyles & Schwenk 1992). Management structures within the different fishing sectors can foster knowledge contribution that may influence sustainability of the fishing industry.

2.3. Industry Sustainability

This section explores the notion of industry sustainability. The starting point is the literature on corporate, business and industrial sustainability. This is because industry is an umbrella term that represents firms, businesses and corporations (Overcash & Twomey 2011). Drawing on existing views from the industrial, corporate and business sustainability literature may provide an understanding of how businesses and corporations in the fishing industry support sustainability. This section has three subsections. The first subsection examines current thoughts on definitions of corporate and business sustainability to understand industry sustainability. The second discusses the importance of industry sustainability. The third subsection explores the different approaches to industry sustainability by drawing from the literature on business and corporate sustainability.

2.3.1 Conceptualising Industry Sustainability

Definitions of business, corporate and industrial sustainability are notoriously contested and complex because they have many conceptualisations (Hahn & Figge 2011; van Marrewijk & Werre 2003). There are also cases where these terms may be used interchangeably despite their differences (Overcash & Twomey 2011). To understand and define industry sustainability, the following paragraphs discuss business, corporate and industrial sustainability respectively.

The notion of business sustainability was championed by the World Business Council for Sustainable Development (WBCSD), which defined sustainability within the business community as a form of progress that meets the needs of the present generation without compromising the ability of future generations to meet their needs (Schmidheiny 1992). Since then, scholars have conceptualised the term differently. Dyllick and Muff (2016) referred to the term as a practice where truly sustainable businesses create value for the common good by solving sustainability challenges facing society. Others have perceived it as a process of integrating social, economic and environmental sustainability objectives into the operational practices of businesses (Labuschagne, Brent & van Erck 2005). The term has been understood as meeting the needs of a firm's direct and indirect stakeholders without compromising its ability to meet the needs of future stakeholders (Dyllick & Hockerts 2002). These stakeholders can support a truly sustainable business with the aim of addressing unsustainable practices (Shevchenko, Levesque & Pagell 2016). These definitions suggest that businesses have responsibilities to meet the social, economic and environmental wellbeing of both internal and external stakeholders for strategic and social reasons (Dyllick & Muff 2016).

Corporate sustainability is an ongoing conceptual development which has received much attention in the literature (Banerjee 2003; Dyllick & Hockerts 2002). Despite its popularity, the term remains contested (Montiel & Delgado-Ceballos 2014). Many scholars have struggled to define the term (Banerjee 2003; Dyllick & Hockerts 2002; Schaltegger, Beckmann & Hansen 2013). Corporate sustainability is defined as a source of sustainable competitive advantage (Bansal 2002). It has been explained as a business strategy for increasing the value of firms' assets when companies address social and environmental concerns (Amini & Bienstock 2014). It is further understood as a marketing tool that capitalises on ecological, social and economic challenges in corporations (Schaltegger, Beckmann & Hansen 2013). Others have considered the term as an integral approach that seeks to address economic, environmental and social concerns in corporations (Amini & Bienstock 2014; Hahn et al. 2017). These definitions suggest that sustainability of a corporation is its ability to integrate and address economic, environmental and social sustainability challenges (Figge & Hahn 2004). It is obvious from these definitions that the contributions of corporations toward sustainable development constitute the basis of corporate sustainability (Schaltegger & Hörisch 2015). Corporate engagement with sustainability is now very topical and is currently influencing similar discussions at industry level (Whiteman, Walker & Perego 2013).

The notion of industrial sustainability was first introduced by the Institute of Manufacturing at the University of Cambridge (Jansson et al. 2000). The term was initially defined as meeting the needs of the present generation without diminishing economic, social and environmental opportunities in the long term through efficient conceptualisation, design and manufacture of goods and services (Jansson et al. 2000; Paramanathan et al. 2004). Since then industrial sustainability has undergone several

conceptualisations. For example, it has been conceived as an outcome of a transformation process where industries become part of and actively contribute to a socially, environmentally and economically sustainable planet (Tonelli, Evans & Cainarca 2013). The term has been defined by reference to ecological sustainability as an industry practice where individuals or a collection of organisations exist and flourish for lengthy timeframes at related levels and in related systems (Russo 2003; Starik & Rands 1995). This is an interesting perspective to take on the fishing industry because it is a collection of related sectors, businesses and corporations that aim to become sustainable in the long term. Both definitions are, however, limited by their strong ecological undertones, as sustainable development is more than just organisational environmentalism (Gladwin, Krause & Kennelly 1995). These definitions demonstrate an absence of a single and more encompassing view on business, corporate and industrial sustainability.

In the absence of a single and more encompassing view, this thesis operationalises industry sustainability as the ability of an industry, as an organisation of firms, to sustain its long-term future by integrating environmental integrity, economic prosperity and social equity in a way that supports its operating environments. This definition suggests that sustaining the long-term future of the fishing industry depends on its ability to secure the social, economic and environmental wellbeing of people living in the Eyre Peninsula region. It further reveals that a sustainable industry successfully combines continuity with sustainability objectives (Clifton & Amran 2011). It is also clear on whose needs and development must be sustained (Hahn & Figge 2011), and it captures the practical long-term vision of an industry (Paramanathan et al. 2004). This review shows that future plans of the fishing industry may in turn affect the social, economic and environmental needs of people living in the Eyre Peninsula region.

2.3.2 Importance of Industry Sustainability

Sustainability holds the long-term future of an industry and the society together (Senge & Carstedt 2001). Without the support of corporations, businesses and industries, society cannot achieve sustainable development as firms represent the productive resources of every economy (Bansal 2002; Hahn & Figge 2011). Competitive advantage depends on firms' ability to consider sustainability issues in their business models (Zollo, Cennamo & Neumann 2013). Industries can achieve sustainable competitive advantage if they adopt proactive environmental strategies (Sharma, Pablo & Vredenburg 1999; Sharma & Vredenburg 1998). The commitment of industries to pursue sustainability can create economic value and minimise adverse impacts on natural resources (Tonelli, Evans & Cainarca 2013). Arguably this strategy reduces the long-term risks associated with natural resource depletion (Shrivastava 1995b). This requires a drastic transformation in industry culture and structure to support more sustainable practices (Azapagic 2003).

Industries and their engagement with sustainability address environmental and social repercussions of current economic growth and development (Shrivastava 1994; Wallner 1999). Extensive studies have argued that managing sustainability must be a moral duty for industries, firms and corporations to resolve current environmental crises (Schaltegger & Hörisch 2015; Schot, Brand & Fischer 1997; Shevchenko, Levesque & Pagell 2016). This is because industry sustainability represents a moral footprint to devise social and environmental solutions (van Marrewijk & Werre 2003). Sustainability drives industries to reduce unsustainable industry practices and invest more in advanced green technologies (Shrivastava 1995a). Industry sustainability enhances collaborations as it requires firms to constantly consult with diverse

stakeholders in the supply and value chain (Paramanathan et al. 2004). These collaborative and consultative processes are vital for developing decision-making capabilities in addressing sustainability issues (Hahn & Figge 2011; Hahn et al. 2017).

2.3.3 Approaches to Industry Sustainability

This section explores the different approaches to industry sustainability by drawing from the literature on business and corporate sustainability. Industries are currently seeking new approaches towards sustainability (Piluso, Huang & Lou 2008). There are three dominant approaches towards sustainability evident in businesses and corporations: normative, instrumental and integrative (Gao & Bansal 2013; Van der Byl & Slawinski 2015). Even though these approaches dominate the current discussion on business–society relations, there is also an emerging approach that implicitly expresses the role of knowledge in corporate and business sustainability (Pogutz & Winn 2016). Unfortunately, this approach is an underdeveloped and under-researched area in the business and corporate sustainability literature (Hörisch, Johnson & Schaltegger 2015; Pogutz & Winn 2016). There is currently a lack of empirical support for sustainability-oriented knowledge (Pogutz & Winn 2016). This thesis goes some way towards addressing the gap in the literature by investigating industry sustainability from a local knowledge perspective. The following subsections discuss the literature on the various approaches to business and corporate sustainability in more detail.

2.3.3.1 Normative Approach

The normative approach emphasises that businesses and corporations must interpret and pursue sustainable development by focusing on justice, equity and ethics (Barkemeyer

et al. 2014; Takala & Pallab 2000). The fundamental logic behind this approach is that promoting virtuous business conducts, sustainable practices and an ethical organisational climate towards sustainability requires corporations and their managers to act as moral agents (Wang, Cheney & Roper 2016). Wolff (1998) argued that the destructive nature of businesses and corporations has reinforced the need for this approach towards sustainable development. Though it is the most fundamental of the approaches proposed by both proponents and critics, unfortunately, it is the most often neglected and unexamined approach towards sustainable development in businesses and corporations (Donaldson & Preston 1995).

Proponents of this approach have argued that sustainable development can be achieved when every business and corporation adopts a sustainable enterprise model based on ethical and societal principles (Baumgartner 2014; Donaldson & Preston 1995; Zollo, Cennamo & Neumann 2013). Business managers and corporate leaders are encouraged to adopt moral and philosophical guidelines to support sustainability management (Donaldson & Preston 1995). This approach can help decision makers pursue sound ethical principles to managing the social and natural environment (Takala & Pallab 2000; Wulfson 2001).

The need to implement this approach has led to the creation of private and public institutions to enforce sustainability principles and management in businesses, industries and corporations (Delmas & Toffel 2008; Hoffman & Ventresca 1999). These normative institutions are expected to manage social, economic and environmental issues, making businesses and corporations legitimate and desirable (Bansal & Clelland 2004; Prakash 2001). The involvement of normative institutions in this approach is imperative because nature has a moral standing in regards to its own welfare and that needs to be respected by industries, corporations and businesses

(Shrivastava 1994). From this perspective, the continuous existence of the fishing industry depends on respect for and recognition of the value of marine-based environments and the ecosystems in which they are based. Though normative logic seems useful for society, it is considered inadequate to sustain the long-term interests of businesses, industries and corporations (Porter & Kramer 2002; Porter & Kramer 2006). This limitation has led to the rise and dominance of another approach based on instrumental logic (Zollo, Cennamo & Neumann 2013).

2.3.3.2 Instrumental Approach

The main argument underlying the instrumental approach is that businesses, industries and corporations must improve their bottom lines while pursuing sustainability (Azapagic 2003). The central idea here is that it pays to manage rather than ignore social and environmental issues (Gao & Bansal 2013). Proponents of this approach are concerned about the central concern of how firms can benefit commercially from addressing sustainable development challenges (Ferraro, Pfeffer & Sutton 2005; Margolis & Walsh 2003). Addressing this concern has resulted in two conflicting logics within the instrumental approach.

The first instrumental logic is the win-win situation. Those who favour win-win argued that both businesses and society must win by practising sustainability (Porter & Kramer 2002; Porter & Kramer 2006). Businesses and corporations following this approach make decisions that link corporate financial performance with corporate environmentalism. They adopt sustainability models that provide shared economic value (Dyllick & Muff 2016), and develop policies and credibility with the implicit

business principle that sustainability pays off financially (Hahn 2015; Hahn & Aragon-Correa 2015).

The second instrumental logic is the trade-off situation. Those who believe in trade-offs also argue that corporate and business contributions to sustainability can only be achieved if a choice can be made between two conflicting goals (Hahn et al. 2010). Businesses, industries and corporations that follow the trade-off logic conduct a cost-benefit analysis where they weigh up social benefits of practising sustainability against business costs (Porter & van der Linde 1995). These businesses demonstrate ethical and altruistic behaviours towards sustainability for the sake of their long-term competitiveness (Jones 1995). From this perspective, it is important to recognise the possibility that the fishing industry and the Eyre Peninsula region may have competing interests when it comes to managing sustainability issues.

Although the instrumental approach may provide sufficient reason for businesses, corporations and industries to practise sustainability and interpret environmental issues as opportunities rather than threats (Sharma 2000; Sharma & Vredenburg 1998), it is not enough to explain the relationship between business and society (Dyllick & Hockerts 2002). To strengthen that relationship, Hahn et al. (2017) have suggested that an integrative approach is essential, because it can incorporate sustainable development and business interests in a holistic manner.

2.3.3.3 Integrative Approach

The original definition of business sustainability emphasised an integrative approach (Baumgartner 2014; Gladwin, Kennelly & Krause 1995). Despite its currency in many scholarly discussions, there is little theoretical development and empirical analysis of

this approach in organisational and management sciences (Gao & Bansal 2013). The main argument underpinning this approach is that the parts of any ecosystem are interconnected and cannot be separated from the whole without damaging both (Gao & Bansal 2013; Hahn, Pinkse, et al. 2015; Westley & Vredenburg 1996). The central idea behind this approach is that businesses, corporations and industries cannot separate their economic sustainability from social and environmental sustainability (Elkington 1998). This approach strengthens interconnectedness, inclusiveness and interdependence within business, corporate, industry and organisational contexts regarding sustainable development (Gladwin, Krause & Kennelly 1995; Meadows et al. 1972).

Proponents of this approach argued that sustainable development can be achieved when businesses and corporations integrate their social, economic and environmental principles (Bansal 2005; Dyllick & Muff 2016). They have advocated that sustainability strategies in businesses and corporations must consider all dimensions, their impacts and their interrelations (Baumgartner & Ebner 2010; Elkington 1997). The logic is that businesses and corporations that focus only on the economic aspect of sustainability may make short-term gains but forfeit long-term success (Dyllick & Hockerts 2002). The long-term success of businesses depends on business leaders and managers addressing the complex nexus between economic, environmental and social issues in society (Hahn et al. 2014).

Implementing an integrative approach where the dimensions of sustainable development and their influences converge can generate greater industry activity with long-term growth and survival (Russo 2003). This suggests that the long-term future of businesses, industries and corporations depends on addressing and assessing the dimensions of sustainable development and their impacts simultaneously and continuously. This approach guarantees businesses and corporations continuity of life,

both now and in the future (van Marrewijk & Werre 2003). This also applies to industries. The long-term future of the fishing industry may depend on how it integrates its social, economic and environmental strategies in a way that supports the Eyre Peninsula region, creating long-term value for enterprises and sectors in the region (Zollo, Cennamo & Neumann 2013). Although the integrative approach is receiving considerable research attention, it is not clear how businesses, corporations and industries can sustain themselves by addressing the tensions inherent in the pursuit of sustainability (Van der Byl & Slawinski 2015).

2.3.3.4 Knowledge Approach

The knowledge approach is an emerging logic in business and corporate sustainability practice (McElroy 2003; Robinson et al. 2006). The basic assumption behind this approach is that knowledge is crucial for corporate efforts towards sustainability (Pogutz & Winn 2016). Although knowledge can play a role in addressing sustainability issues in businesses, corporations and industries, this approach is currently not well developed in the management literature (Hörisch, Johnson & Schaltegger 2015; Pogutz & Winn 2016). There is currently a lack of empirical support for a sustainability-oriented knowledge (Pogutz & Winn 2016). Although current conversations concur that knowledge promotes sustainability management (Horisch, Johnson & Schaltegger 2015) and ecological knowledge affects corporate sustainability (Pogutz & Winn 2016), exactly how local knowledge influences industry sustainability is under-exploited. This thesis contributes to both knowledge management and industry sustainability literature and address the gap in the literature by investigating sustainability of the fishing industry from a local knowledge perspective.

There are several reasons for investigating industry sustainability from a local knowledge perspective. First, one of the current challenges of knowledge management is how to make a concrete and relevant contribution to sustainable development (Laszlo & Laszlo 2002, 2007). The established link between knowledge and sustainable development suggests that knowledge and how it is managed can illuminate and improve understanding of sustainability management in businesses and corporations (McElroy 2003; Robinson et al. 2006). Second, without knowledge it is difficult for businesses and corporations to implement sustainability management strategies (Hörisch, Johnson & Schaltegger 2015), as sustainability requires knowledge-driven actions (Van Kerkhoff & Lebel 2006). Third, sustainability is a complex phenomenon that requires multiple perspectives generated through transparent collaborations and partnerships among diverse actors (Faber, Jorna & Van Engelen 2005). Businesses and corporations are appropriate platforms because they contain multiple and diverse actors gathering and integrating different ideas, insights and quality judgements to address sustainability issues (Pogutz & Winn 2016; Schaltegger, Beckmann & Hansen 2013). Fourth, knowledge is an essential tool for transforming human behaviours and developing rational actions towards sustainability (Faber et al. 2010; Jorna 2006). The extent to which corporations and businesses adopt sustainable and unsustainable behaviours and practices is influenced by how much knowledge they have acquired (Jennings & Zandbergen 1995; Jorna, Hadders & Faber 2009). Businesses and corporations need knowledge to improve their relationships with the natural environment (Boiral 2002; Siebenhüner & Arnold 2007). Sustainable behaviours of fishing companies and businesses may have consequences for sustainability of the fishing industry and, in turn, sustainable development in the Eyre Peninsula region.

2.4. Regional Sustainable Development

This subsection discusses the literature on regional sustainable development, examining current thoughts on sustainable development and sustainability to understand how these concepts are used. The literature on definitions, importance and dimensions of regional sustainable development is explored in order to gain insights regarding how sustainability of the fishing industry enhances sustainable development in the Eyre Peninsula region. In this thesis, regional sustainable development and regional sustainability are used interchangeably, because they both suggest similar meaning (Sharma & Kearins 2011).

2.4.1 Defining Sustainable Development and Sustainability

Many scholars have attempted to define sustainable development without reaching a consensus (Lélé 1991; Redclift 2005; Robinson 2004). The term has received more than 300 definitions (Dobson 1996). This imprecise meaning and lack of clarity for industry practitioners limits their ability to practise sustainable development (Boron & Murray 2004). Sustainable development, although ambiguous, is also increasingly featured in local, regional, national, international and corporate policies, aimed at determining our common future (Mebratu 1998). In this thesis, sustainable development is defined as that which provides an acceptable level of social, economic and environmental wellbeing for present and future generations.

There are several reasons for adopting this definition. Sustainable development captures the interconnection between social, economic and environmental dimensions of development that business organisations currently pursue (Gladwin, Kennelly & Krause 1995). This interconnection suggests that sustainable development is achieved when the

dimensions of social, economic and environmental development are achieved (Bruckmeier & Tovey 2008). This definition challenges business behaviours and practices underlying current development patterns that neglect social and environmental wellbeing of the planet (Bebbington 2001). It also represents a target and direction for businesses, corporations and industries to do more to achieve social, economic and environmental goals (Boron & Murray 2004). This is essential because it demonstrates that sustainable development largely depends on the contributions of industries, as originally suggested in the Brundtland Commission's report on the environment and global development in 1987 (cited in Burton 1987).

Like sustainable development, sustainability is a complex and somewhat confusing concept, because it has been given multiple meanings (Faber, Jorna & Van Engelen 2005). In this research, sustainability is operationalised as the continuous existence of an ongoing system, with a desirable long-term future state for other related systems, that is, socially, economically and environmentally sustainable. This definition of sustainability is essential, because it resonates with the central theme in this research that emphasises the need for industries to continue to exist into the long-term future. It also suggests that true sustainability is achieved when an industry considers social, economic and environmental subsystems that support long-term continuity. Indeed, there is an ongoing debate about how the long-term future of global fisheries can be sustained (Garcia & Grainger 2005; Pauly, Watson & Alder 2005).

The initial definition of sustainability emphasised environmental conservation (IUCN 1980). The term has different meanings among scholars. Sustainability requires change which involves human consciousness to live within the biophysical limits of the environment (Ciegis, Ramanauskiene & Martinkus 2015). Sustainability is an ethical principle that guides human behaviours toward the non-human world (Inyang, Schwarz

& Mbamalu 2009). It describes human–nature relationships (Dovers & Norton 1994). The notion of sustainability also reflects constraints and opportunities for protecting the environment for the present and future generations (Lélé 1991). These definitions describe sustainability as it relates to the environment, nature, ecology or human–nature relationships. Sustainability further suggests a long-term goal orientation (Faber, Jorna & Van Engelen 2005), because it is future-oriented (Basiago 1995). This has led to different interpretations of the term. Sustainability is further conceived as an ideal end state that can be sustained over time (Weingaertner & Moberg 2014). This emphasises the ability to support the ecosystem and the human activities that depend on it over time (Marcuse 1998). This explicates the notion of persistence and survivability associated with sustainability (Costanza & Patten 1995). It is also defined as an ongoing phenomenon with long-term implications (Borland et al. 2016) which are economical, and socially and environmentally sustainable, especially in regional communities (Sharma & Kearins 2011).

2.4.2 Defining Regional Sustainable Development

Although sustainable development is new to the study of regions (Potts 2010), the term has received less empirical research attention in the regional context (McGrath, Armstrong & Marinova 2004). Part of the problem is that there is little information on how sustainable development is achieved and applied to the regional context (Shearlock, James & Phillips 2000). The paucity of information, coupled with the less conceptual development of regional sustainable development, leaves a theoretical gap for this thesis to address. Considerable debate surrounds the meaning of regional sustainable development because there is no single definition of the term (McManus 2008). However, for this research, regional sustainable development, also known as

regional sustainability, is defined as the ability of a region to attain an acceptable level of social, economic and environmental wellbeing for present and future generations.

There are reasons for defining regional sustainable development in this way. First, the goal of every region is to ensure that businesses operate within the limits of supporting social, economic and ecological systems (Graymore, Sipe & Rickson 2008, 2010). To achieve that goal, regions are expected to develop practices, programs and strategies that integrate and reconcile the economic, environmental and social aspects of development in regional communities (Lein 2014). Another reason is that the notion of regional sustainable development is underpinned by a region's ability to harness sufficient resources to achieve sustainable development objectives (Nijkamp, Laschuit & Soeteman 1992). These resources represent solutions for addressing the environmental, economic and social sustainability issues in local and regional communities (Sharma & Kearins 2011). Industries are a crucial part of regional resources, which when properly managed can support development (Doloreux 2004).

2.4.3 Importance of Regional Sustainable Development

Investigating how sustainable development in the Eyre Peninsula region is achieved through the fishing industry is vital for the following reasons. Regions have well-organised industries, political institutions and regulatory systems that support sustainable development (Renn, Goble & Kastenholz 1998). This is especially the case for industries in regional Australia (McManus 2008). Examining regional sustainable development is relevant to understand how the dimensions of sustainable development are applied within a regional context (McGrath, Armstrong & Marinova 2004; Nijkamp, van den Bergh & Soeteman 1990). The study of regional sustainable

development also sheds light on the ecological effects of human activities and economic systems within regional communities (Eder & Narodoslawsky 1999), and how human activities negatively impact ecological, social and economic systems that sustain regions (Graymore, Sipe & Rickson 2010). This may provide insights as to whether social, economic and environmental practices in regions are sustainable (Bertrand et al. 2008). Exploring sustainable development in regions creates an opportunity to gather diverse solutions, insights and perspectives from multiple actors through consensus, to develop a blueprint for regional sustainability (Chan 2002). This demonstrates how the relationships between multiple actors' help achieve the goals of sustainable development in regions (Coelho et al. 2010). Studying regional sustainable development helps us understand how regions can manage and overcome economic adversity and still maintain an acceptable quality of life for people living in local communities (Christopherson, Michie & Tyler 2010; Lebel et al. 2006). Investigating regional sustainability may reveal how regional resources are harnessed and applied in a way that supports the continuous development of present and future generations (Graymore 2005). Human and economic regional resources and systems can be integrated in a way that benefits the welfare and quality of life for people living in local communities (Jones & Tonts 1995). In the same way, we can explore how the fishing industry, as a human and economic system in the Eyre Peninsula region, supports social, economic and environmental sustainability.

2.4.4 Dimensions of Regional Sustainable Development

Hopwood, Mellor and O'Brien (2005) explained that the social dimension of sustainable development relates to issues such as social equality, inclusion, justice, culture, quality of life, hunger, welfare, health, safety and security. The economic dimension touches on

economic growth, household incomes, employment, trade, and market dynamics. The environmental dimension addresses issues such as preserving ecosystems, energy, climate, air, water, land and wildlife which aim to efficiently manage natural resources. The dimensions of regional sustainable development are discussed in the following subsections.

2.4.4.1 Regional Environmental Sustainability

Environmental sustainability is a state where the natural environment is well preserved to continuously flourish (Meadowcroft 2000). Regions that pursue environmental sustainability aim to maintain natural capital, including life-supporting natural resources (Goodland 1995). Regional environmental sustainability emphasises the need to conserve and preserve the natural environment and to address environmental issues such as the depletion of ecosystem and marine organisms, climate change, depletion of the ozone layer, acid rain, loss of biodiversity, recycling, pollution and depletion of renewable and non-renewable natural resources (Hoekstra & Wiedmann 2014; Munda & Saisana 2011). Regions are expected to effectively control pollution, ensure efficient use of resources and protect natural habitats and species (Hammond et al. 1995), which are essential for both humans and organisms (Goodland 1995).

Pursuing environmental sustainability requires that regions ensure that human activities and economic systems are confined within required ecological limits and carrying capacity (Graymore, Sipe & Rickson 2010). Regional industries that generate environmental pressures are expected to take responsibility for conserving the ecosystem (Eder & Narodoslawsky 1999). Industries are considered useful partners in addressing environmental challenges because they have the much-needed skills, ideas

and technical know-how to do so (Berggren 1999). The involvement of industries in tackling regional ecological issues is crucial, because it is the basis of their own long-term survival and socioeconomic development (McManus 2008). The fishing industry can support sustainable development in the Eyre Peninsula region by managing its environmental impacts.

2.4.4.2 Regional Economic Sustainability

Regional economic sustainability involves the process of achieving economic growth and development through sound environmental practices (Spangenberg 2005). It is created, in part, when the regional economy is strong and vibrant, which increases the economic livelihoods of people living in local and regional communities (Sharma & Kearins 2011). It also involves developing programs and policies that tackle economic issues such as underemployment, unemployment, wages and income inequality, import/export, productivity, poverty alleviation, unequal wealth distribution and gross domestic product (Jain 2012; Stimson, Baum & O'Connor 2003). Achieving economic sustainability is dependent on responsible use and conversion of renewable and non-renewable resources through efficient production processes (Goodland 1995). These processes create regional economies characterised by a strong market, wealth creation, industry, services and employment (Shearlock, James & Phillips 2000).

Regional economic growth and development are considered sustainable if regions can sustainably provide different kinds of goods and services through their economic systems (Nijkamp, Laschuit & Soeteman 1992). Attaining an acceptable level of sustained economic wellbeing without nurturing the environment is impossible, because industries cannot generate economic development without the support of environmental

and social systems within which industries operate (Berggren 1999; Wallner 1999). This view has led to the suggestion that since regions cannot do without economic growth and development, stakeholders and industries should develop policies and regulations to ensure sustainable trade-offs (Nijkamp, Laschuit & Soeteman 1992). To promote sustainable regional economic development, regions and their industries must decrease negative impacts on social and ecological systems, rather than simply pursuing an increase in the production and consumption of goods and services (Wheeler 2009). These interrelationships are central to industry's support for sustainable economic development in the Eyre Peninsula region.

2.4.4.3 Regional Social Sustainability

Regional social sustainability involves the process of maintaining and improving the social wellbeing of present and future generations (Borrini-Feyerabend & Buchan 1997). Social sustainability seeks to examine social capital, human capital and wellbeing of individuals and collectives living within regional communities (Weingaertner & Moberg 2014). A growing awareness of social sustainability is attributed to negative social impacts of modern economic development including threats to social cohesion, families, culture, communities, relationships, multiculturalism and socioeconomic equality (Cuthill 2010). Social sustainability is a multi-dimensional concept because it is assessed by diverse indicators (Coelho et al. 2010) including social inclusion and participation, interactions, inequality, health, security, safety, quality of life, quality goods and services, sense of place and identity, education welfare, hunger, diversity, culture and traditions (Dempsey et al. 2011). Social processes including social learning, mental models, knowledge, actor groups, social networks and institutions are vital to understanding socio-ecological systems (Folke 2006).

Regional social sustainability ensures that people have equal access to quality of life and employment in regional communities (Graymore, Sipe & Rickson 2010), which underpins social equity, peace and justice for people in these communities (Sharma & Kearins 2011). Social sustainability also advocates for better and quality housing for people living in regions (Chiu 2002), which improves their standards of living (Godschalk 2004). Although social sustainability promises social goods, industries often do not consider social sustainability in their business strategies (Labuschagne, Brent & van Erck 2005; Visser & Sunter 2002). Social issues remain a major problem in regional Australia (Jones & Tonts 1995; Smailes 1995), and this research explores how the fishing industry contributes to the social sustainability of the people living in the Eyre Peninsula region.

2.5. Theoretical Perspectives

This section elaborates on the theoretical perspectives of this research. The section includes two subsections. The first subsection examines the literature on social capital theory, which provides an understanding of how cognitive, relational and structural processes foster knowledge acquisition and contribution towards sustainability of the fishing industry. The second subsection explores the literature on new institutional theory, to gain an understanding of how different institutions and pressures influence the sustainability of the fishing industry towards sustainable development in the Eyre Peninsula region.

2.5.1 Social Capital Theory

Social capital here refers to "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal 1998, p.243). This definition proposes that resources can be embedded within the social relations and networks of different sectors within the fishing industry (Gutierrez, Hilborn & Defeo 2011). Although there is a rapidly growing literature on social capital, the theory has been largely applied at inter-firm (Inkpen & Tsang 2005), individual (McFadyen & Cannella 2004), regional community (Putnam, Leonardi & Nanetti 1994), national and global (Fukuyama 1995), network (Burt 1997) and organisational levels (Nahapiet & Ghoshal 1998); however, social capital has received less attention at industry level (Wouter & Elfring 2008; Walker, Kogut & Shan 1997). This gap prompts an exploration of social capital, to understand how social processes and practices within the fishing industry foster knowledge acquisition and contribution towards industry sustainability.

Social capital has three major dimensions, namely structural, relational and cognitive dimensions, theorised by Nahapiet and Ghoshal (1998). This research draws upon these dimensions of social capital to explore the means by which social processes foster knowledge acquisition and contribution to sustainability of the fishing industry. The structural dimension stems from the fact that the fishing industry in the Eyre Peninsula region is a social structure that encompasses different fishing sectors. The structural social capital is consequently useful here to explore how the social interactions and connections among the different fishing sectors may influence how they acquire and contribute knowledge towards industry sustainability.

The relational dimension recognises that because the fishing industry is a multi-sector industry, there may be different and multiple business actors. This further suggests that

services are driven by business-to-business relationships and friendships. Interpersonal relationships may have been developed over years of fishing transactions and interactions. Relational social capital is vital here to investigate how these interpersonal and business relationships among actors foster knowledge acquisition and contribution.

The cognitive dimension reflects the longevity of the fishing industry. Its long life means that sectors and actors might have developed some shared codes, languages and narratives, such as accumulated stories, histories and routines from years of experience. These shared narratives among fishing sectors can build a collective industry with a shared agenda and shared interest (van Vliet 1998). Cognitive social capital helps to explain how collective interests and shared narratives influence actors to share and contribute knowledge that supports sustainability of the fishing industry.

Structural social capital is built when knowledge is created and accessed through patterns of interactions and connections between actors within social networks (Nahapiet & Ghoshal 1998). This capital includes social ties, interactions, networks, cooperation and connections within social structures (Tsai & Ghoshal 1998). These social structures encourage interactive processes where actors form social connections essential for gaining access to valuable knowledge (McFadyen & Cannella 2004). There are necessary pre-conditions for access, creation and sharing of knowledge within social structures (Nahapiet & Ghoshal 1998). For actors to access and share their personal knowledge within social networks, purpose-driven networks, direct network ties and a high level of connectivity between actors are essential (Inkpen & Tsang 2005). Actors must network with those who have similar or different knowledge, which is central to solving collective problems (Kwon & Adler 2014). They must also engage in quality interactions and connections with relevant others, creating a conducive social atmosphere for learning, sharing and acquiring new knowledge (Lundvall & Johnson

1994). The acquisition and contribution of knowledge that supports sustainability of the fishing industry requires fishing sectors and their actors to interact and develop quality social connections.

Relational social capital is generated when knowledge is created and accessed through personal relationships and friendships that are developed around trust, norms, obligations and identification (Nahapiet & Ghoshal 1998). McFadyen and Cannella (2004) state that strong interpersonal relations have the most impact on knowledge processes. Trust is defined as a perception of similar behaviours and actions among actors (Gambetta 2000). Trust is paramount in strengthening and building stronger and stable relationships and friendships (Leana & Van Buren 1999). It is trust that enables actors to freely and willingly share and acquire complex and tacit knowledge (Chowdhury 2005; Levin et al. 2004), and encourages openness to new and diverse views regarding knowledge creation and sharing. This constitutes a stronger basis to form norms of collaborations among different actors (Nahapiet & Ghoshal 1998). The extent to which actors view themselves as connected to each other is also essential because it encourages them to share their personal experiences and knowledge (Widén-Wulff & Ginman 2004). In any relationship or friendship, actors come to believe that they have a duty to continue to relate and share knowledge (Nahapiet & Ghoshal 1998). To sustain the fishing industry, actors and sectors need to develop relationships that underpin knowledge acquisition and contribution.

Cognitive social capital stems from knowledge created and obtained through shared codes, language and narratives (Nahapiet & Ghoshal 1998). This means that actors' cognition is important in knowledge processes because it creates a wider sense of community within social structures and networks (Kwon & Adler 2014). Nahapiet and Ghoshal (1998) proposed that within social situations, actors use common language and

codes to openly (or secretively) discuss and gain access to other people's knowledge and information. Actors leverage their own shared narratives, such as stories and metaphors, which are necessary for creating and making sense of multiple meanings. Lesser and Prusak (1999) add that these narratives include accumulated stories, histories, routines, experiences and symbols that are shared over a period of time. Tsai and Ghoshal (1998) stressed that common values and goals are central to cognitive social capital, and are vital to develop trusting relationships and social interactions that enable actors to share and access new knowledge. These shared goals and visions create common interests and understanding among different actors, which are necessary, if they are to pursue a common purpose and collective action (Wasko & Faraj 2005). Firms freely participate in collective activities for good reason (Tomlinson 2011). To sustain the fishing industry, the actors and sectors need to pursue collective action that supports the acquisition and contribution of knowledge.

2.5.2 New Institutional Theory

This research draws on the sociological perspective of new institutionalism, which emphasises that the underlying premises of rational actions are socially constructed and amenable to change (Meyer & Rowan 1977; Meyer & Scott 1983). Institutions here refer to regulative, normative and cultural-cognitive structures that provide stability and meaningful social life (Scott 2013). Institutionalists have always supported the sociological view of knowledge construction within institutions (Berger & Luckmann 1966; Mizruchi & Fein 1999). This perspective of institutions prompts a qualitative inquiry that seeks to understand the social construction of reality and meaning.

The central assumption underpinning new institutionalism is that institutions are paramount social structures that shape how organisations and their processes tend to acquire meaning and achieve stability over time. New institutionalism explains that rational actions are cultural, produced through an interactive process and are not directly influenced by structural conditions (DiMaggio & Powell 1983). This suggests that what happens within institutions matters more than structure. It further assumes that institutional forces help us to understand the connections between institutional processes and organisations (Scott 2008). This means that organisations, in their attempt to achieve continuity, have to deal with different kinds of pressures, besides economic pressures, through their interactions with others in the same institutional environment (Meyer & Rowan 1977; Zucker 1977).

The sociological foundation of new institutionalism reveals three means by which sustainability of the Eyre Peninsula's fishing industry may be influenced by institutional structures and their related pressures that regulate the industry. The first is that fisheries are strictly regulated at the local, regional, national and global level because their continuous existence depends on marine-based resources (Garcia et al. 1999; Garcia & Newton 1994). Despite the many institutions existing within the fishery, exactly how they influence industry sustainability is not clear, especially in the Eyre Peninsula region. Second, the fisheries have undergone and are currently undergoing institutional changes and pressures (Grafton et al. 2008). These institutional changes are expected to make them ecologically sustainable (Pauly, Watson & Alder 2005). Exactly how these institutional changes and pressures affect sustainability of the fishing industry, in the sense of longevity, has received limited empirical attention in the Eyre Peninsula. Third, the stability and continuity of every organisation is directly or indirectly influenced by social structures that are needed to regulate the actors'

behaviours and actions (Scott 2013). Though there are different institutional structures within the fisheries (Garcia et al. 1999; Garcia & Newton 1994), exactly how these structures influence sustainability of the fishing industry in the Eyre Peninsula is less understood.

New institutionalists suggest that different types of institutions influence how organisations achieve stability and continuity (Scott 1995a, 2008). Scott (1995a) theorised that there are three main kinds of institutions, namely regulative, normative and cultural-cognitive institutions. Regulative institutions constitute formal rules intended to guide behaviours and regulate interactions, which include government regulations, policies, legislation, rewards and punishments. Normative institutions constitute values, social norms and role expectations, which are socially constructed and taught through continuous social processes (Scott 2008). Cultural-cognitive institutions constitute different realities and sense-making processes. These include symbols such as signs, gestures and words, belief systems, cognitive frames and schemas of individuals and collectives in organisations. They are useful for interpreting, communicating and constructing the meaning of social phenomena in organisational contexts. These institutions are embodiments of socially constructed knowledge and reality (Mizruchi & Fein 1999). This highlights that the institutions within the fishing industry may have embedded knowledge that can be accessed and understood through social and institutional processes.

New institutional theory emphasises that institutions reflect different kinds of pressures that compel organisations to attain similarity over time, also known as isomorphism (DiMaggio & Powell 1983). The idea behind isomorphism is that, directly or indirectly, organisations tend to become similar as they transform their structures in response to internal and external pressures from their institutional environments (Slack & Hinings

1994). DiMaggio and Powell (1983) proposed that institutions reflect three major pressures, namely coercive, mimetic and normative.

Coercive pressures stem from formal and informal authorities that regulate organisational actions and behaviours. They include legal entities, government agencies, social expectations and technical circumstances that force organisations to conform, align and adhere to acceptable standards (Mizruchi & Fein 1999). For example, businesses, corporations and industries are facing tremendous institutional pressures to consider their impacts on the environment (Delmas & Toffel 2008; Hoffman & Ventresca 1999).

Mimetic pressures originate from the organisational imperative to manage uncertainties and insecurities within their institutional environments. These pressures mount when uncertainties force organisations to copy practices and standards from similar organisations. Fear of uncertainty and the need to survive exerts pressure on organisations to align their operations and structures with more modern, successful and legitimate organisations (Scott 2008).

Normative pressures are derived from professional experts who, through day-to-day activities, are forced to operationalise and regularise their work and working conditions. They do so through formal education, professional training and development programs organised by trade and professional associations and networks (Mizruchi & Fein 1999). These formal and professional initiatives are social processes and structures where norms, values and knowledge are internalised, acquired and shared (DiMaggio & Powell 1983). Thus, sustainability of the fishing industry may depend not only on knowledge interactions with different institutions, but the ability to manage multiple pressures from internal and external institutional environments.

2.6. Theoretical Framework

This section describes the theoretical framework of this study which is developed by integrating current thoughts, arguments and perspectives on key issues being explored in a way that enables us to address the research problem. The literature reviewed in this chapter explores current arguments and perspectives on local knowledge, industry sustainability and regional sustainable development. Each of these issues gave rise to research questions. These guided the theoretical investigation of the literature, always with an eye to the research problem—how local knowledge influences industry sustainability towards regional sustainable development.

This investigation exposed gaps in the literature and this thesis, in part, is an attempt to address those gaps. The literature reviewed in this chapter and current thinking on key research issues contributed to the development of a theoretical framework, as shown in Figure 2.1. This framework provides more insights into how local knowledge influences industry sustainability in a way that supports regional sustainable development by showing the interrelationships between key research issues.

The literature reviewed shows that there are different classifications of knowledge in an organisation such as domains, forms, dimensions and loci of knowledge. The view in the literature is that an organisation may depend on these categories of knowledge for their daily survival. These classifications of knowledge are likely to be acquired formally, informally, socially, observationally, experientially, collectively and individually. The literature also presents these taxonomies of knowledge as likely to be contributed through social, technological and organisational-managerial processes.

The theoretical investigation further reveals that since knowledge has social and institutional aspects, both the concept of social capital and new institutional theory can offer useful insights into how knowledge is acquired, contributed and applied in the fishing industry. The theoretical framework is therefore developed by reference to the literature that establishes that actors can, through social and institutional structures and processes acquire and contribute different kinds of knowledge.

Accordingly, it is apparent from the literature that structural, relational and cognitive social capital can influence how knowledge is acquired and contributed. Structural social capital of networks, connections and interactions; relational social capital of personal relationships and friendships based on trust; as well as cognitive social capital of shared interests, languages, narratives and collective understanding, are considered fundamental to the process of acquiring and contributing knowledge for a common purpose in organisations. Institutions and associated pressures also influence how actors interact, acquire, and contribute knowledge.

From the literature, it seems likely that the different classifications of knowledge may influence industry sustainability, although such a claim has not previously been explicitly articulated. Thus, the literature reveals that the acquisition and contribution of diverse knowledge, through different dimensions of social capital and institutional processes and pressures, may influence the continuity and stability of an industry, although such claims lack empirical evidence. The view in the literature is that institutions that regulate social, economic and environmental activities of an organisation may be developed through social processes, establishing a likely relationship between social capital, new institutional theory, and industry sustainability.

Consequently, the continuity and stability of an industry, supported by knowledge acquired and contributed through social and institutional processes, may positively or negatively support social, economic and environmental sustainability. It was apparent from the literature that industries can contribute to the processes that lead to sustainable development in regions by pursuing their own sustainability, although this has not been fully explored, especially from the fishing industry perspective. These theoretical premises are further examined through an empirical investigation of the fishing industry in the Eyre Peninsula region.

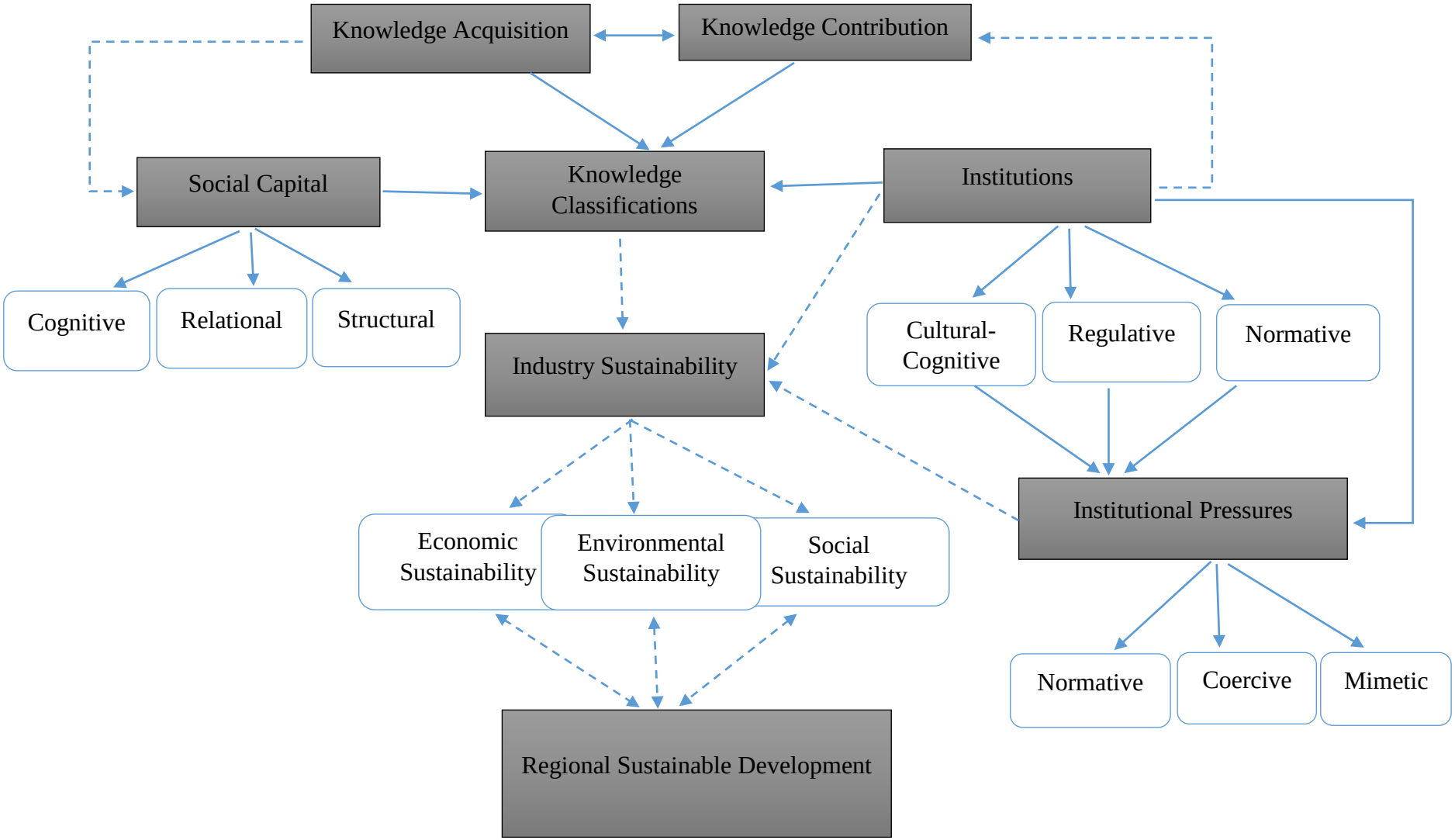

Figure 2. 1 Theoretical Framework

2.7. Conclusion

This chapter has detailed the theoretical landscape in which this research is located by reviewing the existing literature. To understand the current views on the research problem, the literature on knowledge management, industry sustainability and regional sustainable development was reviewed. Definitional challenges were addressed in regard to local knowledge, industry sustainability and regional sustainable development. Gaps in the current treatment of key research issues were also identified.

The literature on knowledge revealed different perspectives and classifications. There were diverse processes of knowledge acquisition and contribution. The industry sustainability literature provided diverse definitions and three dominant approaches on how businesses and corporations pursue sustainability. The emergent knowledge approach has only been recently suggested and has limited empirical support, especially in the fishing industry in the Eyre Peninsula region. The literature on regional sustainable development, also known as regional sustainability, showed that regions pursue social equity, economic prosperity and environmental integrity, although the role of industries in this regard has not been fully explored, particularly in relation to Eyre Peninsula's fishing industry.

The theories of social capital and new institutionalism were examined. Social capital theory proposes that knowledge acquisition and contribution are influenced by structural, relational and cognitive processes. New institutionalism theory argues that seeking continuity and stability are influenced by different institutions and pressures. Two important contributions were made by these theories. While social capital concludes that knowledge is a social process, new institutionalism argues that institutions are socially constructed. These insights direct the empirical investigation

towards a qualitative inquiry guided by social constructionist and relativist orientations to gain in-depth understanding of the research problem.

Chapter 3. Research Methodology

3.1. Introduction

This chapter outlines the research methodology used to investigate the research problem: how local knowledge influences industry sustainability towards regional sustainable development. The chapter is divided into nine sections. The first section introduces the chapter. The second section justifies the research context—the fishing industry in the Eyre Peninsula region. The third section presents the researcher's ontological and epistemological positions and explains how they informed the research process. The fourth section justifies the chosen methodological framework. The rationale for selecting three subcases is outlined in the fifth section. The overall research design is presented in the sixth section, along with the rationale for addressing the research problem. The empirical processes used in gathering and analysing evidence are explained in the seventh section. The eighth section discusses trustworthiness and rigor of the chosen methodology. The ninth section summarises the methodological framework.

3.2. Research Context

This research seeks to understand how local knowledge contributes to industry sustainability, and in turn, how industry sustainability contributes to regional sustainable development. It specifically examines how the knowledge of the fishing industry in the Eyre Peninsula region influences its long-term sustainability and subsequently impacts the sustainable development of the region. As this thesis aims to make a case for the industry's contribution to regional sustainable development,

contextual information about the socio-demographic and economic profile of the region and the regional industry setting are examined. Both the industry and region have a symbiotic relationship that spans years of socio-economic interdependency (Mazur et al. 2004). The Eyre Peninsula's fishing industry has also become a significant part of the regional economy (Pierce & Robinson 2013). There is no universal view on what constitutes a 'region'; in this thesis, region is operationalised as areas outside the capital cities, including the rural and coastal communities, like the Eyre Peninsula (Collits 2004).

3.2.1 Regional Context

The Eyre Peninsula is one of the regions in the State of South Australia. It covers an area of more than 170,4482 square kilometres (RDA, 2014) and comprises eleven local government areas, two remote Aboriginal communities and one unincorporated area serviced by the Outback Communities Authority, which acts as a management authority for the outback communities. Local government areas include: Ceduna, Cleve, Elliston, Franklin Harbour, Kimba, Lower Eyre Peninsula, Port Lincoln, Streaky Bay, Tumby Bay, Whyalla, and Wudinna (see Figure 3.1). These local government areas encompass major metropolitan and non-metropolitan (rural and coastal) communities, including the Eyre Peninsula region.

The Eyre Peninsula is regarded as having one of the most productive regional economies in South Australia – it generates an annual revenue of over $4 billion. This region produces and exports most of South Australia's premium food product-types. It is a high value adding economy that exports to domestic and foreign markets. It exported $4.144 billion of value added products to domestic and overseas markets in

2014 (RDA, 2016). Approximately 97% of the region's grain crop was exported at a value of $643 million, and approximately 82% of South Australia's seafood products were exported from the region in 2013-14 (RDA, 2014). The region's major export industries are agriculture and fishing, mining and manufacturing.

Estimated resident population of the region is 58,707 persons, which constitutes 3.6 per cent of the State's population (ABS, 2010). The growth of the mining and manufacturing industries has drawn people to Ceduna and Whyalla, whiles the growth of seaside towns and fishing businesses might also lead to the influx of people looking for a seaside lifestyle and jobs to Port Lincoln and other pristine coastal communities. Approximately 65 per cent of residents live in two major cities such as Whyalla and Port Lincoln. Whyalla is the region's largest population centre with 23,214 persons (ABS, 2010) and continue to remain as a major manufacturing centre. Port Lincoln is the second largest city in the region with 14,726 persons (ABS, 2010) and is well-known for aquaculture and fishing, agriculture and tourism. In terms of education, the regional workforce is above the State average for certificate level qualifications but below the State average for bachelor degrees and post-graduate degrees.

Eyre Peninsula has diverse industries contributing to its regional economy. The five largest employment sectors, as reported by South Australian Centre for Economic Studies in 2012 are agriculture and fisheries (18.2 per cent), retail trade (14.3 per cent), manufacturing (11.9 per cent), health and community services (10.9 per cent), and mining (1.4 per cent). The major industries include agriculture, manufacturing, fishing and aquaculture, tourism, mining, food, renewable energy, health and community services, but the regional economy is primarily driven by agriculture, aquaculture, fishing, and manufacturing. Though other industries play a significant role in the socioeconomic development of the region, the importance and contribution of the

fishing industry to the Eyre Peninsula cannot be overstated. The region is the largest seafood producer in South Australia and Australia and is internationally recognised as "Australia's Seafood Frontier".

3.2.2 Industry Context

The fishing industry is one of the oldest industries on the Eyre Peninsula, operating for more than 140 years and has many years of fishing history, tradition and experience (Pickworth, Schirmer & Cassey 2006). The industry structure comprises a wide range of fishing specialisations which include marine finfish, molluscs and crustacean. The key sectors within the finfish specialisation include Southern Bluefin Tuna, King George Whiting, Snapper, Sardine and Salmon. The key sectors within the molluscs' specialisation include Scallop, Abalone, Oyster, and Mussel. The key sectors within the crustacean specialisation include Rock Lobster, Crabs and Prawn. Each of these fishing sectors are managed by their own industry associations. For example, the Oyster sector is managed by the South Australian Oyster Growers Association (SAOGA); the Southern Bluefin Tuna sector is managed by Australian Southern Bluefin Tuna Industry Association (ASBTIA); and Northern Zone Rock Lobster sector is also managed by South Australian Northern Zone Rock Lobster Fisherman's Association (SANZRLFA).

Seafood production in the Eyre Peninsula is the largest fishing business in Australia and South Australia (Georgeson, Stobutzki & Curtotti 2014). The fishing sectors are located on the Eyre Peninsula because the region has coastal and marine environment which includes marine and conservation parks and encompasses approximately 250 islands ranging in size from about 180 to 40,000 square metres. These coastal and marine environments provide a conducive working space for most of the fishing sectors and

businesses. The fishing sectors are geographically spread across the region (e.g., Ceduna, Cleve, Elliston, Franklin Harbour, Kimba, Lower Eyre Peninsula, Port Lincoln, Streaky Bay, Tumby Bay, Whyalla, and Wudinna), and can be located along the Great Australian Bight (see Figure 3.1). But most of the fishing activities are concentrated in Port Lincoln, as one of the busiest fishing ports in the region. Each of the fishing sectors is diverse and highly specialised in catching and trading unique fish. Each sector represents a high value fish product, including Southern Bluefin Tuna, Mussels, Abalone, Oysters, Sardines, Prawns and Lobsters. The seafood products from the industry largely comes from the aquaculture and commercial wild catch.

The relative importance of the fishing industry is attributed to its socioeconomic impacts on the Eyre Peninsula region. The fishing sectors contribute to the gross domestic product of the region and the State of South Australia. Southern Bluefin Tuna is the largest single sector in the region's aquaculture industry, followed by Oyster and Marine Finfish; and the Rock Lobster sector is the most valuable commercial fishery in the region, in terms of gross value of $87 million; followed by the Abalone sector with a gross value of $30 million in 2012-13 (EconSearch 2015). The Sardine sector produces most of the total commercial catch with approximately 30,000 annual tonnes of fish (EconSearch 2015). But Southern Rock Lobster, Western King Prawn and Abalone fisheries are the biggest contributors to the regional economy, in terms of gross value (PIRSA 2015). In 2012–13, the fishing industry provided gross value of around $441 million to the State's economy (ABARES, 2015). Eyre Peninsula's commercial fishing industry contributes $379 million to the State's economy annually, and much of this wealth was generated in regional South Australia, largely from the Eyre Peninsula (EconSearch 2015).

The fishing and aquaculture industries are relatively small employers in comparison with other industries in the region, however, employment on the lower Eyre Peninsula is largely created in the agriculture, fishing and aquaculture (EconSearch 2016). The commercial fishing industry in the Eyre Peninsula generated approximately 3,108 jobs in South Australia, however, most of the jobs were created in in regional areas (PIRSA 2015). The region's aquaculture jobs are created in Port Lincoln, Lower Eyre Peninsula, Cleve, Ceduna, and Franklin Harbour. Most of the commercial fishing jobs are created in Port Lincoln, Streaky Bay, Elliston, and Ceduna. Besides creating local jobs and wealth, the fishing industry also improves the social well-being and quality of life of the people living in the region (Pickworth, Scirmer & Cassey 2006).

Fishing in the region has a dynamic value chain and reflects the diversity of actors that support the long-term sustainability of the industry (Delforce, Dickson & Hogan 2005). Within this industry, there are four main value chain elements. They include: primary production of seafood; processing of seafood products to consumers; wholesaling and distribution networks that link the production, processing and retailing of the products; and policymaking. Each link in the value chain represents a different group of actors. They include producers, processors, retailers, suppliers, industry associations, wholesalers and regulators and policymakers. Each of these fishing industry actors has a vested interest in the long-term future of the fishing industry.

The key features of the regulatory framework within the industry vary from States, regional, national and commonwealth. Global fisheries in general, and those in Australia are highly regulated industries because of their social, economic and environmental impacts (Hilborn, Orensanz & Parma 2005; Jentoft 2004). At the national and commonwealth level, the fishing industry is regulated by two important pieces of legislation: the Fisheries Management Act 1991, and the Environment

Protection and Biodiversity Conservation Act 1999. At the State and regional level, fishing in the Eyre Peninsula and South Australia are also regulated by the South Australian Fisheries Management Act 2007, and the Policy for the Co-Management of Fisheries in South Australia (PIRSA 2015). These regulations are implemented, monitored and enforced by the Australian Fisheries Management Authority (AFMA), and Primary Industries and Regions, South Australia (PIRSA). Some of the key features of the industry's regulatory framework include the Marine Parks Act 2007; and the Individual Transferable Quotas (ITQs), which enable fishermen to catch a certain amount of fish for a given period. Both the marine parks and quota systems are significant regulatory tools for protecting and conserving biological diversity and marine habitats in the region. There are other regulatory tools such as leasing and licensing, policy, legislation, and regulation as enforced by Primary Industries and Regions, South Australia (PIRSA). These institutions were created to ensure ecologically sustainable commercial fishing, recreational fishing and aquatic reserves.

From the contextual backgrounds of the industry and the region, there are different sectors and actors that are likely to pass on knowledge from one generation to another. Fishing experts, and practitioners have acquired different kinds of knowledge due to their long history of fishing and product specialisations, which offer a unique opportunity to understand how different fishing specialisations contribute their knowledge towards sustainability of the fishing industry. The relationship between the industry and the region is socioeconomically strong and the role of the fishing in the development of the Eyre Peninsula has been significant over the past years, which provide an avenue to examine how the sustainability of the industry contributes to the sustainable development of the region. Different sectors within the fishing industry prompted the adoption of a multiple embedded case study approach, which offers the

diverse sectors and actors an opportunity to reflect on their knowledge processes towards the sustainability of the industry, and how that also influence Eyre Peninsula's long-term sustainability. The next section discusses philosophical assumptions that guide methodological choices in this research context.

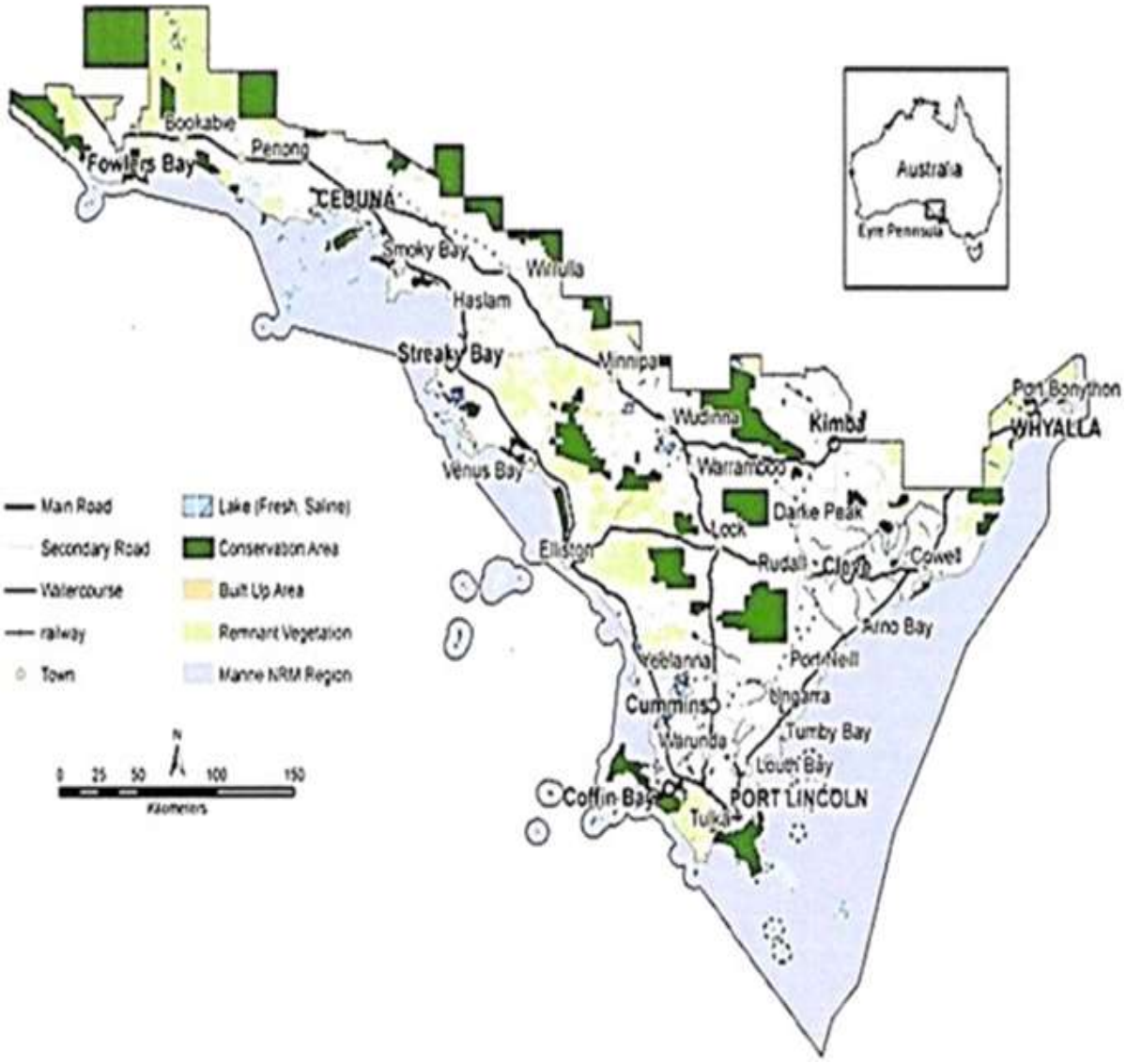

Figure 3. 1 Map of Eyre Peninsula Region

Adapted from Pierce and Robinson (2013)

3.3. Philosophical Assumptions

Every research methodology is influenced by a set of philosophical assumptions (Henn, Weinstein & Foard 2006). This is because knowingly or unknowingly, qualitative researchers bring certain beliefs, theories and assumptions to their research (Creswell 2013). These assumptions are mainly ontological and epistemological. Ontology describes the way we perceive reality while epistemology suggests how we come to know that reality (Fleetwood 2005). Philosophical assumptions underpinned my choice of methodology and grounded the research methods in an appropriate context (Crotty 1998). They further informed my approach to the research problem, how I formulated the research questions, and how I gathered relevant information to answer the questions (Creswell 2013).

Addressing the research problem was done in such a way that the chosen subcases provided multiple and knowledgeable participants. This enabled me to elicit diverse perspectives about key issues, which were useful for interpreting multiple realities. I gained insights into how participants co-constructed their realities through social interactions. This enabled me to explore and attempt some interpretation of their subjective feelings with a direct bearing on our understanding of the research problem.

The chosen methodology and methods used in this research were shaped by the ontological position of relativism and the epistemological position of social constructionism. These were adopted because they were mutually supportive and further supported an interpretive qualitative case study approach (Denzin & Lincoln 2005).

3.3.1 Ontological Position

Ontology describes the way we perceive reality (Fleetwood 2005). Identifying the ontological position here renders more transparent, how my beliefs, values and ethics influenced the direction of this investigation. I assumed that in the social world multiple realities and interpretations exist because different people see and interpret things differently (Creswell 2013). The central argument behind relativism is that because there are multiple realities, there are also multiple subjective interpretations of those realities (Guba & Lincoln 1994). Relativists believe that meaningful reality is locally constructed and co-constructed from multiple realities (Denzin & Lincoln 2005).

Consistent with the aim of this research, I adopted an interview process rather than a survey approach, as a way of constructing meaning and understanding from multiple participants working within the different fishing sectors. The intention was to elicit many perspectives, insights and experiences from diverse participants to shed light on the research problem. This personal approach to the investigation was necessary in order to gain in-depth understanding of how participants acquired and contributed their unique knowledge towards sustainability of the fishing industry.

The ontological belief of multiple realities and co-construction of meaning provided useful theoretical grounding, where case evidence was integrated to identify and examine patterns, relationships and associations among key research issues—local knowledge, industry sustainability and regional sustainable development. This is because different participants inhabit different worlds and their different worlds represent diverse ways of knowing and meaning-making (Crotty 1998). Qualitative researchers agree that relativist ontology is supportive of social constructionism as an epistemology, because multiple realities are co-constructed through lived experiences and social interactions (Creswell 2013; Denzin & Lincoln 2005).

3.3.2 Epistemological Position

Social constructionism was adopted as the epistemological foundation of this research. Ponterotto (2005, p.131) explained epistemology as "the relationship between the knower (the research participant) and the would-be knower (the researcher)". The underlying assumption is that reality is socially constructed through human interaction and language (Berger & Luckmann 1991). It further empathises social factors and how they shape interpretations, and the construction of the social world through collective processes and relational practices (Young & Collin 2004). This assumption informed the study's methodological approach in considering social processes and relational practices that influence knowledge activities within the fishing industry. During interviews and data analysis, I paid careful attention to how the participants socially interacted and constructed their meaning in the process of producing, processing, retailing and distributing, and policymaking.

Cunliffe (2008) and Burr (2015) suggested that social constructionists have three major standpoints: knowledge must be historically and culturally specific; knowledge is sustained by social processes; and knowledge is linked to an action. These standpoints helped me to arrive at the view that participants' social interactions, collective identity, language, and industry actions and practices were some of the fundamental ways to understand the research problem. I perceived their knowledge as meaning generated from multiple realities: "the social in social constructionism is about the mode of meaning generation and not about the kind of object that has to mean" (Crotty 1998, p.55).

I was aware that social constructionists can sometimes make value-laden interpretations of social reality as they are externally influenced by material, physical and social phenomena (Sayer 1997). On the other hand, this epistemological view accepts that there is an objective social reality (Andrews 2012). Consistent with this concern, I made the necessary efforts to ensure that the process of collecting, transcribing, analysing and interpreting case evidence was rigorous and the created findings properly reported (Crotty 1998). It must be noted, however, that a single objective reality in an interpretive qualitative case study may not be guaranteed. The reason being that interpretive naturalistic qualitative research does not share the same positivist orientation of most quantitative inquiries (Denzin & Lincoln 2005).

In case study research, assumptions of relativism and social constructionism support a process of abduction, which follows an iteration between inductive and deduction analysis (Järvensivu & Törnroos 2010). Abduction involves the process of addressing a research problem by combining both theoretical insights from the literature and empirical insights from the evidence gathered to provide a plausible explanation (Dubois & Gadde 2002). I gained insights from gathering and coding the interviews through inductive analysis. I also paid attention to the theoretical perspectives and framework that guide this research. The interpretation of the research problem, and responses to research questions were made by combining insights from the literature and the empirical evidence. This provided in-depth understanding of the research problem. The assumptions of relativism and social constructionism also guided my choice of the methodological framework for examining the research problem, as described in the next section.

3.4. Methodological Framework

Based on the philosophical assumptions of this research, qualitative methodology and techniques (Denzin & Lincoln 2005) in a multiple embedded case study approach (Eisenhardt 1989; Yin 1994) were employed. Multiple embedded case study approach involves collecting, integrating, analysing, and interpreting evidence from multiple subcases and participants to provide a deeper understanding of a phenomenon (Yin 1994). Denzin and Lincoln (2000) explained that qualitative inquiry is a situated activity that locates the researcher in a world that can be understood through interpretive and naturalistic approaches. Adopting interpretive qualitative methodology and methods, as well as a multiple embedded case study approach can be seen to flow naturally from the nature of the research problem, as follows.

First, I was investigating a social phenomenon—how local knowledge influences industry sustainability towards regional sustainable development. Knowledge is an outcome of social processes and practices (Berger & Luckmann 1991) which could not be easily quantified using positivist research methodologies. Adopting an interpretive and naturalistic qualitative inquiry reflected the social construction of knowledge from multiple realities through an inductive approach (Creswell 2013; Denzin & Lincoln 2000) and abductive research processes (Järvensivu & Törnroos 2010). This allowed for both empirical and theoretical observations during this investigation, which was conducive to deeper meaning through an abduction process.

Second, case study research was consistent with philosophical assumptions of relativism and social constructionism (Järvensivu & Törnroos 2010). Case studies can provide single or multiple realities and perceptions for theory building, testing and generation (Eisenhardt 1989; Yin 1994). Collecting, analysing and interpreting evidence from multiple participants provided a deeper understanding of the research

problem. Consistent with relativist and social constructionist stances, emphasis was not only placed on the social processes that fostered the construction of multiple realities of the participants, but also on the meaning they attached to their own lived and subjective experiences.

Third, knowledge within the fishing industry could be inherently complex and dynamic (Gao, Li & Nakamori 2002). This is because it was more likely to involve multiple subcases and interactions among different industry participants. The process of sharing local knowledge is highly contextual and socially complex (Díez-Vial & Montoro-Sánchez 2014). Gaining deeper insights into how knowledge was acquired and contributed by multiple participants to sustainability of the fishing industry in a way that supported the sustainable development in the Eyre Peninsula region was a complex and dynamic social process. Understanding this process meant choosing an interpretive qualitative inquiry, built on gathering rich interactive evidence from multiple participants in the fishing industry.

3.5. Multiple Embedded Case Study Approach

A multiple embedded case study approach offered a constructive opportunity to gather and integrate evidence from multiple subcases of the main case under investigation (Yin 1994). The main case in this research was the fishing industry in the Eyre Peninsula region. A multiple embedded case study approach was used to gather, analyse, and integrate evidence from multiple sources. This approach provided a deeper understanding of how local knowledge influences sustainability of the fishing industry in a way that supported sustainable development in the Eyre Peninsula region. The use of a multiple embedded case study approach can be justified as follows.

First, this case study approach was supportive of an abductive research process which permitted me to develop a theoretical perspective by exploring the literature, and undertake empirical observations by identifying emerging patterns and themes in the evidence gathered (Järvensivu & Törnroos 2010), which provided a deeper understanding of key research issues.

Second, a multiple embedded case study approach sat comfortably with the fishing industry in the Eyre Peninsula region. Both government and industry agencies referred to it as a single industry with different fishing sectors or specialisations. The Eyre Peninsula industry had eleven fishing specialisations (i.e. Southern Bluefin Tuna, Rock Lobster, Oyster, Abalone, King George Whiting, Prawns, Snapper, Crab, Mussel, Scallop, Salmon) (PIRSA 2015). These different fishing sectors constituted the subcases within the main case—the fishing industry.

Third, this approach provided an opportunity to construct a deeper meaning of the complex social issues being investigated through detailed, context-specific analysis of evidence gathered from multiple sources (Eisenhardt 1991). I used embedded analysis based on a thematic approach. Embedded analysis involves evidence from multiple subcases being integrated, analysed and interpreted to build in-depth understanding of a research problem (Miles, Huberman & Saldana 2013; Creswell 2013). This approach ensured that I noted emerging patterns, categories, and themes, and their associations.

Fourth, using this approach allowed me to use a deliberate, purposive and criterion-based selection technique to ensure selected subcases were representative of the main case (Morrow 2005; Patton 2002). Subcases were deliberately selected to represent "information rich" contexts which provided insights and in-depth understanding rather than empirical generalisations (Patton 2005). A fishing classification scheme was

adapted from (PIRSA 2015) to select the subcases. This fishing classification scheme listed all the officially approved fishing sectors. This criterion classified the fishing specialisations in the Eyre Peninsula region into three, namely: finfish, molluscs and crustaceans. I selected three subcases: the Southern Bluefin Tuna sector for finfish, the South Australian Northern Zone Rock Lobster sector for crustaceans, and the South Australian Oyster sector for molluscs, to represent each fishing specialisation in the Eyre Peninsula's fishing industry. These three sectors of the fishing industry were selected because they stand out as contributors to the development of the Eyre Peninsula region (RDA 2016; PIRSA 2015).

3.5.1 Subcase 1: South Australian Oyster Sector

The South Australian Oyster sector represents aquaculture business in the Eyre Peninsula region. The primary goal of this sector is to ensure that it develops sustainable oyster farming in South Australia. It aspires to have the least possible environmental impact. It further seeks to ensure that each of the oyster growers has equitable access to new farming opportunities and works to build a secure and predictable business environment for current and future investors in oyster farming. This reflects a growing concern regarding the sector's social, economic and environmental impact (Pierce & Robinson 2013).

The activities and management of this sector are undertaken by the South Australian Oyster Growers Association (SAOGA), which was established in 1989 (SAOGA 2017). This association was formed by a group of oyster farmers in the Eyre Peninsula region who recognised the need for collaborative management of the oyster farming business in South Australia. The establishment of SAOGA was driven by the oyster growers'

personal determination to develop their skills and expertise, protect their investments and promote their own business operations. As part of its responsibilities, SAOGA produces a quarterly newsletter which provides growers with relevant information and ideas on industry-related issues and initiatives. This sector also has a research council which supports research and development activities. In other words, the sector seeks to promote knowledge-related activities for its members.

At the time of this research, SAOGA had a total membership of 100 growers—all licenced oyster growers in South Australia. Membership is voluntary and based on annual financial subscriptions. There are different categories of membership including producers, suppliers, processors, retailers, wholesalers and policymakers. With a diverse membership across the seafood value chain, the South Australian Oyster sector stands as one of the collectives within the fishing industry. The different actors and growers ensure multiple realities within the sector, which illustrated the variety of knowledge types and sources within the fishing industry.

The major oyster grower communities on Eyre Peninsula are Cowell, Streaky Bay, Coffin Bay, Ceduna and Smoky Bay. These coastal communities are geographically dispersed, which becomes a challenge to effective communication and interaction. To address this challenge, SAOGA holds seminars, dinners and research conferences which enhance communication and interaction between growers and other actors. A management committee comprises an elected President, one or two representatives from each community across the region, and an Executive Officer (SAOGA 2017). This committee meets four times a year. Growers also hold their own meetings. Annual and quarterly general management meetings, bay meetings, seminars and dinners and research conferences provide formal and informal opportunities for growers and the other fishery-related actors to meet and interact. Exploring these interactions provided

insights into how these formal and informal social processes and practices enriched the actors' knowledge acquisition and contribution, and how their knowledge experiences influenced sustainability of the fishing industry.

SAOGA negotiates and lobbies internal and external government agencies and other trade organisations on behalf of the oyster sector. It deals with local and regional government agencies such as Primary Industries and Regions, South Australia (PIRSA) and Regional Development Agency (RDA) on matters affecting the oyster sector and the wider fishing industry. SAOGA has been proactive in developing a code of practice which aims to ensure all SAOGA members adopt the highest professional standards when harvesting, handling, and transporting products. The code of practice and professional operating standards comply with and supplement existing legislation and regulations, as approved by the Environmental Protection Authority (EPA) and PIRSA. There are institutions and agencies that support the activities of the oyster sector. These institutions and agencies are critical to sustainability of this sector and the wider fishing industry.

3.5.2 Subcase 2: Southern Bluefin Tuna Sector

The Southern Bluefin Tuna sector is a wild catch and aquaculture fishing business in the Eyre Peninsula region. It is also considered a Commonwealth fishing business because it operates interstate (Campbell, Brown & Battaglene 2000). It was pioneered through commercial fishing activities in Port Lincoln, a major fishing port in the Eyre Peninsula. Its socioeconomic impact in the region is significant—it is one of the most valuable fishing businesses in South Australia (PIRSA 2015). Although tuna fishing dates back to 1936, its commercial fishing activities started in 1951. Since 1990, the

sector has developed a tuna farming operation. Over the years, the fishermen and tuna farmers have acquired and developed rich expertise, lived experiences and skills in fishing and farming Southern Bluefin Tuna.

Looking across the sector as a whole, the shared goal becomes apparent as developing sustainable, profitable, innovative, and environmentally responsible tuna ranching, farming and fishing in the Eyre Peninsula region and Australia (ASBTIA 2017). To pursue this goal, a commitment from association members and other actors could effectively mobilise efforts and resources. In 1978, tuna boat owners in South Australia mobilised to form the Australian Southern Bluefin Tuna Industry Association (ASBTIA) which manages Southern Bluefin Tuna fishing activities. The tuna boat owners were personally motivated and willing to create a common platform for interacting and sharing ideas about fishing and farming activities. This sector plays a significant role in this investigation because it provided an opportunity to examine how these fishermen, farmers and actors acquired and contributed knowledge to sustainability of the fishing industry.

Part of ASBTIA's responsibilities is to promote continuous cooperation and collaboration among members and other value chain actors. Membership in this association has been voluntary since its inception. Individuals and businesses that hold statutory fishing rights and a quota in the Southern Bluefin Tuna sector are automatic members of ASBTIA. Most tuna quota holders are owners who have fished and farmed for generations. This means they have rich stories and lived experiences, central to understanding how the future of their fishing industry can be shaped. Actors and members within this sector are producers of the finest Southern Bluefin Tuna. Other actors, such as processors, retailers, wholesalers, industry associations, suppliers and policymakers, continuously support business activities within the sector. The sector has

diversified actors and membership and these different actors across the value chain ensure that the sector benefits from diverse perspectives, insights and expertise.

As part of its commitment to bring together its members and actors from geographically dispersed locations in the Eyre Peninsula region, the Australian Southern Bluefin Tuna Industry Association organises seminars, dinners and research workshops. These social events sometimes draw members and actors from other sectors. In these social events, findings from ongoing research projects, fishing industry progress reports and issues as well as news from the association are shared and discussed. These events are significant because they provide formal and informal avenues for actors and members to exchange information, news and ideas. This represents an important research opportunity to explore how actors acquire and contribute their knowledge in a way that influences sustainability of the fishing industry.

The activities and management of the Southern Bluefin Tuna sector are determined by institutional and political pressures because its fishing and farming operations are monitored by Commonwealth and international agencies (Bergin & Haward 1994). This sector is also managed by the Australian Fisheries Management Authority (AFMA), established by the Fisheries Administrative Act 1991. To effectively manage and control this sector, AFMA introduced fully tradeable individual transferable catch quotas (Campbell, Brown & Battaglene 2000). PIRSA is also the state government agency responsible for educating, enforcing and training fishermen and farmers in institutional information. Investigating these institutions and government agencies within the sector provided insights as to how they influenced sustainability of the fishing industry in a way that contributed to sustainable development in the Eyre Peninsula region.

Efficient management of the Southern Bluefin Tuna sector and its farming activities are influenced by findings from its cooperative research centres and by collaboration with many universities. The sector aims to understand, enhance and improve its fishing and farming methods and practices through knowledge exploration. These research and development (R&D) activities, funded by both ASBTIA and government, aim to assess the potential for fishing, farming and marketing quality Southern Bluefin Tuna, both in Australia and Asian markets. This sector appreciates knowledge acquisition, development and application.

3.5.3 Subcase 3: South Australian Northern Zone Rock Lobster Sector

The South Australian Northern Zone Rock Lobster sector operates in three coastal regions: Yorke Peninsula, Kangaroo Island and Eyre Peninsula. It is widely recognised that the impact of this sector on the Eyre Peninsula has been remarkable. The sector has been in existence since the 1870s (SANZRLFA 2017). It is a wild catch fishery. Commercial lobster fishing in South Australia began in 1899. Such a long history of fishing activity suggests many generations of knowledgeable fishermen with different stories to share, reflecting years of fishing expertise, lived experiences and rich information.

Members of the South Australian Northern Zone Rock Lobster Fisherman's Association (SANZRLFA) are licensed quota holders and fishermen who operate fishing vessels in the Yorke Peninsula, Kangaroo Island and Eyre Peninsula regions. As well as producers, SANZRLFA represents processors, wholesalers, distributors, an industry association, suppliers and policymakers who influence their fishing activities. These actors represent different motivations, perspectives and interests in the way this sector

should be managed, how to make it successful and how profitable it should be. Investigating these diverse perspectives, interests and motivations produced rich evidence as to how the continuous participation and involvement of actors in this sector developed knowledge that influenced the long-term future of the fishing industry in the Eyre Peninsula region.

Most of the members of SANZRLFA are distanced from each other, geographically dispersed across the Eyre Peninsula and other regions. To improve communication and encourage interaction among producers and other actors (i.e. processors, wholesalers, distributors, suppliers and policymakers), the industry association organises annual general meetings, dinner sessions, congresses, seminars and training workshops. During these social events, different people in the sector and the wider fishing industry are invited to make presentations, offer training, educate and inform members and other actors. These informal and formal social practices encouraged knowledge contribution and sharing among the actors.

The activities of the South Australian Northern Zone Rock Lobster sector are regulated by different institutions and government agencies. For example, their fishing operations and trading activities are monitored and regulated by PIRSA. The sector must comply with environmental policies from the EPA, as well as policy regulation and legislation, such as the South Australian Fisheries Management Act 2007, and the Policy for the Co-Management of Fisheries in South Australia, which is currently enforced by the Primary Industries and Regions South Australia (PIRSA 2015). SANZRLFA lobbies and negotiates with these regulating agencies and institutions that affect its fishing activities and business operations and see themselves as responsible for ensuring sustainability of the sector.

The Rock Lobster Fishery Management Advisory Committee (RLFMAC) was established in 2012 across the Northern and Southern Zones, to facilitate independent, objective and expertise based fishery management decision making; and the operations of the SANZRLFA are overseen by the advisory committee including an industry council (SANZRLFA 2017). Advisory committee and council selection require people with practical and professional knowledge and experience. Their primary responsibility is to develop and provide useful and practical recommendations to the appropriate regulatory authorities and agencies, so as to support the development of policies and programs concerning the sustainable operation of the sector and the wider fishing industry.

The fishing sectors described above are intimately connected to the region and their impacts are significant. Their knowledge activities, institutional environments, social processes, multiple actors, and their plans for sustainable operations justified their inclusion in the multiple embedded case study research. They offered an avenue for selecting knowledgeable research participants with years of working wisdom, lived experiences and rich information. The research design is described and justified in the next section.

3.6. Research Design

This research was conceived as an interpretive qualitative multiple embedded case study (Creswell 2013). The argument against case studies is that they offer a limited basis for generalisation (Eisenhardt 1989). To address this concern, a multiple embedded case study design was employed, as suggested by Yin (2003). This meant drawing evidence from multiple subcases within the main case of the fishing industry in

the Eyre Peninsula region. These subcases provided the opportunity for a richer understanding of the issues at the heart of the research problem. This research set out to explore the research problem from the perspective of a single major case, which was the fishing industry, by gathering information from its fishing sectors or specialisations. Fishing is a complex industry with multiple fishing sectors, and three representative subcases or units were selected.

The South Australian Oyster sector, Southern Bluefin Tuna sector and South Australian Northern Zone Rock Lobster sector were selected. These subcases were chosen because they provided "information rich" contexts (Patton 2005) and they had knowledgeable participants who have been in the industry for many years. These subcases allowed in-depth understanding of the research problem and supported the multiple embedded case study research design employed in this qualitative investigation. The research design is illustrated in Figure 3.2.

To address the research problem, I reviewed the relevant literature and undertook empirical investigations. The literature review was guided by the research issues, which helped me to develop relevant research questions. I broadly reviewed and synthesised the theories on knowledge management, industry sustainability and regional sustainable development. Getting immersed in the theories was necessary because it helped me to clearly identify and describe theoretical gaps and to develop useful interview questions for fieldwork and data collection.

Exploring theories through the literature review and developing and refining interview questions are important components in qualitative case study research design (Järvensivu & Törnroos 2010). Gioia, Corley, and Hamilton (2013, p.21) have noted "we are never completely uninformed about prior works…. some combination of

knowing and not knowing amounts to another fine balancing act that allows for discovery without reinventing the well-ridden wheels". This view guided me to develop relevant interview questions that address gaps in the literature and to address the research questions and research problem.

During the data collection, case evidence was gathered through in-depth interviews ranging from formal to informal techniques. Participants were interviewed in many locations. For example, some were interviewed at their workstations while others preferred being interviewed informally in their fishing vessels anchored at the wharf. During the informal interview process, my safety and security and that of participants were ensured. The nature of the evidence gathering technique was largely semi-structured interviews. This technique ensured flexible interaction and rich conversations with participants (Myers & Newman 2007).

I employed an embedded analysis, based on a thematic approach, for handling the case evidence because they were gathered from three subcases or units of a single major case (Creswell 2013; Miles, Huberman & Saldana 2013). Embedded analysis is recognised as that which is capable of enhancing the generalisability and transferability of case findings to other similar contexts (Creswell 2013). A thematic approach was vital because it helped me to identify, analyse and report deep and rich patterns and themes across the case evidence (Braun & Clarke 2006). The embedded analysis was done by integrating and interpreting all the evidence from the three subcases, so as to provide a deeper and holistic understanding from multiple realities (Creswell 2013).

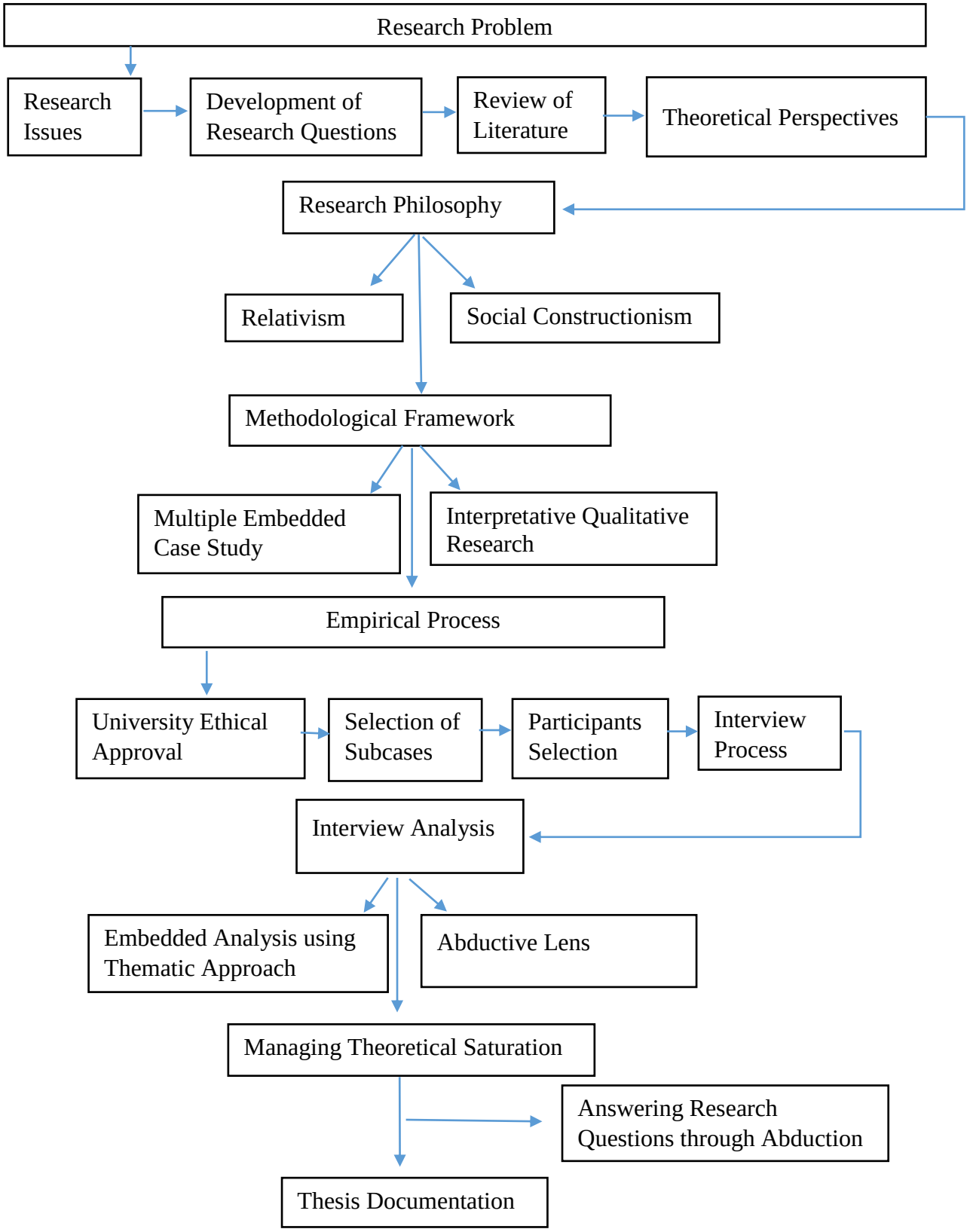

Figure 3. 2 Research Design

Evidence gathering reached saturation at particular points. Data and theoretical saturation were reached when I realised that the interview evidence was adding nothing new to what was already known (Bowen 2008). During the thematic analysis, I got to a point where I stopped looking for conceptual categories when nothing new was apparent. At that point, the interview process and the thematic analysis procedure ceased because additional evidence and interviews provided little in terms of new themes, insights, and perspectives during the synthesis (Suri 2011).

This research adopted an abductive analytical lens during the empirical investigation. The abduction logic supported an iterative or recursive process of going back and forth between theory and empirical evidence continuously during the investigation (Järvensivu & Törnroos 2010). I must indicate here that there was no absolute inductive process in this research. This is because most qualitative inquiries are informed by the researchers' prior knowledge or theoretical background in the field of study (Gioia, Corley & Hamilton 2013; Timmermans & Tavory 2012). Consistent with an abductive logic, I was informed about prior scholarly work but made every effort to avoid confirmation bias – that is, the tendency to search and interpret information that confirms pre-existing hypotheses (Gioia, Corley & Hamilton 2013). The following section provides a detailed description and justification for how the case evidence was gathered, integrated, analysed, interpreted and discussed.

3.7. Empirical Process

The empirical process in this research involved evidence gathering, analysis, interpretation and discussion. I sought to obtain a deeper insight into how local

knowledge influences industry sustainability towards regional sustainable development. Semi-structured, face-to-face interviews were used to gather evidence from the subcases, as was appropriate for a qualitative case study design (Denzin & Lincoln 2005; Yin 2013). During the embedded analysis using a thematic approach (Creswell 2013), I made every effort to pay attention to the actual phrases, texts and words because they were the evidence that helped me construct the meaning of the research problem (Gephart 2004).

Participants were interviewed across three subcases. They were interviewed from subcase 1 (South Australian Oyster sector), subcase 2 (Southern Bluefin Tuna sector) and subcase 3 (South Australian Northern Zone Rock Lobster sector). The participants were producers (fishermen, farmers and growers), as well as processors, suppliers, wholesalers, retailers, executives of industry associations and policymakers. They represented the value chain of the fishery, and played strategic roles along the value chain. The value chain was vertically integrated (Delforce, Dickson & Hogan 2005), which meant that some of the participants provided services across more than one value chain and across different sectors.

3.7.1 Ethical Consideration

Ethical concerns were raised prior to this investigation, at the beginning of this investigation and during evidence gathering, analysis, interpretation and reporting. As part of my ethical responsibilities, I safeguarded the safety and security of the participants. Denzin and Lincoln (2005) suggested that because the objects of inquiry in interviewing are humans, extreme care must be taken to avoid any harm to them. I took extreme care in the way I conducted myself before, during and after the interview

process. Prior to this investigation, I obtained ethics approval from the University of Adelaide Human Research Ethics Committee (see Appendix B), which was satisfied that my research posed no physical, emotional and psychological harm to participants. This meant my research involved no more than low risk for research participants. The committee approved and authorised commencement of the research on the 27th February 2015.

Being an international student with little knowledge of my research context when I arrived, I initially made an informal visit to the Eyre Peninsula, and visited some of the fishing communities in the region. This visit was vital because I was able to contact some of the Executive Officers of industry associations, who served as "gatekeepers" and offered access to the fishing industry and to their members. This helped me to gain access to relevant participants and to quality information (Feldman, Bell & Berger 2004). I informally talked to the Executive Officers of these industry associations about my research intentions, without interviewing them.

Formal consent was later sought from each of the Executive Officers of the industry associations by emailing the consent form, participants' information sheet and complaints procedure form to them (see Appendix D). These ethics documents provided clear information about the purpose and nature of the research, perceived risks and benefits, and where possible emergency contacts if anything should happen to me, or any of the participants. I asked them to distribute these documents to their members, and to put me in contact with their members and other industry-related actors who agreed to be participants. This helped me to build rapport with the fishery, its industry associations and the participants before interviewing.

During the interview process, participation was voluntary and none of the participants was forced to participate, either by me or their industry association executives. When I had a sufficient starting number of contacts, I travelled to the locations of the participants in the region. The interview process was organised ethically. Before the interviews, participants were asked to sign the consent form (see Appendix C) and they agreed for the interviews to be digitally recorded using an audio tape-recorder. The data obtained from the participants was stored in a secure place consistent with The University of Adelaide's research policies and regulations. I promised participants confidentiality and anonymity when reporting the findings. This was done by using only their individual sectors and value chain labels but not their job titles and names, as the participants worked and lived in small fishing communities where their identities could easily be discerned.

3.7.2 Participant Selection

A purposive selection procedure was employed. This purposive sampling procedure enabled me to gather rich information from relevant participants (Patton 2002). This provided a comprehensive view of the fishing industry by interviewing information-rich participants from information rich subcases.

A total of 54 participants were purposively selected across the three subcases in the Eyre Peninsula's fishing industry. The participants represented horizontal, vertical and lateral actors in the value chain. The horizontal actors were selected from competitive individual sectors; the vertical actors included processors, suppliers, distributors and retailers; and the lateral actors included regulatory agencies and industry associations (Brown et al. 2010). In this research, the interview participants constituted seafood

producers (e.g. fishermen, farmers, deckhands, divers, and farm managers), processors, suppliers, wholesalers, retailers, industry association executives and regulatory agencies. All the interviewees were local to the region. Categories, number and current positions of participants are shown in Table 3.1.

Table 3. 1 Participants Characteristics

Categories	Number of Participants	Current Positions
Horizontal Actors	**35**	
Oyster sector	11	5× Growers 3× Divers 3× Farm Managers
Bluefin Tuna sector	13	3× Deckhands 4× Fishermen/Farmers 3× Divers 3× Farm Managers
Rock Lobster sector	11	3× Deckhands 3× Fishermen 3× Divers 2× Farm Managers
Vertical actors	**8**	4× Suppliers [a] 4× Processors/Wholesalers/Retailers [a]
Lateral actors	**11**	Policymakers: 1× RDA [a, b] 2× PIRSA [a, c] 1× AFMA [a, d] 7×Industry Associations: 2× ASBTIA 3× SANZRLFA 2× SAOGA
Total number of interviewees	**54**	

[a] Vertically integrated and operate across multiple industry sectors. [a, b] Regional Development Agency. [a, c] Australian Fisheries Management Authority. [a, d] Department of Primary Industries and Regions, South Australia.

These participants were deemed appropriate for the following reasons. First, I wanted to make sure that the selected participants represented the entire seafood value chain. Second, I intended to select participants from the entire value chain of the fishery, because they play strategic roles and were actively and deeply involved in business

activities. Third, these participants provided differing perspectives on and stories about key issues being explored in this investigation. Their years of experience and insights provided a local understanding of the research problem (Maxwell 1992). This was a useful avenue to gather, analyse and interpret their lived experiences in constructing the deeper meaning of the problem (Patton 2002). The following subsection discusses how the participants were interviewed.

3.7.3 Interview Process

Semi-structured interviews provided the core data for this research. In-depth interviews were suitable for eliciting actors' experiences, insights and stories to understand how local knowledge influences industry sustainability towards regional sustainable development. The interview process was case-by-case evidence gathering. This provided an opportunity to revise some of the initial research questions as the investigation progressed. This approach was also constructive because key research issues needed to be informed by the perspectives of interviewees (Gioia, Corley & Hamilton 2013).

Semi-structured interviews were chosen as the most appropriate evidence gathering procedures to collect rich information and further explore the subjective experiences of interviewees (Denzin & Lincoln 2000). I used semi-structured interviews to build rapport, interact and talk freely with interviewees, which generated deep insights and stories (Patton 2002). This method allowed interviewees to express themselves without any pressure, which is one of the limitations of structured interviews (Van der Zee, Bakker & Bakker 2002). The interview process created a positive atmosphere, which enabled interviewees to raise unexpected issues and concerns, which were addressed.

The case evidence was gathered from interviewees who represented vertical, horizontal and lateral actors. The duration of each interview was 20 –50 minutes. In total participants provided 35 hours of interviews. There is currently no consensus on the appropriate number of interviews or sufficient time period for conducting interviews (Guest, Bunce & Johnson 2006), so I erred on the side of more than not enough.

During interviews, I followed the interview guide which contained key questions (see Appendix A). These questions were open-ended but they focused on key issues in this research such as local knowledge, industry sustainability and regional sustainable development. For example, I asked interviewees to explain how they learned about fishing, how they felt they had an opportunity to contribute their knowledge towards the long-term development of the fishing industry, and how they thought their fishing sector activities contributed to long-term sustainability in the Eyre Peninsula region.

The end of the interview was as important as the beginning, because it provided an opportunity for recapping. I invited interviewees to make suggestions and seek clarification on what we had discussed. This approach enabled them to add new information. Through this review process, I could rectify any inconsistent information regarding issues we discussed. Agreements were noted and disagreements were resolved. The digitally recorded files were then uploaded to NVivo (version 11) software application on my computer ready for transcription.

3.7.4 Interview Analysis

Qualitative data were prepared for analysis. For the sake of clarity, data and interview transcripts are used here interchangeably. There is no single agreed-upon canon for analysing qualitative data (Burnard 1991). Leading scholars in qualitative research such

as Creswell (2013), Miles, Huberman and Saldana (2013) and Denzin and Lincoln (2005) have suggested various approaches that qualitative researchers use to analyse interview transcripts. In this research, the interview transcripts were transformed into findings by adopting embedded analysis using a thematic approach as recommended by Creswell (2013). This enabled evidence gathered from three subcases to be categorised according to emerging themes (Braun & Clarke 2006). This was useful because I wanted to identify, analyse and report emerging themes and patterns in a way that provide a holistic understanding of how actors thought their knowledge influenced sustainability of the fishing industry in a way that supported sustainable development of the Eyre Peninsula. Data collection, data analysis and report writing are interrelated and were not treated as distinct stages but occurred concurrently (Creswell 2013). The procedure for embedded analysis using a thematic approach involved five steps: organising the data; reading and memoing; describing and classifying data into codes and themes; interpreting data; and representing and visualising the data as discussed in the following subsections.

3.7.4.1 Organising the Data

I uploaded the interview files to NVivo (version 11) software application which helped me to shape, manage and analyse the data. I then started the process of transcription. There is no consensus on acceptable standards for interview transcription in qualitative research (Gilbert 1993; Lapadat & Lindsay 1999). The purpose of the transcription in this research was about interpretation and generating meaning (Halcomb & Davidson 2006). I listened to all conversations and selected data that were consistent with the objectives of this investigation (Gilbert 1993). The relevance of transcription is to embark on a journey, where the researcher can reflect on theoretical objectives and

definitions of the investigation (Ochs 1979). In this study, the theoretical objective was to generate meaning. I listened to the audiotape recordings of interviews repeatedly. I converted the data files into appropriate text units such as words, phrases and sentences, called interview transcripts (Burnard 1991). These were typed and stored using NVivo software. I was immersed in the transcription process for several months before the coding started. The closeness to the data made me more familiar with the transcripts, which was useful for organising, coding, analysing and interpreting the data (Gilbert 2002). I could review and retrieve this material whenever I wanted, because computer-assisted qualitative analysis ensured proper handling and management of the data files and interview transcripts (Bazeley & Jackson 2013).

3.7.4.2 Reading and Memoing

Following the organisation of the data, I read the interview transcripts in their entirety several times over, so as to immerse myself in the details of the transcripts, before coding. I read volumes of notes and wrote memos with the help of NVivo which enabled insights and impressions to be captured. Predetermined questions were initially ignored because I wanted to have a sense of the data towards a careful coding, analysis and interpretation of the interview transcripts (Gilbert 2002).

3.7.4.3 Describing and Classifying the Data into Codes and Themes

Reading and memoing were followed by describing and classifying the data into codes and themes. Coding describes identifying, sorting, collating and assigning codes or evidence into key themes and sub-themes (Strauss & Corbin 1998). I sorted data according to themes from the terms and language used by interviewees for coding, a

process known as first-order analysis (Strauss and Corbin 1998). I wanted to understand key issues from the perspective of interviewees. During first-order analysis, hundreds of first-order themes and thousands of codes were generated from words, text and terms. These were coded because they were relevant to answering the research questions and informing the research problem, which was consistent with the abductive research process (Järvensivu & Törnroos 2010). I identified emerging concepts from the perspectives of interviewees. For example, emerging themes included: ways of learning, types of knowledge, sustainable fishery, institutions, efficiency, competitive advantage, foreign markets, regional development, social interactions, industry associations, governments, economically sustainable, and environmentally sustainable and these themes appeared repeatedly. These themes formed the initial coding frame but they were distilled during second-order coding.

During second-order coding, first-order themes were examined against key research issues such as local knowledge, industry sustainability and regional sustainable development. To ensure that the research questions were answered and the research problem addressed, I distilled and created new themes by bringing several initial codes and themes together, which is known as second–order coding (Strauss and Corbin 1998). I remained open to other emerging codes and themes during second-order coding. For example, newly created themes included: types of local knowledge, learning mechanisms, interactive processes, knowledge influences and regional sustainable development. I created a hierarchy of themes and sub-themes. I decided which themes were more important, and others became sub-themes and sub-sub-themes. For example, “regional sustainable development” had a sub-theme “environmental sustainability”, which had other sub-sub-themes such as environmental protection, clean-up exercises, recycling and managing fish stocks, mortalities and

depletion. These were not entirely different from first-order themes. As such they also provided a rich story of how local knowledge influences industry sustainability towards regional sustainable development through careful interpretation.

3.7.4.4 Interpreting the Data

Interpretation in this research involved making sense of the evidence and "lessons learned" (Guba & Lincoln 1985). To do that, I looked beyond the codes and themes and sub-themes to construct meaning. I gathered insights, hunches, intuitions and impressions of what was going on in the evidence. As I transcribed the interviews, any impressions and insights from the transcripts were jotted down in a form of notes or memos using NVivo. This provided a rich account of stories embedded within the evidence. There was a fine balance between what the evidence was showing and what interviewees were telling me about key research issues being explored. I observed some patterns between themes and sub-themes which were noted for explaining the perceived links among key issues being investigated. I paid attention to the "voices" of interviewees which was the most appropriate way to provide both theoretical and practical understanding (Locke & Golden-Biddle 1997). I used relevant quotes to explain and justify each emerging theme and sub-theme, to demonstrate how the evidence answered the research questions and informed the research problem in relation to the existing literature and theories.

3.7.4.5 Representing and Visualising the Data

Following interpretation of evidence, relevant quotes were used to describe and support each of the emerging themes, sub-themes and sub-sub-themes presented in the findings.

Results Tables were created to detail the results (see Appendix E). It must be noted here that the evidence in the tables does not represent all the data gathered. Although Miles and Huberman (1994) have suggested that investigators do a preliminary counting of codes to determine frequency and importance, I did not count the codes or texts because such positivist orientation was inconsistent with the ontological and epistemological assumptions of this research.

3.8. Methodological Trustworthiness and Rigor

As outlined above, I adopted relativism as an ontology and social constructionism as the epistemology of this research. I further employed embedded analysis using a thematic approach to transform the interviews. My ontological perspective assumed that social phenomenon can be explored from multiple realities and interpretations which means constructing a meaningful reality is context-specific. Epistemologically, this research was underpinned by the assumption that meaning is socially constructed through human interactions and language. This assumption allowed me to choose approaches that differed from validity and reliability techniques to ensure rigor and trustworthiness. The methodological trustworthiness and rigor of this research were instead ensured through credibility, dependability, transferability and confirmability as suggested by Guba and Lincoln (1985) and discussed below.

Credibility explains the consistency between interpretation and description of the data. In this research, credibility was ensured by purposively selecting three "information-rich" subcases which represented the fishing industry in the Eyre Peninsula region. Knowledgeable participants across these subcases were purposively selected and interviewed. I employed a purposive selection technique to ensure that participants

interviewed represented the wider industry population. The subcases and participants were selected to ensure that the transcription, reading and memoing, description and classification, interpretation, and representation and visualisations during the analysis, as well as the findings and discussion chapter, truly represented the voices and responses from the participants. The findings were consistent with the views and perspectives expressed by participants in this study. I made my interpretations and drew conclusions from multiple evidence, representative subcases and key participants from the fishing industry. I had prolonged engagement with these participants and gathered evidence for more than eighteen months. I ended each interview with a participant by double-checking apparent inconsistencies and consistencies with them.

Dependability describes how the findings consider context-specific variations. It further ensures that researchers are responsible for reporting the research process in a logical, traceable and clearly documented way (Schwandt 2007). In relation to dependability, this research was transparent and rigorous. I conducted an audit trail, where my supervisors ensured that the right processes were followed to arrive at my conclusions. I was reflexive in my account of the entire research process. In this methodology chapter, I have provided a systematic account of my experience during the investigation in the research setting. I have shown how ethical concerns were addressed, and how I contacted industry associations, chose the three subcases, selected key participants, conducted the interviews, transcribed data, analysed the evidence and ensured that my interpretation was consistent with the views and perspectives of participants. I did that to ensure that subsequent researchers can follow the same research processes towards similar research outcomes. The findings considered context-specific differences between subcases because although fishing sectors were diverse, the issues explored were common and of great importance to all stakeholders.

Transferability refers to the generalisability of the findings (Tobin & Begley 2004). I sought in-depth understanding of the research problem. Though I did not seek to generalise the findings of this research outside the fishery, the outcomes of this investigation can be generalised to other settings. Using multiple subcases, and integrating multiple evidence to construct meaning through embedded analysis provided a solid ground for a level of generalisability and subsequently ensured transferability (Eisenhardt 1989; Yin 1994). Adopting ontological and epistemological assumptions and the research methods employed in this investigation to explore other settings could further enhance the transferability of the empirical process.

Confirmability is concerned with objectivity and neutrality of the research findings and seeks to establish that evidence and the interpretation of evidence are not an invention from the author's imagination (Tobin & Begley 2004). Complete objectivity could not be guaranteed in research that employed relativist and constructivist assumptions, because social construction of reality and co-creation of multiple realities are fundamentally inter-subjective and require subjective interpretation (Denzin & Lincoln 2005). Instead of objective interpretation, the outcomes of this research were "created findings" through subjective and authentic interpretation (Guba & Lincoln 1994). All the data files including audio-recorded interviews, interview transcripts, and coding are secured in the NVivo software for easy access if auditing is needed.

3.9. Conclusion

Adopting relativism as an ontology and social constructionism as an epistemology of this research meant choosing qualitative inquiry to investigate how local knowledge influences industry sustainability towards regional sustainable development. Choosing

the fishing industry in the Eyre Peninsula region led me to purposively select three subcases and key participants. Both qualitative inquiry and case study research required deeper interaction with participants in their natural settings to gain in-depth understanding of their perspectives on key issues that informed the research problem. I did this through semi-structured interviews and analysing interview transcripts. I employed strategies to ensure interviewees' anonymity and confidentiality. Given that I was an international student in Australia and had no knowledge of my research context, I devised ways of accessing my research setting and successfully carried out my investigation. To provide an accurate and detailed background description of each of the subcases, I relied on current information provided by the executive officers of industry associations, supported by relevant literature. The research process was carried out through an abductive lens. I employed embedded analysis using a thematic approach to transform the data. I analysed the data with the help of NVivo software. The findings were presented in a way that reflected the feelings, thoughts and experiences of participants. The trustworthiness and rigor of the methods employed in this research were ensured by addressing credibility, dependability, transferability and confirmability criteria. The presentation and discussion of findings are detailed in the following chapter.

Chapter 4. Findings and Discussion

4.1. Introduction

This chapter presents and discusses the findings of this study. The findings emerge from embedded data analysis using a thematic approach, previously discussed in Chapter 3. The findings make sense of the research problem: how local knowledge influences industry sustainability towards regional sustainable development. As part of the analytical framework, excerpts from the evidence are detailed in tables (see Appendix E).

This chapter is divided into three sections. The first section introduces the chapter. The second section presents the findings of this study by describing relevant themes and sub-themes using evidence from the analysis. The evidence is also discussed by interpreting their meaning for answering the research question and addressing the research problem. The discussion draws on insights and ideas from the literature and theories previously explored in Chapter 2. The third section summarises major empirical findings of this study to show how they addressed the research problem, answered the research questions and achieved the objectives of this thesis.

4.2. Findings

The main theoretical insight from these findings is that different kinds of local knowledge, acquired through multiple learning mechanisms and largely contributed through social processes have strategic, organisational and commercial influence on

sustainability of the fishing industry, which has subsequent implications for sustainable development in the Eyre Peninsula region.

This section consists of five subsections. The five subsections present, interpret and discuss the findings that answer the research questions and address the research problem. The first subsection interprets and discusses evidence on different kinds of local knowledge that influence the sustainability of the fishing industry. The second subsection provides evidence from the analysis to understand how the knowledge that influences the sustainability of the industry is acquired. The third subsection interprets the results to provide an understanding of how the knowledge that influences the sustainability of the industry is contributed. The fourth subsection interprets evidence from the case study to provide an understanding of how the knowledge influences the sustainability of the fishing industry. The fifth subsection provides an understanding of how the sustainability of the fishing industry influences sustainable development in the Eyre Peninsula region.

For the sake of clarity in reporting these findings, illustrative quotes from the horizontal actors across the subcases are represented as Tuna, Oyster and Lobster sectors as producers. Those from the processors, suppliers, distributors and retailers are represented as vertical actors, while those from the policymakers and industry associations are represented as lateral actors. This is essential to guarantee the confidentiality and anonymity of the participants.

4.2.1 Local Knowledge for Industry Sustainability

This section presents and interprets the evidence from the analysis that identifies the different kinds of local knowledge that influence the sustainability of the fishing

industry. Although extensive research has produced an enormous list of different types of knowledge (Blackler 1995; Grant & Berkes 2007; Lam 2000; Nonaka 1994), exactly which of them are relevant for sustaining the long-term future of an industry has been under-researched. The empirical evidence revealed that the sustainability of the fishing industry is underpinned by a mix of historic and modern skills, ideas, experience, expertise and information, which are deeply rooted and developed within the industry, such as industrial, generational, institutional, collective, professional, scientific and technological knowledge.

4.2.1.1 Industrial Knowledge

The evidence suggests that sustainability of the industry is influenced by industrial knowledge. The industrial knowledge relates to the commercial and business expertise in fishing. A majority of interviewees admitted that one of the previous challenges was lack of fishing knowledge, which nearly destroyed the industry. Some of them maintained that they currently have enough knowledge to secure the fishery and without it, it was impossible to sustain the industry. This finding suggests that industrial knowledge emerges from the specialised fishing industry sectors. This means that sectors are vital sources of knowledge for developing an industry (Adams, Brusoni & Malerba 2011). The notion that an industry's knowledge is the combination of the skills, insights and ideas of its individual firms has already been emphasised by Zack (1999a). The interviewees also described their industrial expertise as 'fishing power' or 'fishing knowledge'. This finding further showed that the sectors in the fishing industry had enormous amounts of industrial fishing knowledge which continue to underpin its survivability and sustainability:

Tuna sector: With all the knowledge, we don't need any knowledge of how to catch fish. Fishing power is not a problem anymore……fishing knowledge is not a problem anymore. We are talking about Tuna developing new idea and expertise around breeding fish in the way Japanese do it, and they tried to do it here and having been successful for several years. So, they are the core thing that we think about when we talk about sustainability of this industry.

Lateral actor: A lot of the time you are working with industry and you've got to have a knowledge-base to start with. So, you've got to learn about how the industry works to survive.

4.2.1.2 Generational Knowledge

The experiences of interviewees suggest that the industry's continued existence is assisted by its generational knowledge. Interestingly, the majority of interviewees were generational family fishermen who inherited their ideas, information and experiences from their parents and other family members. Some came from families that pioneered certain sectors within the fisheries' industry. For example, one of them revealed that his family was the original pioneer of the Tuna sector and thus gained his knowledge from working with them. The older generation were delighted to transfer their experiences to the younger generation to continue the family fishing businesses. The evidence indicated that the knowledge that sustained the fishing industry included experiences and expertise from different generations. Although generational knowledge is known to support the maintenance of family values (Liebowitz et al. 2007), there is less research on how it contributes to sustainability of a fishing industry. The interviews suggest that the rationale for the exchange of the inter-generational knowledge was to sustain the long-term future of the small family fishing businesses that constitutes the fishing industry:

Tuna sector: Back then my family pioneered the tuna fishery. My family was in Tuna fishing industry from 1952-1968. From maybe when I was four years old. I learned from my Father, my Brothers and Uncles.

Lobster sector: I just handed my experience to my oldest Son. I hope the next generation will continue to fish the license.

4.2.1.3 Institutional Knowledge

Institutional knowledge has been indispensable to the continuous existence of the fishing industry. Information from most of interviewees revealed that institutions were barriers and facilitators of industry sustainability. Conversations with the policymakers suggested that they work hard to equip the sectors and their actors with relevant institutional information to make the good decisions that underline the success of the industry. The actors knew the rules, regulations and legislation that governed their business operations and transactions. They also knew the consequences of disregarding those rules and regulations. This finding echoes the views of the classical new institutionalists that institutions are social construction where rational actions and behaviours are either formed or changed due to new information (Meyer & Rowan 1977; Meyer & Scott 1983). The finding is also consistent with the ideas from the previous scholarly works that institutions are embodiments of knowledge that shape the actions and behaviours of firms and industries (Chetty, Eriksson & Lindbergh 2006; Hardin 2009). The general impression from interviewees was that sustainability of the fishing industry was supported by reasonable institutions and their embedded knowledge:

Lateral actor: They know how the institutions operate. They know our compliance regimes. A long way to making sure the fishermen have the information to make a good decision about their businesses. If they fail to be educated or understand the rules or ignore the rules that is where the compliance side comes along and they get fines or whatever. Sure, in the long-term because if we do not get it right down here is not going to get right out there.

The finding also showed that although institutions, such as rules and regulations, are vital sources of information and knowledge, they also exert pressures. The information from interviewees further revealed mixed feelings about existing regulatory environments. While some of them were happy about getting the right information and knowledge from the institutions, others were unhappy that these institutions were undermining the industry, as some institutional pressures within the industry had led to the demise of some of the sectors. For example, some of the interviewees said that the current quota system supports the long-term existence of the industry. There were other interviewees who also felt that the introduction of the marine parks has contributed to the shrinking or eventual collapse of some of the sectors:

> *Oyster sector: There got to be regulations but the regulations should be sensible regulations as well. Legislation is starting to erode those sectors.*
>
> *Tuna sector: I think through the quota system we protect what we've got as well. Is not something like I see in other countries where it is not a protected sort of business and anyone can come in and do whatever they like. There is a quota system in place which is allocated to license holders and they have the license to go and catch a certain amount of fish. This means that for catching too much the prices will drop and then it will damage the industry.*
>
> *Lobster sector: The Cray fishing [Lobster] sector that is contracting because of Marine Parks, and the guys have cut out the traditional areas they use to fish, so all that means is that, they are getting a bit smaller and the price of Crayfish is going up dramatically.*

This finding is inconsistent with suggestions from new institutional theorists that different institutions, such as normative, regulative and cognitive-cultural institutions, which produce normative, coercive and mimic pressures are useful for the long-term stability and continuity of organisations (DiMaggio & Powell 1983; Scott 2008). However, this finding rather reiterates the concerns raised by Aldrich and Fiol (1994) that certain institutions can have detrimental effects on the creation and continuity of industries. The above findings suggest that institutions have differing influence on the sustainability or otherwise of the fishing industry.

4.2.1.4 Collective Knowledge

The knowledge of the collective of fishing experts and practitioners within the industry is essential for its long-term sustainability. When asked how they could support the continuous development of their industry, most of interviewees said they rely on their collective knowledge. The fishing industry consists of multiple sectors and actors with different expert knowledge and product specialisations. The continuous existence of the fishing industry has been possible because it functioned as a collective by combining knowledge resources. Although the fishing industry is made up of different sectors and actors, they function as a collective when it comes to meeting bigger goals that affect the future of the industry. This is in line with the views that an industry consists of different sectors that are likely to come together towards a common goal (Adams, Brusoni & Malerba 2011). This is consistent with the work of Hecker (2012) and Krogh (2009) on collective knowledge as the combination of individual ideas, expertise and experiences. interviewees also said that their collective knowledge influenced the way they solved problems and created solutions together, which continues to develop the fishing industry. Close relationships and interactions among these different experts and practitioners were pivotal in developing and harnessing collective knowledge towards sustainability of the industry:

> *Oyster sector: We were ever strong association between everybody. So, we share information, talk to each other, go to a different Bay and it just developed that way.*
>
> *Tuna sector: There are a lot of things they can do by using their collectives and that is the collective knowledge. Is a matter of bringing the knowledge you to the system and to the challenge and utilise other people's knowledge. It was everyone's ideas of what we can put together to make it work better.*

4.2.1.5 Professional Knowledge

The continuous existence of the fishing industry is also the product of its professional knowledge. Interviewees were clear that each of them have had previous professional backgrounds. They have had experiences either related or unrelated to the fishing industry. They brought to the industry new ideas and experiences which were acquired through their years of professional life. Interestingly, some of the policy makers were well informed and had knowledge about the industry dynamics because they had worked in similar or related industries. This suggests that the knowledge influencing sustainability of the industry comes from past professional wisdom, common-sense and judgements acquired through previous years of industry practice and reflective learning. This finding is consistent with the explanation offered by Hoyle and John (1995) and Eraut (1994) that in every profession there are those who bring additional expertise and knowledge developed through years of practicing and reflecting from past mistakes and successes. It was evident throughout the interviews that most of the people working within the fishing industry have had different previous professional experiences and expertise. The knowledge from previous professional backgrounds is necessary to direct the industry in a sustainable way:

> *Oyster sector: My background is all completely different things. It is oil, food and casinos. And you know everything.*
>
> *Lateral actor: I have worked my whole career in food, beverage companies and export companies.*

4.2.1.6 Scientific Knowledge

Interviewees revealed that sustainability of the industry is strongly influenced by scientific knowledge. Scientific information, data and knowledge underpinned the continuous existence of the fishing industry and sectors. Continuous fishing and

farming of fish required that the sectors assume a scientific mentality. More interesting is the revelation that the younger generation of fishermen are now scientifically inclined. Most of these generational family fishers are now getting a scientific education and sustainability of the fishing industry is influenced by the generation and application of scientific knowledge. Each of the fishing specialisations has got some scientific stuff behind their continuous progress. At the wider industry level, this knowledge underpins their actions, practices and the continuous development of the fishing industry. This finding is consistent with the idea that industry knowledge includes an external source such as research institutions (Zack 1999a) which provide scientific knowledge to firms and industries through research collaborations (Jensen et al. 2007; Liebeskind et al. 1996). Behind their actions, practices and decisions were scientific information and knowledge, which are vital for the continuous improvement of the industry:

> *Tuna sector: First of all, it is science-based. This is a different type of generation. If you look at the scientific knowledge of the farm it is all about knowledge and application of that knowledge.*
>
> *Lateral actor: There are younger generations that have got degrees. That have gone off and done their degrees and come back to their family fishing business. They are used to talking at the scientific level because of their degrees. They do not want just the information but the background you know, the long-term implications.*

4.2.1.7 Technological Knowledge

Most interviewees said that being a sustainable industry meant developing technological knowledge. The finding suggests that the sectors of the industry were technologically inclined. Each of the sectors had devoted money into technological advancement superior to their competitors. Most of the interviewees said they are currently using modern technologies in fishing and farming. Interviewees from both

aquaculture and wild catch sectors said they are now technology-driven. They have embraced new and modern electronics. They have enormous technical will to develop new systems and techniques for fishing and farming which have never existed before. They are integrating new modern technologies and electronics with fishing and farming practices. For example, some of the fishing sectors are using new technologies to feed and monitor the fish in their cages offshore. They have developed their own unique technologies for fishing and farming which is context-specific. This finding echoes the views of Kumaraswamy and Shrestha (2002) that industries that integrate modern technologies into their practices, and leverage technological knowledge can accelerate development. They felt that the only way to be competitive, develop and be sustainable was to develop and invest in modern technologies and electronics:

> *Tuna sector: It was my job to develop a new technology. A new level of knowledge. There is no other industry in the world where this technology exists. The technology exists in their minds. There is no book. You cannot read it. It is all in their heads.*
>
> *Lobster sector: All the modern electronics. I don't even know what they do. We didn't have all those electronics in my days but we now have all these electronics like GPS [Global Positioning System], Plotters and Sunnics.*

4.2.2 The Acquisition of Local Knowledge towards Industry Sustainability

This section presents and interprets the evidence on how the knowledge that influences the sustainability of the fishing industry is acquired. The findings showed that the different kinds of knowledge influencing sustainability of the fishing industry are acquired through diverse learning approaches. The relevance of the findings is that despite the growing literature on learning activities as vital sources of knowledge acquisition (Argyris & Schön 1996; Brown & Duguid 2001; Nonaka, Umemoto & Senoo 1996), there is still a limited understanding of how the knowledge that influences industry sustainability is acquired through these learning approaches. The findings

revealed that the knowledge that influenced sustainability of the fishing industry was acquired through six major learning mechanisms including on-the-job training, experiences, experiments, formal education, social processes and observations. These learning approaches were the main sources of the knowledge that influenced sustainability of the fishing industry.

4.2.2.1 On-the-job Learning

Some of the knowledge that influences sustainability of the fishing industry is acquired by learning on the job. The results indicated that some of the actors learned fishing, farming, processing and retailing of seafood as they went along. They had limited contact with supervisors and managers during their first time at work. They had much exposure on the job, which helped them to learn. In fact, the experience of most interviewees was that their supervisors and managers often insisted they learn on their own. This finding reflects the idea championed by Marsick and Volpe (1999) that during informal learning, on-the-job training activities are integrated with people's daily work and routines, where they are expected to respond to unexpected, unanticipated and programmed work problems. They further argued that learning occurs as individuals pursue and reflects on their day-to-day activities. Some interviewees believed that this type of training made them better fishermen and businessmen, as they had to go out there and learn by doing the work. This meant they applied personal efforts to quickly learn their jobs:

> *Tuna sector: The in-depth knowledge that I hold about the industry today was all learned on the job.*
>
> *Vertical actor: You learn on the spot.*

4.2.2.2 Learning from Experience

The evidence revealed that some of the knowledge that influences sustainability of the fishing industry is acquired through lived experiences. The findings suggested that another source of knowledge was the integration and transformation of past and current experiences. This finding is consistent with the central idea behind experimental learning where people acquire knowledge by learning from experience (Kolb, Boyatzis & Mainemelis 2001). According to the evidence, most of the actors have worked within the fishing industry for many years. Their lived experience arose from working with different fishing sectors. Most of them had gathered enough knowledge by reflecting on their previous experiences, which is consistent with Corbett's (2005) argument that through experiential learning people integrate their past and current experiences to construct deeper meaning and improve future experiences. The knowledge obtained from their lived experiences made them reliable and knowledgeable fishermen and businessmen:

> *Lateral actor: I have worked in various sectors. I mean the Lobsters, Abalone, Oysters and Mussels. So actually, you can draw on those experiences.*
>
> *Lobster sector: The biggest thing with the knowledge of fishing I think it takes about 4-5years to pick as a Fisherman and gain enough knowledge to become a reliable Fishermen.*

4.2.2.3 Learning through Experiments

Sustainability of the fishing industry is affected by the knowledge acquired through years of continuous experimentation and trial and error. Interviewees said they had to apply knowledge from industry, scientists and universities to obtain an advanced level of knowledge through years of experimentation which provided solutions to practical industry challenges. During difficult times, the industry used trial and error with existing theories to obtain new insights. They had to experiment a lot with their

theories, ideas and thoughts. This finding reflects the idea that people learn from experiments when they can engage and apply their concepts or theories in real life situation to acquire new knowledge (Raelin 1997). Many of these experiments failed but some succeeded. Experimentations took many years but eventually generated new ideas and knowledge. New treatments were developed through experimentation and trial and error. The actors within the fishing industry had to collaborate constantly with government and different scientists to integrate, apply and generate new knowledge through experimentation. In the absence of explicit knowledge, most of interviewees said they had to rely on years of trial and error to gather new ideas about how to run their businesses efficiently:

> *Tuna sector: We had a lot of experiments. Developed a treatment through some trials which were done by the government, scientists and veterinarians all together bring all their knowledge.*
>
> *Lobster sector: There was no real book on how to run a closed circulation systems. Open circulation from the sea water would have been easy. But for a close circulation it took many years of trial and error.*

4.2.2.4 Learning through Formal Education

Most interviewees considered formal education an important opportunity to obtain and learn new skills, information and knowledge to support the industry. The findings showed that some of the knowledge that influences sustainability of the fishing industry was obtained through formal education. The actors had different levels of formal education and training. Most of them obtained their knowledge by learning from University, TAFE [Technical and Further Education] and attending short courses. These educational programs were formal, technical and vocational, which have been emphasised in the literature as essential parts of the structured, organised and classroom-sponsored learning for acquiring explicit knowledge (Brown & Duguid

1991; Marsick & Watkins 2001; Svensson, Ellström & Åberg 2004). The actors had different qualifications from formal education and training echoing the outcome of formal education and training as described by Eraut (2000). The evidence suggested that the levels of education and training ranged through Masters, Master of Business Administration (MBA), and Certificate programs. The most common level of education among the fishing actors was Certificate 3:

> *Tuna sector: I have Master's degree in Fishery Management.*
>
> *Lobster sector: I have done an MBA. MBA is a very broad concept.*
>
> *Vertical actor: I went to TAFE [Technical and Further Education], and I studied Aquaculture for 6months and got Certificate 3.*

4.2.2.5 Learning through Social Networks

Some of the knowledge that sustains the fishing industry is acquired through social networks. As a multi-sector industry, the continuous development of the fishing industry was inconceivable without the insights and knowledge embedded in the social networks and interactions between its sectors and actors. Interviewees said the actors bounce ideas off each other because they were industry collectives, which echoed the idea that individuals and groups interact, network and learn new ideas through social and relational processes (Capello & Faggian 2005). They had built strong inter-sector networks which made it easier for them to learn from each other, an idea supported by the scholarly works of Inkpen and Tsang (2005) and Mu, Peng and Love (2008). For example, they often interact and network informally in the pubs and bars. The personal relationships and interactions within these social networks, among the diverse actors and between the different sectors are also essential for gathering valuable knowledge and solutions to sustain the industry:

Tuna sector: We learn from each other. From oysters, prawns and mussels and others.

Oyster sector: You probably don't understand how much knowledge you've got until you start to talk to other oyster farmers and networking with them.

4.2.2.6 Learning through Observation

The results showed that some of the knowledge that influences sustainability of the fishing industry is obtained through observation. The evidence revealed that the actors had to observe their experienced colleagues continuously to learn new ways of doing things. Observing experienced colleagues to acquire knowledge is consistent with the findings of Nadler, Leigh and Van Boven (2003) who claimed that people acquire and create knowledge by observing successful and knowledgeable others. Knowledge is gained by watching, seeing and listening to what the other people were doing and saying on their farms, factories and businesses. This result suggests that acquiring knowledge from observation is the most popular learning practice within the fishing industry, which confirms the views that observing others is the most effective way of obtaining new knowledge (Coetzer 2007). The finding indicated that observing experienced hands on the farms and fishing bays is a tacit experience for most of the actors:

Oyster sector: Observation means looking at and observing the growers around us that have been doing it for a lot longer than I am and just being aware and understanding your environment.

Tuna sector: Through observation and you can't write a book on it.

4.2.3 The Contribution of Local Knowledge towards Industry Sustainability

This section presents and interprets evidence from the analysis on how the knowledge that influences the sustainability of the fishing industry is contributed. The findings showed that the knowledge that influences sustainability of the fishing industry was

contributed through interactive processes. These interactive processes were the means through which the actors and sectors channelled their ideas, insights and experiences towards sustainability of the industry. Several studies have examined the different ways through which individuals, groups and organisations share and contribute knowledge (Chow & Chan 2008; Wasko & Faraj 2005; Ye, Feng & Choi 2015). However, there is less understanding of how the knowledge that influences industry sustainability is contributed, especially within the fishing industry in the Eyre Peninsula region. From the analysis, the actors across the fishing sectors contributed their knowledge towards sustainability of the fishing industry through a range of interactive processes: industry associations; meetings and discussions; conferences, seminars and workshops; networks and cross-fertilisation; social interactions and relationships; cooperation and collaboration and conversations, talks and communication. These interactive means suggest formal and informal social processes, which are discussed below.

4.2.3.1 Industry Associations

The findings revealed that some knowledge influencing sustainability of the fishing industry is contributed through industry associations – formal industry bodies through which knowledge and information are contributed. This finding is consistent with the views expressed by Hansen (1999) and Brown and Duguid (2001) that professional networks and associations are invaluable structures for sharing quality information. It also supports the views of Zhou and Fink (2003) and Tomlinson (2011) that industry and trade associations are social structures that ease communication and interactions among collectives, which stimulates knowledge sharing. The industry associations as knowledge structures confirm the notion of structural social capital, which suggests that social structures and connections facilitate knowledge creation and sharing (Nahapiet &

Ghoshal 1998). These industry associations are made up of fishing and business professionals whose knowledge and views supported the continuous development of the fishing industry:

> *Tuna sector: Knowledge is channelled through industry associations.*
>
> *Lobster sector: I honestly think that if you want to be represented, if you want to contribute your maximum potential, working together through an association structure is the way to go about it. And the structures they have put in place, it has become a lot more organised, and they are functioning well now because the distance is very challenging for them. These structures and their own involvements in these structures, reading the materials we send them and attending the meetings and that is why we make the efforts and we go down there by telling them what is happening and asking them to have a conversation among themselves and come back to the organisation like this because that is the one chance they should have inputs into the management of their fisheries.*

4.2.3.2 Meetings and Discussions

The findings showed that the sectors and actors contribute their knowledge towards the continuous development of the industry by participating in formal meetings and having discussions. Interviewees said that some of the ideas, insights and expertise that influence sustainability of the fishing industry are contributed during different kinds of meetings and discussions. Allen, James and Gamlen (2007) suggested that formal and informal meetings and discussions are vital means and activities to share knowledge. Most interviewees indicated that they give their ideas and insights to the industry by attending several meetings including management, research and association meetings. This is due to the geographical dispersion of the sectors, actors and the fishing activities in the Eyre Peninsula region. There are also regular inter-sector meetings and discussions among all the fishing sectors. During these meetings, issues are raised, discussed and ideas contributed. There are meetings between government agencies and the fishing industry where information about the rules and regulations is also shared and discussed:

Lateral actor: We have industry meetings on Fridays. I am doing a port meeting with the abalone guys because they want a refresher on what the rules are. It's been a few years and a few grey areas.

Tuna sector: I think am involved in management meetings, association meetings and research meetings. It does come about through the open discussions during those meetings that you put your views across. And putting ideas forward and contributing to those sorts of things.

Lobster sector: Everyone that I have met is forthcoming to share their knowledge especially when you have meetings.

4.2.3.3 Conferences, Seminars and Workshops

The evidence indicated that sustainability of the fishing industry is influenced by the knowledge contributed during conferences, seminars and workshops. Interviewees said that attending seminars, conferences and workshops is an essential way to support the fishing industry by sharing knowledge and different perspectives. This finding supports the view in the literature that seminars, workshops and conferences are some of the important sources of storing, documenting and sharing knowledge (Conklin 1996). The actors continuously share their knowledge and perspectives towards the common good of the industry during the question and answer time at these forums:

Tuna sector: Just like attending workshops like we had. If there is something we can contribute they will ask us some questions or give someone a different point of view.

Oyster sector: There are stuffs like the conferences and seminars. We are always sharing knowledge.

4.2.3.4 Social Networks and Cross-fertilisation

To address bigger industry issues that affect the continued existence of the industry, the actors across the sectors contribute new ideas and insights through cross-fertilisation and social networking. Interviewees indicated that industry crises hold the actors together, which facilitates knowledge contribution for making crucial decisions and

taking common courses of actions towards resolving a common problem. This finding supports the idea of cognitive social capital where shared goals create a common interest and understanding among different actors to pursue a collective action towards a common purpose (Wasko & Faraj 2005). Consistent with existing literature, the finding is particularly common in industries where the need to identify new opportunities and address pressing constraints are crucial for survival and continuity (Kwon & Adler 2014). This finding reiterates the role of structural social capital where common social ties, interactions and networks within social structures build closeness, which encourages people to share and create new knowledge (Tsai & Ghoshal 1998). The finding further echoes the suggestion offered by Gutierrez, Hilborn and Defeo (2011) that social relations and networks are vital for improving the successes of the fishing industry as they are embedded with vital resources including knowledge. The nature of the industry is such that the sectors come together to share ideas and insights during crises. For example, the industry developed a social network of multiple sectors and actors to respond to the creation of marine protected parks which was one of the most controversial industry crises. During these crises, the interactions within the social industry network provide fresh ideas and perspectives which develop solutions to secure the fisheries from shrinking and collapsing:

> *Lobster sector: When the marine park first hit us, they formed a thing called Alliance and we all sat and knowledge it out.*
>
> *Tuna sector: I do not think one industry pours out into the others but they are all interlinked.*

4.2.3.5 Social Interactions and Relationships

The finding showed that interactions and relationships among the actors fostered knowledge contribution to the long-term future of the fishing industry. Most

interviewees revealed that social interactions and relationships within those industry associations, networks and cross-fertilisations foster knowledge sharing. This provides ideas and knowledge to shape the future direction of the industry. Inputs into the long-term future of the industry come from established relationships and interactions with key internal and external actors. For example, regulatory agencies have regular interactions with the industry, based on openness and transparency, which ensures trusted exchanges of ideas and knowledge. It was apparent from the evidence that these relationships and interactions within the fishing industry are strengthened by trust, openness and transparency which enables actors to share their deep experiences and insights. This finding is consistent with the concern raised by several studies that relational social capital is vital because deep knowledge cannot be shared and created when there is no trust and openness (Chowdhury 2005; Levin et al. 2004; Nahapiet & Ghoshal 1998). These trust-based relationships and interactions facilitate sharing of ideas and knowledge which are vital for the continuous existence of the fishing industry:

> *Lateral actor: In the last three to four years, our main aim is being more open and transparent in sharing knowledge.*
>
> *Vertical actor: Building those relationships and having inputs or sharing ideas with industry.*
>
> *Tuna sector: Building relationship with those guys so that they bring their knowledge forward.*

4.2.3.6 Cooperation and Collaboration

The findings clearly revealed that to support the long-term sustainability of the fishing industry, the actors and sectors contribute their knowledge by cooperating and collaborating with each other on several regional initiatives and industry-related issues. The evidence further showed that they had to work together a few times to gather new

insights and ideas from many fishing sectors and actors to address issues that threatened the industry's existence, which reiterates the notion of the relational social capital proposed by Nahapiet and Ghoshal (1998) that norms of collaboration among diverse actors ensure continuous interactions, sharing and creation of new knowledge. The scope of cooperation and collaboration includes regional initiatives such as food festivals, co-management of the industry, as well as knowledge sharing activities. The sectors come together and work together to improve the wellbeing of the region and the industry by sharing relevant information and knowledge:

> *Oyster sector: We had several stakeholders come together and we share information and knowledge.*
>
> *Lobster sector: There are other initiatives regionally on the Eyre Peninsula like the festivals like "Tunarama" and the organisers will try and engage all the other different sectors on the Eyre Peninsula. So, they will come talk to Abalone and everyone else to have some level of engagement in that for the Eyre Peninsula.*
>
> *Tuna sector: And I basically represent them and I am a link between industry and government because the government of South Australia wants to operate a co-management type of system where you have got the Scientists, the government and the industry all working collaboratively and cooperatively together rather than having individual parts to protect the industry from falling.*

4.2.3.7 Informal Conversations

The findings showed that the actors contribute their knowledge to sustain the fishing industry by engaging in different kinds of conversations. Interviewees said that the most common informal social practices within the industry are personal conversations and communication among the actors. They further indicated that they contribute their ideas and insights by talking and chatting during informal social gatherings. Having personal conversations and communication in informal social spaces are essential for sharing and contributing knowledge towards the advancement of the industry. The communication mechanism is informal or personal. This result supports the suggestions from previous

studies that knowledge is shared through informal conversations and interpersonal communication (Allen, James & Gamlen 2007; Conklin 1996). The future of the industry depends on the contribution of knowledge by the actors and sectors. Interestingly, they largely share knowledge through informal conversations at bars and pubs:

> *Oyster sector: Is only by sharing the knowledge and having a chat and a beer that we learn stuff.*
>
> *Tuna sector: We chat to impact knowledge and get again some knowledge of them. Because by this crossover of knowledge we will be better off.*

4.2.4 The Influence of Local Knowledge on Industry Sustainability

This section reports and interprets evidence on how local knowledge influences the sustainability of the fishing industry. Scholarly works have examined the role of knowledge in gaining and sustaining industry competitiveness (Gold, Malhotra & Segars 2001; Grant 1996b) but none has explored how it influences industry sustainability. Knowledge is crucial for addressing sustainability management issues in businesses (Hörisch, Johnson & Schaltegger 2015; Pogutz & Winn 2016). Earlier studies have shown that knowledge promotes sustainability management (Horisch, Johnson & Schaltegger 2015) and ecological knowledge generated in corporations affects sustainability (Pogutz & Winn 2016). Despite the insights from these studies, there is still lack of an understanding about how knowledge influences sustainability of an industry, especially that of the fishing industry in the Eyre Peninsula. This suggests that there is currently a lack of empirical data on sustainability-oriented knowledge (Pogutz & Winn 2016). Responding to this gap, this study examined how local knowledge influences sustainability of the fishing industry. The findings revealed that local knowledge affects sustainability by influencing strategic priorities, organisational

actions and commercial activities. Local knowledge underpins sustainability by informing strategic priorities such as industry-university-government research collaborations, innovation, research and development, product development and value addition and creation. Local knowledge also impacts sustainability by influencing organisational actions such as decisions and direction, change and continuous improvements, problem solving and efficiency. The findings further revealed that local knowledge influences sustainability by driving commercial activities such as industry competitiveness, marketing strategies, market expansion, product quality and reputation, promotions and price determination. These findings are reported and discussed below.

4.2.4.1 Strategic Priorities

This section reports and discusses evidence on how local knowledge influences the strategic priorities of the fishing industry in a way that support its sustainability. The main issues of strategic concern are industry-university-government research collaborations, research and development, innovation, product development and value addition. The findings suggested that these strategic issues are the major priorities of the fishing industry in generating and applying knowledge towards its sustainability. They paid attention to these strategic issues in order to increase the long-term competitiveness and survival of the fishing industry. This suggests that knowledge is a strategic resource for gaining and sustaining firm and industry competitiveness (Gold, Malhotra & Segars 2001; Grant 1996b). The strategic issues are presented and discussed in the following subsections.

4.2.4.1.1 Industry-University-Government Research Collaborations

The findings revealed that there are external collaborations between the fishing sectors, government and the scientific research institutions and universities, whose aim is to do research that advances knowledge and benefits the whole fishing industry. This finding echoes the ideas from the literature that industries gain by giving ideas and receiving new knowledge and solutions as they work together with research institutions and the scientific community (Lee 2000; Tether & Tajar 2008). Interviewees indicated that most of the sectors have formal research agreements with universities and the government to exchange ideas, and to generate and apply new knowledge. These research collaborations have brought about several breakthroughs and opportunities. Interviewees mentioned that research collaborations represent useful opportunities for the sectors to present industry problems and find solutions through scientific exploration. For example, these research collaborations led to the development of treatments and solutions to bacteria and viruses that increase fish mortality rates, which was necessary to save the fishing industry from collapsing:

> *Tuna sector: We have a formal system where we have a Tuna sub-program or industry partnership agreement with the commonwealth government. For example, we had a simple blood fluke which first, kills the Tuna, and second, retains their growth. So, we developed a treatment through some trials which was done in this office by the Government, Scientists, Veterinarians, University of Queensland, University of Sydney, and University of Tasmania, all bringing their knowledge. By that system, we reduced the mortality in the farms from 13% to 1% and the fish grows better. This was done just by bringing together and applying the knowledge of all the stakeholders.*
>
> *Oyster sector: Through these research collaborations, there is always an opportunity to put your ideas out there and run them past the Researchers and Scientists.*

4.2.4.1.2 Research and Development (R&D)

The evidence suggests that the knowledge from the research collaborations support most of the R&D activities within the fishing industry. Based on the analysis, research collaborations support R&D activities. The understanding is that research collaborations in the industry may be described as knowledge and relational processes, and R&D represents the outcome of such processes, which supports the development of new products and services. The sectors have strategic interests in research and development. Most interviewees said that there are research organisations their sectors have to work with to carry out research projects. During these research and development activities, they have developed new products and improved existing services. Interviewees further revealed that they have also invested huge sums of money into the discovery of new ways of fishing and farming, which were critical to the survivability of the industry. This evidence resonates with the view that knowledge makes creative contributions towards research and development which helps create new products and services (Lundmark & Klofsten 2014). The research and development activities are quite widespread across all the fishing sectors. The aim is to develop new techniques and products and services from advanced knowledge which improve the viability, profitability and productivity of the fishing industry:

> *Tuna sector: With the Australian Fisheries Research and Development Corporation (AFRDC), the sectors do quite a bit of investigations and research and development projects.*
>
> *Oyster sector: The sectors spent a lot of money looking at new techniques, new species, products, services, new husbandry and sciences, and some of these activities are based on outputs or recommendations from the Australian Fisheries Research and Development Corporation (AFRDC).*

4.2.4.1.3 Innovation

The findings showed that the continuous existence of the industry depended on innovation driven by knowledge and ideas. The knowledge developed through the industry research partnerships supports innovative activities. Some of the sectors have developed and transformed business concepts into reality through ongoing innovations. These innovative activities are essential to the cost effectiveness, product quality and efficient running of the industry. The findings suggest that the innovative activities of the fishing industry are supported by combining knowledge from each of the fishing sectors. This finding is consistent with the views of Nonaka, Toyama and Konno (2000) that firms can efficiently and effectively create new products and improve existing ones by harnessing their specialist knowledge. Interviewees revealed that some of the sectors were created through continuous innovation. Some of the innovative activities include development of new business concepts, techniques, procedures, products and services. One interesting example of innovation was the introduction and development of the business concept of "tuna farming" which most of the interviewees described as a business concept that was invented to make the industry sustainable forever:

> *Tuna sector: The first innovation is developing the concept of the tuna farming. Then the next innovation is reducing the cost and increasing, the quality by different technology of tuna farming. And the third is an incremental step after that. So, incremental steps like stocking rates, feeding systems and seasonal feeding patterns and you need to get the knowledge.*
>
> *Vertical actor: Innovating new ways, innovating new procedures, new techniques for packaging, filleting, freezing, chilling and transporting are ongoing innovation.*

4.2.4.1.4 Product Development

The findings showed that for the fishing industry to continue to compete and survive each of the sectors has to continue to develop new products. To do that they have to

constantly share new ideas and insights, which are vital for the continuous existence of the industry. The evidence suggested that the fishing industry cannot be separated from its products because they are interlinked. Interviewees suggested that underlying the knowledge exploration, ongoing innovation and research and development activities was the development of new products and services. Most interviewees said that the only way for the industry to survive the internal and external competition was to continuously develop new products by seeking and sharing new knowledge and ideas. This evidence implies that knowledge can develop new products and improve firms' continuous performance (Lawson et al. 2009). Developing and creating new products and improving existing ones were considered necessary for the long-term future of the industry:

> *Vertical actor: Just through continuous product development. Creating different products again. And they were extracting oil from lobster and creating another whole market of products.*
>
> *Lateral actor: Sharing ideas about how they can develop their products.*

4.2.4.1.5 Value Addition and Creation

According to the findings, value addition and creation are possible because the actors know how to create high-value seafood products, which is essential for the survival of the fishing industry. Each of the sectors knows how to create value by integrating knowledge. That echoes the views of Tsai and Ghoshal (1998) and Løwendahl, Revang and Fosstenløkken (2001) that combining knowledge is the basis of value creation and product innovation. Interestingly, developing new products is considered insufficient for the industry to survive the competition. Adding value to the products and creating new products with high value are seen as essential, if the industry is to continue to be the Australia's seafood frontier. Interviewees revealed that their continuous

competitiveness is based on value additions and creation which meant transforming and making new products marketable:

> *Vertical actor: We were the first that know how to take the Southern Bluefin Tuna which was traditionally harvested and sold whole. We were the first to take that product, value add it and created one kilo portions, packed them individually and eventually created a retail restaurants markets within Australia and overseas.*

4.2.4.2 Organisational Actions

This section presents and discusses the evidence from the analysis on how local knowledge affects the sustainability of the fishing industry by influencing organisational actions. The findings revealed that the long-term existence and survival of the fishing industry is influenced by actions informed by knowledge contributed by the fishing sectors. Within the literature, knowledge is considered action-oriented (Argyris 1993; Pfeffer, Jeffrey & Sutton 1999). The evidence further echoes the notion that knowledge has the potential to influence future organisational actions (Carlsson et al. 1996). The findings showed that decisions and direction, change and continuous improvement, problem-solving and efficiency are the main organisational actions influenced by local knowledge. These organisational actions are reported and discussed in the following subsections.

4.2.4.2.1 Decisions and Direction

The findings showed that integrating ideas and knowledge from all the fishing sectors and actors shapes the decisions and direction that underpinned the long-term future of the fishing industry. Interviewees mentioned that guiding the industry towards the right direction requires years of knowledge and wisdom. They reasoned that lifelong accumulation of knowledge generates an advanced level of knowledge called wisdom.

This advanced level of knowledge comes with age and is developed through years of fishing and farming. The findings suggested that future direction and better decisions are made because they can tap from the rich information and lived experiences of the actors within the sectors. Choo (1996) suggests that the strategic value of knowledge is in making decisions about the future course of action, and it is knowledge that enables people to act wisely and decisively. It is the local knowledge from the fishing sectors that influences better business decisions and points the industry towards the right future direction:

> *Oyster sector: With age comes wisdom. And I think this is my time to contribute my wisdom to help stir our industry in the direction that I think it is good and proper. This means presenting information to them so they can use that information to make better decisions.*
>
> *Lobster sector: Sitting around the table we have got a hundred years' worth of information from people with which we think we can guide people in the right direction.*

4.2.4.2.2 Change and Continuous Improvements

The evidence from the study revealed that the fishing industry is a dynamic industry that constantly seek to progress by gathering and integrating knowledge. The findings further revealed that change and continuous improvement within the fishing industry are driven by knowledge. Most of the long-term decisions are about change and continuous improvement. Interviewees said that transforming the industry and improving how things are done requires ideas and knowledge. They also maintained that knowledge is not only acquired and contributed but applied to transform fishing techniques, practices and behaviours which affected sustainability. The findings showed that for the fishing industry to continue to progress long-term, the sectors always work with new technologies and improve the way fishing businesses are run. These findings are important because continuous change and improvements are possible when an

industry acquires and applies knowledge and technologies (Bessant, Caffyn & Gallagher 2001; Johannessen, Olsen & Olaisen 1999). Interviewees believe that knowledge and ideas are essential if they are to change and improve practices to continue to be in business:

> *Tuna sector: The need to continue to improve gets people thinking about their own knowledge and how they can apply knowledge.*
>
> *Oyster sector: We always have a headset about how we can improve our practices. It is the continuous improvements model sitting in our heads.*

4.2.4.2.3 Problem Solving

The findings demonstrated that local knowledge preserved the continued existence of most of the fishing sectors and the fishing industry by solving crucial problems. The industry has also suffered from collapsing fishing sectors in the face of strict government regulation of marine parks. But through these difficult times they stayed together and shared knowledge on how to resolve the issues as collectives. This finding suggests that collectives can integrate their knowledge to solve complex industry problems (Krogh 2009; Wasko & Faraj 2005). Interviewees said that they had to work with several actors' including the government and scientific communities to address most of the industry constraints by exploring and exploiting knowledge. Problem solving was regarded as a knowledge process. This means that the fishing industry still exists because it could address industry issues by contributing, integrating and applying its knowledge. The findings revealed that knowledge about sustainability was applied to secure the industry from being unsustainable:

> *Vertical actor: We have the best sustainably managed wild catch fishing industry in the world. The Spencer Gulf Prawns Industry 35 or so years ago, they realised they can fish themselves out of existence and there will be no industry left. So, they invited the government to help do some research and to see whether it is sustainable, whether it is at sustainable level and whether we*

get to continue to have an industry forever. So, industry and government came together and now it is the best wild catch fishing industry in the world and sustainable forever. Now it is not up and down anymore and that is brilliant knowledge sharing. Put your hands up and say I need some help. Maybe we can all share and with that knowledge we can continue to fish.

4.2.4.2.4 Efficiency

The findings showed that efficiency is achieved by applying the local knowledge of the fishing industry. Interestingly, most interviewees said that the main goal of the sectors is to be efficient. To be efficient, most of the sectors and actors contribute their knowledge to the industry. The evidence suggested that efficiency can be achieved through technological knowledge. Most interviewees mentioned that the sectors have invested in modern technologies and electronics, which have improved their fishing and farming businesses. These findings suggest that the industry is efficient because of its knowledge and technologies. The evidence further suggested that the skills and knowledge acquired through these modern technologies and electronics reduced waste and cost thereby making the industry more efficient and sustainable. This is because being efficient means positive influence on the environment and the regional economy:

Vertical actor: Tuna improving the technology which is improving the procedures which means less waste which means better for the environment and more efficient working practices which means less cost which is not good for jobs but it means everyone is working more efficiently.

Oyster sector: They want to be productive. They want to be efficient. They want to take advantage of opportunities. They want to be better than their competition you know. All those skills that you learn, you can put them into the industry.

4.2.4.3 Commercial Activities

This section presents and discusses the findings on how local knowledge influences the commercial activities of the fishing industry towards its long-term sustainability. To be commercially viable, the sectors and actors contribute and integrate their knowledge.

Previous studies have also shown that sustained firm and industry competitiveness come from knowledge integration (Spender 1994; Tallman et al. 2004; Teece 2000). These findings further support the idea that commercial successes require knowledge that works and even works better (Demarest 1997). The findings revealed that knowledge impacts sustainability of the fishing industry by contributing to industry competitiveness, marketing strategies, markets expansion, product quality and reputation, promotions and price determination. The findings suggest that these commercial activities underline sustainability of the fishing industry as discussed below.

4.2.4.3.1 Industry Competitiveness

The findings revealed that sustaining industry competitiveness is possible through knowledge. Interviewees maintained that the only way to compete domestically and internationally is the development and application of knowledge. Tallman et al. (2004) argued that firms within an industry can combine their knowledge to gain and maintain a competitive advantage. The evidence from the analysis showed that all the fishing sectors within this industry are concerned to gain a long-term competitive advantage because they want business continuity. The actors and sectors have to develop, integrate and apply their knowledge for the industry to be ahead of the market competition. For example, some of the interviewees mentioned that to be competitive, the industry had to leverage knowledge to improve production and produce high premium products instead of the cheaper options from foreign competitors. The fishing industry in the Eyre Peninsula remains buoyant and competitive because of its unique knowledge of fishing and fish farming:

Tuna sector: How do you get ahead of the competition? It is the development and application of knowledge. What we have in Port Lincoln that gives us the competitive edge is the knowledge. The thing that makes this place able to compete with Taiwan just almost is the knowledge.

Lobster sector: But then we exported our knowledge to other countries, Mexico, and Croatia for example, and now they are competitors and we needed to stop that. Because if I have a good idea and it will improve production, why would I tell anyone else, it is a commercial advantage. As a result, we have the high premium Lobster around the planet. It hasn't gotten any direct competition as far as quality, but we've got massive competition in terms of some of the tropical Lobsters.

4.2.4.3.2 Marketing Strategies

The evidence suggested that to be more competitive and sustain the fishery, the sectors and actors had to depend on the knowledge of the industry and the region. This means that the sustained competitiveness of the fishing industry is achieved through knowledge-based marketing strategies. This finding reflects the idea expressed by Sinkula, Baker and Noordewier (1997) that knowledge influences the way firms make changes to their marketing strategies. The finding revealed that the sectors have developed strategies to market their products and they are on the path of implementing those in both domestic and foreign markets through collective marketing efforts. Interviewees said that what informs their collective marketing strategies is their unique ideas. The market success of the fishing industry was attributed to sharing ideas and knowledge from the collective of fishing experts and practitioners across the specialised industry sectors. The implication is that without new ideas and knowledge, the fishing industry would have fallen to foreign competition. There are currently good market opportunities but they believe that their knowledge will bring more:

Tuna sector: The seafood industry is quite well marketed, and there are marketing strategies based on different ideas, so they are on that path. Let talk about marketing, there is opportunity there. Once people gets the knowledge of this place more opportunities will come.

Vertical actor: There have been some collective marketing efforts where people bring their ideas.

4.2.4.3.3 Promotions

According to the findings, one of the most common marketing efforts that support sustained competitiveness of the fishing industry is promotions. Interviewees revealed that being the seafood frontier of Australia comes from years of idea generation and sharing. The sectors and actors have to individually or collectively promote their products domestically and internationally. Promotions as part of their marketing strategies involve emphasising to the domestic and overseas markets how sustainable the seafood products and the fishing industry are. All the fishing sectors are part of a collective that promotes and markets the seafood by bringing and combining their lived experience and ideas. Shaw et al. (2001) argued that promotions and marketing decisions are effective if they are based on knowledge and information. Most interviewees mentioned that it was their personal interest, motivation and passion to share the knowledge of their products which continue to sustain the fishing businesses:

Oyster sector: We all get along reasonably well. All the different sectors and we all get an opportunity as Farmers to be part of the seafood frontier to be able to promote seafood generally with our ideas.

Vertical actor: I personally love promoting the oyster sector because I am passionate about educating people about the benefits of eating oysters and sharing a life experience with wine and then that is marketing experience.

4.2.4.3.4 Market Expansion

The findings suggest that the continuous existence of the fishing industry means developing, expanding and advancing into new and more markets by creating knowledge. Interviewees said that the marketing strategy of the fishing industry is to expand into more markets. They also mentioned that through some of the sectors, the

industry has been able to enter foreign markets. The explanation was that the knowledge they develop from previous market activities helps other inexperienced sectors to venture and expand into new foreign markets. This finding confirms the views of Morgan et al. (2003) that businesses can adapt well if they rely on their past experiences when exporting to unknown markets. This suggests that a bigger range of markets sustains competitiveness and improves industry continuity:

> *Oyster sector: A lots of their products are sold overseas. So, that creates markets and knowledge about this area that we couldn't have done on our own as oysters.*
>
> *Tuna sector: They are currently working on their products into China and their knowledge of working with the Japanese will help them.*

4.2.4.3.5 Product Quality and Reputation

The findings suggest that market expansion towards sustained competitiveness and the continuity of the fishing industry is possible through knowledge-driven product quality and reputation. Interviewees said that a good reputation from quality product is possible because of their years of accumulated knowledge of fishing and farming. The evidence revealed that one basis of sustaining the fishing industry was its reputation and quality product, developed by integrating knowledge and new ideas. The finding further showed that the promotion of product quality was undertaken as a collective industry. This is particularly true for firms operating in a regional and specialised food industry where they rely on their collectives to preach quality and gain reputation (Winfree & McCluskey 2005). From the evidence, lived experience and knowledge of the fishing industry acquired from years of fishing, helped to produce quality product which have built a good reputation for the industry and the region in overseas and domestic markets:

Tuna sector: The industry has been around for a long time and they know it and they know how to produce a good product. We have built a reputation for Port Lincoln as a great area for seafood in general. It is not just in Port Lincoln but the whole of the Eyre Peninsula is renowned for its quality of seafood.

4.2.4.3.6 Price Determination

The findings showed that the continuity and competitiveness of the fishing industry is supported by prices determined by expert information and ideas. Interviewees revealed that the prices of the seafood products were set by local experts who managed sales, promotion and marketing. The experts involved in the marketing of the products often provided information which influenced pricing decisions. Most interviewees mentioned that the fall and rise of the prices of the seafood were influenced by an exchange of information and knowledge among key actors. This finding supports the idea that knowledge and information play a key role in determining and accepting prices (Rao & Sieben 1992). This suggests that relying on expert information and knowledge to determine the prices of the seafood supported the sustained competitiveness of the fishing industry in the domestic and international markets. Interviewees revealed that sometimes producers and processors had to discuss and share ideas and information about how to maximise profits by increasing the prices of their quota in seasons, which was good for continuous existence of the industry:

Oyster sector: If our industry wants to expand and become more profitable and successful, then we probably must look at marketing to raise the prices.

Lobster sector: What the processors and producers are saying to us is that if you want to maximise price on your offshore quota you will catch in June-July.

4.2.5 Industry Sustainability towards Regional Sustainable Development

This section presents and discusses the evidence on how the sustainability of the fishing industry supports sustainable development in the Eyre Peninsula region. Although the

socioeconomic benefits of the fishing sectors to the region have been gradually increasing over past years (PIRSA 2015), what is currently missing in the literature is exactly how sustainability of the wider fishing industry can maintain these benefits in the Eyre Peninsula. There is a lack of evidence on how industries are moving towards sustainable development in regional Australia (McManus 2008). This study demonstrates how sustainability of the fishing industry is contributing to the sustainable development of the regional Eyre Peninsula. From the evidence, the actors and sectors revealed that the continuous existence of the fishing industry can contribute to the environmental integrity, social equity and economic prosperity of the region. Shearlock, James and Phillips (2000) maintained that the three dominant dimensions of regional sustainable development are environmental, social and economic sustainability. The environmental, economic and social contributions of the fishing industry towards sustainable development in the Eyre Peninsula region are discussed in the following subsections.

4.2.5.1 Environmental Sustainability

The evidence from this study revealed that the continuous existence of the fishing industry can contribute to the environmental wellbeing in the Eyre Peninsula region. The evidence further suggested that the actors and sectors are taking steps to be eco-friendly, despite their past ecological issues. The fishing sectors clearly indicated that they have had unfriendly attitudes towards the environment and marine organisms in the past. They agree they have a poor historical record on the environment but are currently taking measures to protect the environment and marine organisms. The core evidence from the study showed that actors across the fishing sectors are currently making efforts to protect the environment, organise clean-up exercises, recycle, and

manage the fish stocks by reducing mortalities and depletions. These findings support the view that environmental sustainability includes practices essential for protecting, conserving and preserving both renewable end non-renewable natural resources (Goodland 1995). The findings somewhat challenge existing studies that question the environmental contribution of the fishing industry in the Eyre Peninsula region, especially in the aquaculture sector (Carvalho & Clarke 1998; Mazur & Curtis 2008). The environmental contributions of the fishing industry towards sustainable development in the Eyre Peninsula region are discussed in the following subsections.

4.2.5.1.1 Environmental Protection

The evidence revealed that the past generation of fishermen and businessmen were considered unfriendly towards the environment and natural resources. Interviewees said that the past fishermen almost destroyed and have in many cases actually destroyed many marine organisms and harmed the natural environment of the region. However, it was also evident that the current generation of fishermen and businessmen are far more conscious about the environment and are eco-friendly. This suggests that the fishing industry can now be considered to be supporting the environmental wellbeing of the Eyre Peninsula and South Australia, and is consistent with the view that industries can contribute to environmental sustainability (Berggren 1999). The finding also demonstrates how industries can respect the ecological limits of their regions (Graymore, Sipe & Rickson 2010). From the evidence, the fishing industry has now become more sensitive to and aware of the environmental footprint of the region:

> *Lobster sector: Because then what happened was we were over fishing, we were catching too much Lobsters, so, then in 2002-2003, we had to decide whether to cut the days. The Scientists came to us and said, "you are taking too much fish and if you don't stop taking too much of fish you won't have a fishery, so you have to regulate yourself or we will regulate you.*

Vertical actor: We've got the technology to chop off every tree down in the whole world, we've got the fishing technology to rape the sea a hundred times over, and we must educate them not to do that. There is wildlife that is coming back, there is bird life that is coming back in balance with nature, we got to the point that we nearly killed them, there is some species that will never come back because we have taken them all, we raped and pillage too much and we now need to understand where that balance is and stay within that balance, but we need information to do that.

Oyster sector: We are doing everything right environmentally and looking after the water that we grow our oysters.

Lateral actor: The current generation of kids are better educated and they are a lot savvier in relation to looking after the environment and looking after resources so we don't have a few shits.

4.2.5.1.2 Recycling

The fishing industry protects the environment in the Eyre Peninsula by recycling its waste both onshore and offshore. Interviewees stated that these days the sectors and the actors are more mindful of waste management than in the olden days. For example, in the past, the fishermen did not have rubbish bins on their vessels. Currently, the sectors ensure that every vessel has a recycling bin and they properly look after the environment. They have devoted time and effort to recycling waste either onshore or offshore. Recycling waste is one essential way to manage waste and protect the environment (Hart 1997), particularly within the fisheries (Folke & Kautsky 1992). The findings showed that recycling waste is good both for the environment and the image of the region:

Oyster sector: We put together with tuna. We are so much into how to recycle all the plastics that are coming from our baskets and their big pontoons. So, that is helping the whole environment and the image of the Eyre Peninsula.

Lobster sector: We look after the environment very well. We have a rubbish bin and we have a recycle bin on board. So, everything goes in, everything is recycled now and is much different to our days.

4.2.5.1.3 Clean-Up Exercises

The fishing industry supports environmental wellbeing of the Eyre Peninsula region by organising clean-up exercises. It was evident that the sectors and actors collaborate to clean their fishing zones, which is good for the environment in the region. Interviewees said that a clean-up exercise is a collective industry effort, as most of the sectors come together to ensure the region is environmentally healthy. Having more than eleven sectors is enough to tidy the beaches and the water bodies, and make the region clean:

> *Tuna sector: Our size means that we can do beach clean-ups and pick-up debris from oyster, abalone and other seafood sectors like prawns and rock lobsters.*
>
> *Oyster sector: We do clean-ups of the bays. Keeping our bays clean is like when stuff breaks we pull it out of the water so we don't have the oyster farms littered. So, we keep the harbor clean and keep the area tidy.*

4.2.5.1.4 Managing Stocks, Mortalities and Depletion

The fishing industry addresses the natural resource and biodiversity issues in the Eyre Peninsula region by managing the fish stocks. The fishing industry also takes necessary steps to reduce mortalities and depletion of fish stocks and other marine organisms. The evidence suggested that the fishing sectors are working to improve the densities of their fish stocks by reducing mortalities and depletion of marine organisms. This evidence challenges the view expressed in previous scholarly works that the global fishing industry has depleted fish stocks and destroyed the ecosystem (Pauly et al. 2002; Pauly & Watson 2003). The findings suggest that some of the fishing sectors are currently working to improve regional environmental wellbeing.

> *Lateral actor: They can certainly contribute to the region because it is a very sustainable industry. It is good. Their husbandry systems and their mortality. But in years gone by, there was 8-10% mortalities which are a lot of mortalities. It feels like 50,000, or 100,000 fish in your farm. But last year, there was a farm and that farm had 32 mortalities out of 25,000.*

Lobster sector: We have something on our cray pots called seal protection devices. We used to put them in when we are around seal activity and now we have got these devices on 24/7 even if we are not in areas that are affected by seals. We just introduced some new management arrangements in our fishing industry to ensure that we don't cause any species depletion.

4.2.5.2 Economic Sustainability

This section presents evidence on how the sustainability of the fishing industry supports the economic wellbeing of the people living in the Eyre Peninsula region. The evidence shows that the continuous presence of the fishing industry has contributed enormously to the economic prosperity of Eyre Peninsula. The findings suggested that the viability and profitability of the fishing sectors affect the economic activities of the other industries and economic wellbeing of the local and regional people in the region. These findings echo the reports that the economic benefits of the fishing sectors are crucial for the state of South Australia and the regional economy in the Eyre Peninsula (EconSearch 2015; EconSearch 2010). In summary, the evidence revealed that the fishing industry supported the Eyre Peninsula through wealth creation, foreign currency, local employment, income and spending, reinvestment and supporting local industries. The economic contributions of the fishing industry towards sustainable development in the Eyre Peninsula region are discussed below.

4.2.5.2.1 Wealth Creation

The fishing industry contributes to the economy of Eyre Peninsula by simply creating more wealth. The findings showed that fishing sectors are the prime wealth generators in the region. It is understood that the continuous existence of the industry supported wealth creation for the people living in regional and local communities. Without wealth

and revenue from the fishing industry, the Eyre Peninsula region would struggle to survive:

> *Lateral actor: The seafood industry being probably the second largest revenue generator in the region is probably prime for that [revenue]. It creates wealth on the Peninsula and without it, it will be terrible.*
>
> *Tuna sector: The fishing industry is the greatest wealth generator on the Eyre Peninsula by far, even though there is wheat here, but it doesn't generate the type of wealth that seafood does.*

4.2.5.2.2 Foreign Currency

The evidence from the study revealed that the continuous existence of the fishing industry had benefited the Eyre Peninsula with a lot of foreign currency from overseas trade and export. It was evident that "bringing back overseas currency" is the major way each of the fishing sectors supports the economy and economic activities in the region:

> *Lobster sector: These small sectors they are very important than even the government that everyone thinks about. Because they don't make those connections between sustainable products that is replacing itself and bringing back overseas currency. That is the major way the sectors are contributing to Eyre Peninsula.*

4.2.5.2.3 Local Employment

The continuity of the fishing industry has contributed to the regional economy by generating more jobs and employment opportunities. The findings showed that each of the fishing sectors creates jobs and employment opportunities for local and regional communities on Eyre Peninsula. This evidence echoes the views of Sharma and Kearins (2011) that the regional economy is stronger and vibrant when people have economic livelihoods. The fishing sectors and actors believe that the employment created by fishing sustains most of the local communities in the region:

Oyster sector: We employ a lot of people and sustain townships like Coffin Bay and Smoky Bay and places like that, that have no employment.

Tuna sector: At the moment, it is creating a lot of work for a lot of people and has for a lot of years, and I hope it will continue to do so.

4.2.5.2.4 Income and Spending

The fishing industry supports economic prosperity on the Eyre Peninsula by providing an important source of income for people living in the region. The income generated by these sectors promoted and increased the spending or purchasing power of the people living in the region. This was considered vital for small coastal communities and towns whose livelihood depends on fishing (Allison & Ellis 2001; Allison & Horemans 2006). The fishing industry plays a significant role in the regional economy by providing reliable income for many families:

Lateral actor: The money that is brought into this region through fishing and employment is what sustains not just one or two families, but ten or fifteen families and it is crucial for coastal communities.

Vertical actor: Money is circulating. They are buying houses. They are spending money. And they are buying a lot of beer every day.

4.2.5.2.5 Reinvestment

The evidence from the study also revealed that the fishing industry supports the Eyre Peninsula by re-investing its wealth and profits in some of the local communities. Interviewees mentioned that each of the fishing sectors has reinvested significant portion of the profit in the region. For example, some of the sectors have reinvested their money in other industries, community facilities, infrastructures and current town developments. Some of the sectors have significant investment in other industries. This suggests that reinvestment is one of the most powerful ways by which the fishing industry contributes to economic development of regional and local communities.

Interestingly, all the sectors acknowledged that the tuna sector had made enormous investment in the region:

> *Lateral actor: They all pick something they are all passionate about that fulfil the community needs and have invested in that area. They have reinvested in other industries and community facilities and things like that.*
>
> *Tuna sector: I have never seen in the world where the people in the seafood industry or tuna particularly reinvest all their profits or surpluses in this region. There is no other town in Australia or city in Australia that is dependent on the re-investment of one industry. They reinvested inside the towns, the region and seafood industry. Tuna sector, for example, has reinvested most of its money into infrastructures and in the current developments in Port Lincoln.*

4.2.5.2.6 Supporting Local Industries

The fishing industry also contributes to economic development on the Eyre Peninsula by stimulating and supporting local industries and businesses. The flow-on effects of fishing sectors on other businesses and industries were apparent. Interviewees said that without the fishing industry, most of the other businesses would not have survived in the region. The finding also revealed that the fishing industry largely supports the growth of marine-based industries like tourism and food. The continuous existence of the fishing industry prevented other regional industries and businesses from collapsing:

> *Lateral actor: If you were to look at the growth of the tourism industries in the Eyre Peninsula, I will say probably 90% of them will be marine-based. Swimming with sharks, swimming with tuna, swimming with seals, turtles, fishing tours and bay tours especially are here due to the fishing industry.*
>
> *Tuna sector: We support a lot of businesses including the processing industries, maintenance, suppliers and all those sorts of businesses. If this industry falls over, all these other industries are falling over too.*

4.2.5.3 Social Sustainability

This section presents evidence on how the sustainability of the fishing industry supports the social wellbeing of the people living in the Eyre Peninsula region. The evidence

from the study showed that the fishing industry contributes to social equity in the Eyre Peninsula by addressing relevant social issues. The findings revealed that industry sectors continue to improve the social wellbeing of small coastal communities through their fishing activities. These findings echo previous studies in suggesting that social sustainability can be achieved when issues affecting equity, peace of mind and justice are addressed in regional and local communities (Sharma & Kearins 2011; Weingaertner & Moberg 2014). These findings further challenge the notion that industries hardly support social sustainability (Labuschagne, Brent & van Erck 2005). These findings address a gap in the literature, which suggests that social issues are neglected in regional Australia (McManus 2008; Jones & Tonts 1995; Smailes 1995). The evidence in this study suggests that the fishing industry addresses relevant social issues, such as regional branding, sponsorships and philanthropy, infrastructural developments, sustainable living and quality lifestyle, population density, and the longevity and resilience of regional communities on Eyre Peninsula.

4.2.5.3.1 Regional Branding

The findings suggest that while the fishing industry continues to exist, the image of the Eyre Peninsula region will continue to be enhanced. The evidence revealed that the image of the fishing industry and the region are interconnected. Interviewees said that each of the fishing sectors had put the region on the global map and they all put their stamp on the Eyre Peninsula. The fishing industry and the region are inseparable entities due to regional branding. This means that sustainability of the fishing industry has enhanced the domestic and international recognition of the Eyre Peninsula region:

> *Vertical actor: Some of these different sectors have done some work on regional branding.*

Lobster sector: There is no doubt that if you were to take rock lobster fishing out of the Eyre Peninsula, I can assure you that half of the Chinese will forget where Eyre Peninsula is, because Abalone and Lobster are without doubt the two products that all the Asians markets know. Tuna yes but in Japan and not in China. So, the seafood industry and the Eyre Peninsula are connected.

4.2.5.3.2 Philanthropy and Sponsorships

The findings show that the continuous existence of the fishing industry supports social equity on the Eyre Peninsula by being charitable. This means investing in community facilities and development without expecting a financial return. Interviewees mentioned that each of the fishing sectors of the industry give voluntarily to charity and sponsor events and people. Philanthropy and charitable sponsorships can improve the social wellbeing of people living in small coastal communities in the Eyre Peninsula region:

Lateral actor: The philanthropic side of their [fishing industry] nature is that they all pick something they are all passionate about that fulfils community needs and invests in that area. I am sure they make no money out of those things; they do contribute to services and to community facilities in a fairly substantial way.

Tuna sector: In the tuna sector, the way they contribute is through sponsorships.

4.2.5.3.3 Infrastructural Developments

The findings also revealed that the continuous existence of the fishing industry has supported the quality of life for people living on Eyre Peninsula by developing and improving physical infrastructure and social facilities. Through different fishing sectors, most of the people living in remote areas are enjoying new facilities and infrastructure. Interviewees also said that various fishing sectors finance physical infrastructure from their proceeds. This means that without the presence of the fishing industry, physical infrastructure and social facilities would either not exist or be improved:

Lateral actor: The seafood industry and the tuna fishermen, like they have got a bigger income so they contribute to things like buildings, swimming centres, purchasing buildings and opening gymnasiums and all sorts of wonderful things within the communities.

Oyster sector: The region is dependent on our seafood industry to keep things going for the areas and develop our towns. You don't want to lose the infrastructures in the towns.

4.2.5.3.4 Sustainable Living and Quality Lifestyle

The findings were clear that the continuous existence of the fishing industry has sustained the lives of the people living in small fishing communities on Eyre Peninsula, and without the industry, the quality of life would have been much lower. Interviewees agreed that each of the fishing sectors provides a good working lifestyle for the people in the region. This finding reiterates the points raised by previous scholars that social wellbeing improves when a higher quality of life and a good lifestyle are provided for those residing in regional communities (Godschalk 2004; Graymore, Sipe & Rickson 2010). Most of the interviewees said that fishing provides a way of life for everyone that worked in the industry and for those who lived in coastal communities. They believed that to continue to provide sustainable living and a quality lifestyle for families and friends in coastal towns, the fishing industry must be sustainable:

Oyster sector: I think it is more of a lifestyle [choice] than anything else. And it provides a way of life and a vein [sic] for life.

Vertical actor: We saw the evidence that if you want to make a sustainable life for yourself, your family, for your friends and for your town, then you must fish and farm sustainably.

4.2.5.3.5 Population Density

The findings showed that the continuous existence of the fishing industry improves social development on the Eyre Peninsula by drawing people to the region.

Interviewees were of the view that the fishing industry is a population drawcard and thus increases socio-economic activities in the region. The industry attracts many people and families to the region who want to have a good quality of life. This has increased the population density of small coastal communities in the region. Because of the fishing industry, many people and businesses have been established in the region. Without the industry, the population would drop and that would damage the socio-economic development of the region:

> *Oyster sector: They have all got families and so then it adds to the critical density of the population of the towns.*
>
> *Lateral actor: The seafood contributes largely to the Eyre Peninsula as a region because it draws people here. If there is no opportunity for work and family to have a good life, then obviously, they are going to move away or not come at all so our population will decrease.*

4.2.5.3.6 Longevity and Resilience

The findings suggested that the longevity and resilience of the Eyre Peninsula depends on the continued existence of the fishing industry. The long-term future of the region and the industry are interlinked and inseparable. Interviewees mentioned that small towns and coastal communities in the region may not have survived without the economic activities of the fishing sectors. This finding addresses the requirement flagged by Christopherson, Michie and Tyler (2010) and Lebel et al. (2006) that an industry should be an economic system that helps regions adapt and manage their socio-economic difficulties. The findings also suggest that many of the towns in the region would have become lifeless, if not for the continuous existence of the fishing industry:

> *Oyster sector: As a region, the industry contributes in a huge way because there are a lot of towns here that wouldn't have existed.*

Tuna sector: The history of fishing towns in the world is not a good one because their collapse is quite prolific and they collapse for a whole range of reasons. A lot of towns have collapsed because of the introduction of say 200-mile limits. Some have collapsed because the fishing industry has collapsed. If it was not here, Port Lincoln would be a ghost town I think and a shitty little dusty town.

4.3 Summary of the Major Findings

This section summarises the main findings of this case study research. It seeks to illustrate how the evidence addresses the research problem: how local knowledge influences industry sustainability towards regional sustainable development. The section further shows how the evidence gathered from the case analysis answers the research questions and achieves the five main objectives of this thesis.

The first research objective was to identify the kinds of local knowledge that influence industry sustainability. Although a substantial number of studies have examined different taxonomies of knowledge in organisations (Blackler 1995; Lam 2000; Nonaka 1994), an understanding of how these different kinds of knowledge influence industry sustainability—especially that of the fishing industry—is currently limited. In addressing the gap in the literature, the empirical findings revealed that sustainability of the fishing industry is influenced by generational, institutional, collective, professional, scientific, technological and industrial knowledge. This classification of local knowledge reflects recurring themes in the empirical data.

The second objective was to understand how the knowledge that influences industry sustainability is acquired. Though knowledge is acquired through various modes of learning, (Argyris & Schön 1996; Brown & Duguid 2001; Nonaka, Umemoto & Senoo 1996); an understanding of how the knowledge that influences industry sustainability is obtained is lacking. To my knowledge, there is no study that has examined this issue in the fishing industry, especially in the Eyre Peninsula region. Drawing from the evidence

in this case study, the findings suggested that on-the-job learning and learning from experiences, experiments, formal education, social networks and observations are the major ways in which the knowledge that sustains the fishing industry is acquired.

The third objective was to understand how the knowledge that influences industry sustainability is contributed. A substantial number of scholars have examined the different ways individuals and organisations share and contribute their knowledge (Chow & Chan 2008; Wasko & Faraj 2005; Ye, Feng & Choi 2015). However, an understanding of how knowledge influences industry sustainability is still limited, especially within the fishing industry. The findings from this case study have shown that the knowledge that influences industry sustainability are largely contributed through formal and informal social processes such as industry associations, meetings and discussions, conferences, seminars and workshops, social networks and cross-fertilisation, social interactions and relationships, cooperation and collaboration and informal conversations. This evidence suggests that knowledge that sustains the fishing industry comes from formal and informal social sources.

The fourth objective was to illustrate how local knowledge influences industry sustainability. An empirical overview of the relationship between local knowledge and industry sustainability has not been fully explored in the literature. Though we know that knowledge is a strategic resource for achieving sustained competitive advantage (Gold, Malhotra & Segars 2001; Grant 1996b), the role of knowledge has only recently been examined in the business sustainability literature (Hörisch, Johnson & Schaltegger 2015; Pogutz & Winn 2016). Therefore, an understanding of how knowledge influences industry sustainability is limited, particularly in the fishing industry on Eyre Peninsula. The findings of this study help address this gap by revealing that local knowledge sustains an industry by influencing its strategic priorities, organisational actions and

commercial activities. The results further tell us that an industry can be sustained when it can strategically engage in research collaboration to generate relevant knowledge to pursue R&D, which is essential for innovation, product development and value creation. The same knowledge is organisationally vital for making crucial decisions and determining direction, bringing about change and continuous improvements, solving complex problems and increasing efficiency. Knowledge also has commercial value for gaining and sustaining industry competitiveness, developing marketing strategies which are important for expanding markets, creating quality product and enhancing reputation, promotions and determining competitive prices.

The fifth objective was to understand how industry sustainability influences regional sustainable development. The role of industries in regional sustainable development has been widely contested by scholars. There are those who believe that industries can support regional growth and development (Markusen 1994b; Potts 2010). There are also those who believe that industries are vital for regional development but they have many reservations (Gray, Golob & Markusen 1996; Wixe & Andersson 2017). There are many scientific and government reports about the benefits of the fishing industry in the Eyre Peninsula region (for example see EconSearch 2009, 2015; PIRSA 2015). However, we currently know little about how the continuous existence of the industry has affected sustainable development in the Eyre Peninsula. There is also a limited understanding of how industries support sustainable development in regional Australia (McManus 2008). The evidence from this case study helps to address this gap in the literature by revealing that the sustainability of the fishing industry can contribute to environmental integrity, social equity, and economic prosperity of people living in the Eyre Peninsula region. This study revealed that the industry has moved away from its past environmental flaws and is currently adopting eco-friendly approaches to

protecting the environment, managing waste through recycling and clean-ups, and managing natural resources by reducing fish mortalities and depletion. As an economic force, it has created wealth, reinvested their capital and supported local businesses, which have generated more jobs and provided incomes for people living in the regional communities. As a social buffer, the fishing industry has improved the social wellbeing of people living in local and regional communities by sponsoring events, building infrastructure and facilities, providing sustainable living and lifestyle, increasing population and by improving regional reputation and image, all of which are essential for the longevity and long-term prosperity of the Eyre Peninsula. These findings have theoretical and practical implications that will be explored in the next chapter.

Chapter 5. Summary and Conclusion

5.1 Introduction

This study investigated how local knowledge influences industry sustainability towards regional sustainable development. The main purpose of the case study was to understand how local knowledge supports the sustainability of the fishing industry in a way that supports sustainable development in the Eyre Peninsula region. The research sought to achieve five main objectives: to identify the kinds of local knowledge that influence industry sustainability; to understand how the knowledge that influences industry sustainability is acquired; to understand how the knowledge that influences industry sustainability is contributed; to illustrate how local knowledge influences industry sustainability; and finally, how industry sustainability influences regional sustainable development. The underlying assumption here is that sustaining an industry is inconceivable without the acquisition, contribution and application of local knowledge. This is because strategies, actions and activities that affect sustainability of the fishing industry are underpinned by a combination of acquired knowledge contributed by the fishing sectors and associated actors.

This concluding chapter aims to provide a summary of the theoretical and empirical journeys undertaken during this doctoral research. The chapter is divided into seven sections. The first section introduces the chapter. The theoretical and methodological underpinnings of this research are explained in the second section. The third section outlines the major findings of this study. The fourth section identifies the theoretical contribution by discussing the value of this research in relation to existing management

and organisational theories. The fifth section describes the practical implications and emphasises the contribution of research findings to management practice. The sixth section reveals the research limitations and recommends areas for future research. The seventh section concludes this chapter with a synthesis of the findings to show how they address the research problem and objectives of this study.

5.2 Theoretical and Methodological Underpinnings

The nexus between theoretical and methodological considerations was useful for interpretive qualitative case study research. This study was underpinned by social capital and new institutional theories. The notion of social capital provides in-depth understanding of knowledge creation, development, acquisition and contribution within social structures. New institutionalism emphasises the social construction of knowledge through social structures. Both theories support the sociology of knowledge which is best understood through qualitative inquiry. The sociology of knowledge suggests that actors provide multiple accounts and perspectives of their lived experience gained by interacting within their social structures.

The theoretical background of this research was consistent with the philosophical underpinnings of the methodology employed to investigate the research problem. The ontology of relativism and the epistemology of social constructionism were supportive of the study's theoretical perspectives. Both philosophical positions operate on the premise that individuals' interactions within a specific local context provide an avenue for accessing multiple realities and construct deeper meanings. To limit empirical accounts to a specific local context, a multiple embedded case study analysis was adopted. This meant adopting a methodological approach that permits access to the

actors' social worlds so as to understand the research issues and problem from their perspectives.

Based on the theoretical and philosophical underpinnings of this research, a qualitative inquiry of case study analysis was used to investigate the research problem. Semi-structured interviews and face-to-face interactions were employed to gather multiple perspectives and realities from actors within the fishing industry. The evidence was integrated, analysed and interpreted to provide in-depth understanding of the research problem. To ensure that the research truly reflected the views of the actors; credibility, dependability, confirmability and transferability criteria proposed by Guba and Lincoln (1985) were used to ensure trustworthiness and rigor.

5.3 Key Findings

The key outcome of this research is that sustainability of the fishing industry was underpinned by strategic priorities, organisational actions and commercial activities, influenced by different kinds of local knowledge acquired and contributed largely through learning mechanisms and social processes, which has social, economic and environmental implications for sustainable development in the Eyre Peninsula region. This suggests that the continuing existence of industry depends on leveraging local knowledge. It further demonstrates that industries can support the sustainable development trajectories of regions by being sustainable themselves. This key research outcome can be reflected in five major empirical findings.

First, the findings of this study showed that industry sustainability is influenced by different kinds of local knowledge. The long-term future of the fishing industry was revealed to be largely determined by generational, institutional, collective, professional,

scientific, technological and industrial knowledge. The insight from the evidence was that blending the experiences of the younger and older generations, individual sectors thinking as collectives, working with the scientific communities, relying on previous professional backgrounds, learning from diverse institutions, capitalising on current technological revolution and gaining more knowledge about the commerce and business of fishing underpinned sustainability of the fishing industry in the Eyre Peninsula region.

Second, the findings of this study revealed that the knowledge that influences industry sustainability is mainly acquired by on-the-job learning and learning from experiences, experiments, formal education, social networks and observation. To sustain the long-term future of the industry, actors and sectors had to rely on years of learning on the job, lived experiences, constant observation, social networking, trial and error and formal education to obtain new knowledge. This suggests that to nurture sustainability of the fishing industry, the sectors had to acquire new knowledge through multiple learning mechanisms.

Third, the findings in this research indicated that the knowledge that influences industry sustainability is largely contributed through formal and informal social processes. Industry associations, meetings and discussions, conferences, seminars and workshops, networks and cross-fertilisation, social interactions and relationships, cooperation and collaboration and informal conversations are essential avenues used by the actors and sectors to contribute their knowledge towards sustainability of the fishing industry. This knowledge is essentially fostered through social processes.

Fourth, the findings of this study also illustrated that local knowledge influences industry sustainability by informing strategic priorities, organisational actions and

commercial activities. For the fishing industry to be sustainable, it strategically prioritises knowledge generation through scientific research collaborations, which assist with R&D, innovation, product development and value creation. This knowledge informs organisational decisions and direction, change and continuous improvement, problem-solving and efficiency. The knowledge is commercially useful for developing marketing strategy including expanding markets, creating quality product and enhancing reputation, promotions and determining prices, which are essential for gaining and sustaining industry competitiveness. Priorities, actions and activities that affect sustainability of the fishing industry are determined by the knowledge embedded within sectors.

Fifth, the findings of this study demonstrated that the continuous existence of the fishing industry can support the long-term sustainability of the Eyre Peninsula region. The fishing industry has contributed to environmental, social and economic wellbeing of the people living in the Eyre Peninsula. Interviewees said that the history of this industry is that it had harmful and negative influence on the environmental integrity of the region. Currently, the industry is much more aware of its negative impacts on the environment, marine organisms and water resources and is adopting eco-friendly approaches through institutional guidance in addressing these regional environmental issues. It has also invigorated and reinvigorated the regional economy by providing sustainable jobs and income for the local people, and has contributed to addressing the social issues in the region by providing sustainable living and lifestyle for the people through improved physical and social infrastructure and facilities. These findings suggest that sustainability of the fishing industry supports sustainable development of the Eyre Peninsula region.

5.4 Theoretical Contribution

The principal theoretical contribution of this research is the development of a local knowledge-based view of industry sustainability. This suggests that the ability of the fishing industry in the Eyre Peninsula region to sustain its long-term future may depend, in part, on leveraging its local knowledge. Scholars have looked at different approaches to explain how businesses can become sustainable. There are those who believe that corporations can be sustainable by being ethical (Barkemeyer et al. 2014; Wulfson 2001). Some have argued that businesses can become sustainable by being strategic in how they support sustainability (Ferraro, Pfeffer & Sutton 2005; Margolis & Walsh 2003). There are others who have reasoned that businesses can become sustainable by integrating different dimensions of sustainability that links strategic motives with ethical obligations (Baumgartner 2014; Gladwin, Kennelly & Krause 1995). Currently a few scholars have begun to develop the view that knowledge promotes sustainability management in corporations and businesses (Hörisch, Johnson & Schaltegger 2015; Pogutz & Winn 2016). To my knowledge there has not been a study that explores exactly how local knowledge influences industry sustainability. This study contributes to the industry sustainability literature by arguing that the Eyre Peninsula fishing industry's capacity to leverage local knowledge, may well affect its ability to achieve true sustainability, in the sense of its ability to continue to flourish and still be socially, economically and environmentally healthy in the region.

Following the above contribution is a closely related one that connects knowledge management and business sustainability literature. Though we know a lot about the different kinds of knowledge in organisations (de Jong & Ferguson-Hessler 1996; Hitt, Ireland & Lee 2000; Nonaka 1994), we know much less about how knowledge contributes to industry sustainability. This research extends the knowledge taxonomy

literature into the industry sustainability literature by showing that some kinds of knowledge make a serious contribution to industry sustainability. Despite the scholarly literature on knowledge acquisition (Inkpen 1998, 2000) and knowledge contribution (Ye, Feng & Choi 2015), little has been written about how these processes generate knowledge that supports industry sustainability. Based on the findings, this study further contributes to the literature by arguing that the way different kinds of local knowledge are acquired and contributed by the actors and sectors has an impact on the sustainability of the fishing industry in the Eyre Peninsula region.

Another valuable contribution to theory lies in the development of the notion of industry sustainability within the business sustainability literature. Growing from the discussion of the relations between business and society, the understanding of business and corporate sustainability has been confusing because there are different conceptualisations of these terms (Hahn & Figge 2011; van Marrewijk & Werre 2003). Different scholars and fields have defined industry sustainability to reflect different perspectives. For example, within fishing industry research, a sustainable industry is largely defined from an ecological perspective—the fishing industry is not depleting the fish stock and not destroying the ecosystem (Pauly et al. 2002; Pauly, Watson & Alder 2005). Within management research, however, the term has been widely accepted to refer to ecological sustainability, and industries are also expected to consider themselves as part of environmental, economic and social ecosystems (Russo 2003; Starik & Rands 1995). In this thesis, the term is operationalised as the ability of industry to sustain its long-term future by integrating environmental integrity, economic prosperity and social equity in a way that sustains its operating environments. From this understanding, this study demonstrates that the longevity of the fishing industry is underpinned by knowledge embedded within its sectors which contributes to the

economic, social and environmental wellbeing of the regional communities on the Eyre Peninsula.

This research also makes a theoretical contribution in its advancement of a social perspective on industry sustainability. The study extended the notion of social capital to examining knowledge acquisition and contribution at industry level. It advances a social perspective on industry sustainability by showing how, through formal and informal social processes, different sectors and actors acquire and contribute knowledge towards sustainability of the fishing industry. Social capital has received a lot of attention at the individual, collective, firm and organisational level, but less attention at the industry level (Wouter & Elfring 2008; Walker, Kogut & Shan 1997). Despite the role of social capital in knowledge creation and development (McFadyen & Cannella 2004; Nahapiet & Ghoshal 1998), its contribution to industry sustainability has not been fully explored. Social capital in this research offered an opportunity to understand how sustainability-oriented knowledge is acquired and contributed through diverse structural processes, such as social interaction, cross fertilisation and networking. It further provided an avenue to understand that relational practices through interpersonal relationships based on trust foster knowledge contribution to sustainability of the fishing industry. The evidence from the case study showed that ideas and information for sustainability are sourced through personal communication in informal spaces such as pubs. It also revealed that through cognitive social capital such as collective language, understanding and interest, diverse actors and sectors can integrate their ideas and insights towards one common purpose or goal of sustaining the fishing industry.

This research further contributes to theory by providing institutional perspectives on industry sustainability, and illustrating how different institutions can influence whether an industry is sustainable or not. This study shows that institutions can provide valuable

knowledge and information towards industry sustainability. It further reveals that the same institutions can also be the source of continuous pressure that inhibits sustainability. Extensive research has been done on how institutions force industries to conform to environmentalism (Delmas & Toffel 2008; Hoffman & Ventresca 1999). Not many studies have explored how institutions influence industry sustainability. There has been little discussion on how institutions, as an embodiment of knowledge and pressure, either facilitate or inhibit sustainability, especially in relation to the fishing industry on the Eyre Peninsula. This study revealed that institutions play a crucial role in sustaining the long-term future of the industry by providing invaluable knowledge. Some institutions were perceived as having a negative influence on the sustainability of the fishing sectors, while others were perceived as supporting the long-term existence of the industry. For example, the interviewees revealed that while an institution like the quota system positively support the long-term existence of the fishing industry, another institution like marine parks negatively influences the sustainability of the industry. This means that industry may perceive institutions differently even if they are designed to achieve the same outcome. The new institutional theory can offer useful explanations for how and why industries achieve sustainability or otherwise.

The final theoretical contribution of this research is the development of an industry-based view of regional sustainability. The idea in this study is that sustainable industries sustain regions. This study has demonstrated that industry sustainability contributes to regional sustainable development. Little attention, however, has been paid to how local industries support the sustainable development of their regions. Though scientific and government reports acknowledge the invaluable contribution of the fishing industry towards the Eyre Peninsula region (EconSearch 2015; EconSearch 2010), we lack a

qualitative understanding of how this industry supports sustainable development of the Eyre Peninsula region. This study established a link between the long-term futures of the fishing industry and of the Eyre Peninsula region. The study further reveals that managing industry sustainability is a unique way to ensure that the region continues to thrive. Indeed, the collapse of regions may often be attributed to failed industries. This research has demonstrated that the sustainable development of the Eyre Peninsula region may be closely connected to the sustainability of its fishing industry.

5.5 Practical Implications

Key findings in this research provide several managerial implications for practice. First, this study found that the long-term future of the fishing industry largely depends on generational, institutional, collective, professional, scientific, technological and industrial knowledge. Based on this finding, managers could provide an avenue for different generations to interact, which might help blend old and new ideas. Regular interface between industry and regulating institutions might help fishing industry managers to access requisite information for making appropriate and sustainable business decisions. Creating a conducive social atmosphere for individual sectors to come together may enable actors to more easily contribute fresh perspectives. Allowing actors to share their previous industry experiences may help develop quality experiences. Promoting more research collaboration between the sectors and the scientific community (e.g. science bodies and universities), can generate more problem-driven knowledge. Investing and sharing new technological advancements and expertise can help other sectors to move forward, which is essential for sustainability of the wider industry. The main practical implication here is the development of an industry-level knowledge integration approach where the sectors and actors can contribute and access

knowledge and solutions from a common pool. Blending scientific knowledge with other forms of knowledge is vital to sustainability of the fishing industry, which depends on this hybrid knowledge.

A second practical managerial implication of this study is the recognition that social processes play a significant role in knowledge acquisition and contribution to industry sustainability. The fishing industry as a collective enterprise mainly uses social mechanisms in their knowledge activities. This is seen in the way actors and sectors interact, observe each other and learn from each other while working on the job to gain new knowledge. These social processes, whether formal or informal, are considered useful avenues to obtain new insights and perspectives concerning the long-term future of the fishing industry. Managers within the industry could strengthen informal social practices so that actors can effectively and easily acquire and contribute knowledge to the industry. Managers can connect sectors and actors by formalising informal contacts and social activities, which can fast track the process of cross-fertilising diverse and dispersed sectors in the region. These informal social processes are necessary because sectors and actors are geographically and regionally dispersed. For example, some actors have to travel long distances to attend seminars, conferences and workshops formally organised by their industry associations. Some have to make personal visits to friends that enable them to converse about bigger issues that affect the long-term future of the industry. Industry managers could blend formal and informal social practices for the sake of developing rich industry sustainability-oriented knowledge.

Third, another practical implication is that the fishing sectors and their managers should be mindful of the role that local knowledge plays in their strategic priorities, organisational actions and commercial competitiveness towards industry sustainability. Knowledge underpins the way sectors and actors collaborate with scientific

communities, solve critical problems, change and direct their industry towards efficiency, and subsequently achieve long-term competitiveness. Sustainability of the fishing industry depends on the way it acquires, develops, contributes, integrates and applies local knowledge. Greater consciousness of the inherent value of local knowledge among managers could distinguish the fishing industry from its competitors in other countries. Sustained consciousness and recognition of the inherent value of local knowledge is the surest way to secure the fishing industry from collapsing (Johannes, Freeman & Hamilton 2000).

The fourth practical managerial contribution arising out of the findings of this study concerns the need for fishing industry managers to realise the inherently deep connection between the industry and the Eyre Peninsula region. Indeed, to pursue sustainability, the fishing industry on the Eyre Peninsula has to exploit its local knowledge. However, without the region and its natural resources, the industry might not be sustainable and without industry the region might also be vulnerable. The industry's continuous existence has implications for the region's environmental footprint, social wellbeing and economic prosperity, which in turn have implications for long-term sustainability of the industry. The fishing industry managers must see that both the long-term future of the region and the industry are interconnected, as the decline of one could hurt the other. To improve the industry–regional relationship requires industry managers and policymakers to appreciate this natural connection and continuously interact and share knowledge and information.

Fifth, policymakers need to understand the repercussions of their institutional arrangements with regard to sustainability of the fishing industry. The introduction and reform of rules, legislation and regulations for the fishing industry must be assessed, as these institutions can either inhibit or facilitate sustainability of the fishing sectors and

consequently the fishing industry. Industry managers should also assess the impacts of their internal institutions over time. Codes of conduct, industry standards and guidelines, as introduced by industry associations, must consider industry sustainability. Because industry sustainability is supported by some but not all institutions. The findings showed that some institutions were sources of pressure and were eroding fishing sectors. Some institutional arrangements and associated pressures are considered risky for developing and sustaining an industry (Aldrich and Fiol 1994).

5.6 Limitations and Recommendations for Future Research

Although this study makes several important contributions to theory and practice, there are limitations that represent opportunities for future research.

First, this research sought to understand how local knowledge influences industry sustainability in a way that supports regional sustainable development. To this end, the fishing industry in the Eyre Peninsula region was chosen as a case study. The fishing industry has multiple subcases or fishing sectors. Evidence was collected from three subcases which were purposively selected. Selecting three sectors out of more than eleven fishing specialities, however, provided a limited account of the social phenomenon under investigation. Therefore, future research could increase the number of subcases by selecting more fishing sectors to provide a holistic understanding of the research problem.

Although the sample size of 54 interviewees is relatively large, certain important actors of the industry's value chain were not selected. For example, customers were not included in the sampling frame because most of the seafood products are exported. This

provides an opportunity in future to widen the sample to include customers and the influence they may have on industry sustainability.

It should also be noted here that the thesis relies exclusively on the perceptions and opinions of key actors operating in or around the Eyre Peninsula's fishing industry. The evidence was gleaned from diverse interviewees, including producers, processors, retailers, wholesalers, industry managers, regional development agencies, and governmental and regulatory institutions in the region. Nevertheless, while the interviews are dominated by actors whose livelihoods depend directly on the fishery, other expert and regulatory commentators also have a voice. Although the findings cannot claim all the authority of 'triangulation', they cannot be characterised simply as the self-interested view of the industry's central players. The findings in this study explore the contribution of the fishing industry towards the sustainable development of the Eyre Peninsula region, as perceived by the industry itself and a range of industry stakeholders.

Second, this study employed embedded analysis using a thematic approach to transform the evidence. This study investigated the research problem by integrating evidence from the three subcases. "Embedded thematic analysis" encourages the integration of evidence more so than case-by-case comparisons. Another study, however, could provide interesting findings by doing sector-by-sector or case-by-case comparisons.

Third, although multiple sources of evidence are largely preferred by qualitative research scholars, in-depth interviews were used as the primary evidence gathering procedure. Relying on interviews as the only data source may limit the claims and interpretations drawn in this study. The choice of interviews as a source of evidence was based largely on the philosophical orientation of this doctoral investigation which

is purely interpretive. To fully understand the richness of the social phenomenon explored in this study, future research could use additional methods, such as direct participant observation and ethnography, to gather more evidence. A mixed methods approach, with evidence from both interviews and surveys may help to enrich future understanding of the issues explored in this study.

Fourth, though this thesis examines the sustainability of the Eyre Peninsula's fishing industry from a local knowledge perspective, this does not necessarily speak to the long-term wellbeing of the industry, where wider perspectives come into play. These include global challenges to ecological sustainability such as global warming, overfishing or ocean pollution. The findings of this study throw light on local knowledge and its local impacts, but in terms of sustainability, the findings are not exhaustive. These other, global factors can still undermine the sustainability of the Eyre Peninsula region and its fishing industry.

Finally, one of the objectives of this research was to understand how industry sustainability supports regional sustainable development. This case study largely focused on evidence from interviews and less on scientific reports about the fishing industry in the Eyre Peninsula region. This would have provided data more aligned to a positivist orientation. However, the interview participants included government and regulatory institutions operating on the Eyre Peninsula during the data collection process. To extend further the discussion of the role of the fishing industry in regional sustainable development, triangulation methods or mixed methods might be worthwhile.

5.7 Conclusion

The main objective of this research was to understand how local knowledge influences industry sustainability in a way that supports regional sustainable development. Though a great deal of research has been conducted on local knowledge, the extension of this important subject into industry sustainability literature has, thus far, received much less empirical attention. This thesis set out to investigate the perspective of various industry stakeholders on how knowledge embedded within the fishing industry influenced its sustainability. The thesis concludes that sustaining the fishing industry might be more likely if the different kinds of local knowledge can be identified, applied and leveraged. Sustainability of the fishing industry has significant implications for the social, economic and environmental wellbeing of the people living in the Eyre Peninsula region. Based on the findings of this study, it can be argued that industries and regions may have inherent and knowledge-based connection, as the ability of an industry to leverage its local knowledge in pursuit of sustainability in its commercial activities, strategic priorities and organisational actions may also affect the economic prosperity, social equity and environmental integrity of a region.

Appendices

Appendix A: Interview Guide

Interview Questions for Participants

1 *Background information*
   a. How long have you been in this sector?
   b. How did you get involved?
   c. How did you learn about fishing?
2 *Do you feel you get an opportunity to contribute your knowledge to how this sector develops?*
   a. How do you do that?
   b. In what ways, do you think your knowledge of fishing contributes to how this sector develops?
3 *Do you feel that the people working in this sector have enough opportunity to contribute to how the fishing industry develops on the Eyre Peninsula?*
   a. In what ways?
4 *Do you think the other sectors contribute to how the fishing industry develops on the Eyre Peninsula?*
   a. How do you think they do that?
   b. In what ways, do you think fishing sectors can contribute to how the fishing industry develops on the Eyre Peninsula?
5 *Do you think fishing can contribute to the long-term development of the Eyre Peninsula?*
   a. How?
6 *Conclusion*
   a. Is there anything else you think I should know about this sector and the fishing industry in the Eyre Peninsula?
   b. Would you be happy for me to contact you if I need to clarify or expand on what we have just discussed?
   c. Can you suggest anyone else who might like to participate in this research and contribute their views?

Appendix B: Evidence of Ethics Approval

THE UNIVERSITY of ADELAIDE

RESEARCH BRANCH
OFFICE OF RESEARCH ETHICS, COMPLIANCE AND INTEGRITY

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CRICOS Provider Number 00123M

Applicant: Dr L Daniel

School: Business School

Project Title: Local knowledge and industry development: The wisdom for regional sustainability

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The University of Adelaide Human Research Ethics Committee
Low Risk Human Research Ethics Review Group (Faculty of Arts and Faculty of the Professions)

ETHICS APPROVAL No: H-2015-029 App. No.: 0000019947

APPROVED for the period: 27 Feb 2015 to 28 Feb 2018

Thank you for your responses dated 20.02.2015 and 25.02.2015 to the matters raised.

This research is to be conducted by Samuel Quartey, PhD candidate.

PROFESSOR RACHEL A. ANKENY
Co-Convenor
Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)

PROFESSOR PAUL BABIE
Co-Convenor
Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)

THE UNIVERSITY of ADELAIDE

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CRICOS Provider Number 00123M

27 February 2015

Dr L Daniel
School: Business School

Dear Dr Daniel

ETHICS APPROVAL No: **H-2015-029**

PROJECT TITLE: **Local knowledge and industry development: The wisdom for regional sustainability**

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Arts and Faculty of the Professions) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants. You are authorised to commence your research on **27 Feb 2015**.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled *Project Status Report* is to be used when reporting annual progress and project completion and can be downloaded at http://www.adelaide.edu.au/ethics/human/guidelines/reporting. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the Information Sheet and the signed Consent Form to retain. It is also a condition of approval that you **immediately report** anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol; and
- the project is discontinued before the expected date of completion.

Please refer to the following ethics approval document for any additional conditions that may apply to this project.

Yours sincerely

PROFESSOR RACHEL A. ANKENY
Co-Convenor
Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)

PROFESSOR PAUL BABIE
Co-Convenor
Low Risk Human Research Ethics Review Group
(Faculty of Arts and Faculty of the Professions)

Appendix C: Consent Form

THE UNIVERSITY of ADELAIDE

Human Research Ethics Committee (HREC)

CONSENT FORM

1. I have read the attached Information Sheet and agree to take part in the following research project:

Title:	**Local Knowledge and Industry Development: The Wisdom for Regional Sustainability**
Ethics Approval Number:	**H-2015-029**

2. I have had the project, so far as it affects me, fully explained to my satisfaction by the research worker. My consent is given freely.

3. Although I understand the purpose of the research project it has also been explained that involvement may not be of any benefit to me.

4. I have been informed that, while information gained during the study may be published, I will not be identified and my personal results will not be divulged.

5. I understand that I am free to withdraw from the project at any time.

6. I agree to the interview being audio recorded. Yes ☐ No ☐

7. I am also aware that I should keep a copy of this Consent Form, when completed, and the attached Information Sheet.

Participant to complete:

Name: _____ Signature: _____ Date: _____

Researcher/Witness to complete:

I have described the nature of the research to _____
(print name of participant)

and in my opinion she/he understood the explanation.

Signature: _____ Position: _____ Date: _____

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Appendix D: Complaints Procedure for Participants

The University of Adelaide
Human Research Ethics Committee (HREC)

This document is for people who are participants in a research project.

CONTACTS FOR INFORMATION ON PROJECT AND INDEPENDENT COMPLAINTS PROCEDURE

The following study has been reviewed and approved by the University of Adelaide Human Research Ethics Committee:

Project Title:	**Local Knowledge and Industry Development: The Wisdom for Regional Sustainability**
Approval Number:	**H-2015-029**

The Human Research Ethics Committee monitors all the research projects which it has approved. The committee considers it important that people participating in approved projects have an independent and confidential reporting mechanism which they can use if they have any worries or complaints about that research.

This research project will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research (see http://www.nhmrc.gov.au/publications/synopses/e72syn.htm)

1. If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the project co-ordinator:

Name:	**Dr Lisa Daniel**
Phone:	**+61 08 8313 3105**

2. If you wish to discuss with an independent person matters related to:
   - making a complaint, or
   - raising concerns on the conduct of the project, or
   - the University policy on research involving human participants, or
   - your rights as a participant,

   contact the Human Research Ethics Committee's Secretariat on phone (08) 8313 6028 or by email to hrec@adelaide.edu.au

secretariat/ethics/human\complaints

Appendix E: Representation and Visualisation of some Evidence (Excerpts)

Summary Table 1: Theme – Types of Local Knowledge

Sub-themes	Evidence
Industrial knowledge	
Tuna	With all the knowledge we don't need any knowledge of how to catch fish. Fishing power is not a problem anymore. Fishing knowledge is not a problem anymore.
Lobster	Basically, it includes the knowledge of fishing, the weather, how to catch a crayfish and their movements and what depth.
Vertical	Particularly in the role where we handle so many types of species, particularly, you get a very good knowledge or bigger picture of where the seafood is coming from.
Lateral	A lot of the time you are working with industry and you've got to have a knowledge-base to start with. So you've got to learn about how the industry works in order to survive.
Generational knowledge	
Tuna	Back then my family pioneered the Tuna fishery. My family was in Tuna fishing industry from 1952-1968. From maybe when I was 4 years old. I learned from my Father, my Brothers and Uncles.
Lobster	I just handed my experience to my oldest Son. I hope the next generation will continue to fish the license.
Oyster	I am fortunate that my family has been farming Oysters for 25 years. So, in that sense there is a lot of history there and there is a lot of experience that I can draw on.
Vertical	It was good to get involved in the family business and learn how it works.
Lateral	I see a lot of the younger legs that are stepping up like Dad used to fish the license and now his son is now fishing the license.
Institutional knowledge	
Oyster	There got to be regulations but the regulations should be sensible regulations as well. Legislation is starting to erode those sectors.
Lateral	They know how the institutions operate. They know our compliance regimes. A long way to making sure the fishermen have the information to make a good decision about their businesses. If they fail to be educated or understand the rules or ignore the rules that is where the compliance side comes along and they get fines or whatever. Sure, in the long-term because if we do not get it right down here is not going to get right out there.
Tuna	I think through the quota system we protect what we've got as well. Is not something like I see in other countries where it is not a protected sort of business and anyone can come in and do
whatever	they like. There is a quota system in place which is allocated to license holders and they have the license to go and catch a certain amount of fish. This means that for catching too much the prices will drop and then it will damage the industry.
Lobster	The Cray fishing [lobster] sector that is contracting because of Marine Parks, and the guys have cut out the traditional areas they use to fish, so all that means is that, they are getting a bit smaller and the price of Crayfish is going up dramatically.
Collective knowledge	
Tuna	There are a lot of things they can do by using their collectives and that is the collective knowledge. Is a matter of bringing the knowledge you have to the system and to the challenge and also utilise other people's knowledge. It was everyone's ideas of what we can put together to make it work better.
Lobster	Taking everyone else's.
Oyster	We were ever strong association between everybody. So we share information, talk to each other, go to a different Bay and it just developed that way.
Professional knowledge	
Tuna	I had management experience in retail before, so I had some ideas.
Lobster	I was working as an Engineer.
Oyster	My background is all completely different things, its oil, food and casinos and you know everything.
Vertical	I was a Diving Instructor in the UK, and I retired. I used to teach for the local authority.

Lateral	I have worked my whole career in food, beverage companies, and export companies.
Scientific knowledge	
Tuna	First of all it is science-based. This is a different type of generation. If you look at the scientific knowledge, marketing knowledge or the engineering knowledge of the farm it is all about knowledge and application of that knowledge.
Lobster	Only last week we had a big meeting in Lincoln with all companies and what Science have got, what they are going to do, what are their programs.
Oyster	A lot of the Farmers out there in the Oyster industry have you noticed, are much focused in Science and Genetics. They are interested in knowing the research that is going on.
Vertical	There is a little more scientific stuff behind it.
Lateral	There are younger generations that have got degrees. That have gone off and done their degrees and come back to their family fishing business. They are used to talking at the scientific level because of their degrees. They do not want just the information but the background you know, the long-term implications.
Technological knowledge	
Tuna	It was my job to develop a new technology. A new level of knowledge. There is no other industry in the world where this technology exists. The technology exists in their minds. There is no book. You cannot read it. It is all in their heads.
Lobster	All the modern electronics. I don't even know what they do. We didn't have all those electronics in my days but we now have all these electronics like GPS [Global Positioning System], Plotters and Sunnics.
Oyster	They will spend money on looking at new techniques, new species and new husbandry.
Vertical	Designed ways and equipment that will help them do their job. Recommended hardware as well.

Summary Table 2: Theme – Learning Mechanisms

Sub-themes	Evidence
On-the-job training	
Tuna	The in-depth knowledge that I hold about the industry today was all learned on the job.
Lobster	You just learn as you go along.
Oyster	If you are willing to work with the guys they will actually train you on the job.
Vertical	You learn on the spot.
Lateral	You have to learn and go your own way to find out what the rules are.
Experience	
Tuna	I think just gathered more knowledge over the years.
Lobster	The biggest thing with the knowledge of fishing, I think it takes about 4-5years to pick as a Fisherman and gain enough knowledge to become a reliable Fishermen…
Oyster	Knew from …previous experiences.
Vertical	By being in the industry beforehand and gaining an understanding of the production equipment that we use and what to recommend.
Lateral	I have worked in various sectors and I mean the Lobsters, Abalone, Oysters, and Mussels. So actually you can draw on that experience.
Experiments	
Tuna	Had a lot of experiments. Developed a treatment through some trials which were done by the government, scientists and by veterinarians all together bring all their knowledge.
Lobster	There was no real book on how to run a closed circulation systems. Open circulation from the sea water wouldn't have been easy but for a close, it took many years of trial and error.
Oyster	Tried and experimented different things and different baskets and right through to the final products.
Formal education	
Tuna	I have Master's degree in Fishery Management.
Lobster	I have done an MBA, MBA is a very broad concept.
Oyster	Did Aquaculture at the University and I got an Aquaculture degree.
Vertical	I went to TAFE and studied Aquaculture for 6months and got Certificate 3 as what it worth in Aquaculture.
Lateral	Did Bachelor of Aquaculture Science in Honours. And now Master's in Agribusiness.
Social networks	
Tuna	Can learn from Oysters, Prawns, and Mussels.
Lobster	From Bay to Bay, and you go to other people's sheds and learn from them.
Oyster	You probably don't understand how much knowledge you've got until you start to talk to other Oyster Farmers and networking with them.
Vertical	You learn a bit from your customers, you learn from your staff, and you learn from everyone around you.
Observations	
Tuna	Observation and you can't write a book on it.
Lobster	Just the years of teaching and watching and with all the modern electronics.
Oyster	Observation means looking at and observing the growers around us that have been doing it for a lots longer than I am and just being aware and understanding your environment and your animal.
Vertical	From my observation only.
Lateral	There is an element of observing. So am going out to watch you do this activity to make sure it fits within the rules.

Summary Table 3: Theme – Interactive Processes

Sub-themes	Evidence
Industry association	
Tuna	Knowledge is really channeled through industry associations.
Lobster	Through our industry association.
Oyster	Obviously, they have got their own associations too, which they would use to move forward and interactions with those associations could bring on outside views.
Vertical	They have got so many bodies that they could go to and take an information from.
Meetings and discussions	
Tuna	I think am involved in management meetings, association meetings and research meetings. It does come about through the open discussions during those meetings that you put your views across. And putting ideas forward and contributing to those sorts of things.
Lobster	Everyone that I have met is forthcoming to share their knowledge especially when you have meetings.
Oyster	Have their voice through their bay reps, our structure has a bay rep and that bay rep has bay meetings so they can attend.
Lateral	We have industry meetings on Fridays. I am doing a port meeting with the abalone guys because they want a refresher on what the rules are. It been few years and a few grey areas.
Seminars, conferences and workshops	
Tuna	Just like attending workshops like we had. If there is something we can contribute they will ask us some questions or give someone a different point of view.
Lobster	We have these workshops where all the stakeholders of all the fishing industry come and talk once or twice a year.
Oyster	There are stuffs like the conferences and seminars. We are always sharing knowledge.
Vertical	Going to conferences, going to field day, going to seminars, trade show is an excellent conduit to educate a bigger audience.
Lateral	We have annual forums where we get together across the whole agency and things like that.
Social networks and cross-fertilisations	
Tuna	Did not think one industry pours out into the others, but it is all interlinked.
Lobster	When the marine park first hit us they formed a thing called Alliance and we all sat and knowledge it out.
Oyster	You probably don't understand how much knowledge you've got until you start to talk to other Oyster Farmers and networking with them.
Vertical	Smaller closely-knit industries like the Tuna and sardine industry... it looks like it pretty good as in sharing information among each other.
Lateral	Formed industry target team, so there are representatives from each sector and that is where information and inputs from those stakeholders come back to him.
Social interactions and relationships	
Tuna	Building relationship with those guys so that they bring their knowledge forward.
Lobster	Able to have a very good relationship with SARDI [South Australian Research and Development Institute].
Oyster	Interactions with those associations could bring on outside views.
Vertical	Building those relationships and having inputs or sharing ideas with industry.
Lateral	In the last three to four years, our main aim is being more open and transparent in sharing knowledge.
Cooperation and collaborations	
Oyster	Had a number of stakeholders come together and we share information and we sort of work together to achieve our goals.
Vertical	Do get to share knowledge and work with them.
Conversations, talks and communication	
Tuna	We chat to impact knowledge and also get again some knowledge of them. Because by this crossover of knowledge we will be better off.
Lobster	Gain a lot of knowledge from talking with fishermen and understanding their issues as well.
Oyster	Is only by sharing the knowledge and having a chat and a beer that we learn stuff.
Vertical	Talk to them, share and communicate with them obviously about our products but you know in those conversations at the same time.
Lateral	Do a lot of dialoguing with fishermen to give them as much information to support the making of good decisions.

Summary Table 4(a): Theme – Knowledge Influences

Sub-theme (strategic priorities)	Evidence
Industry-university-government research collaborations	
Tuna	We have a formal system where we have a Tuna sub-program or industry partnership agreement with the commonwealth government. We developed a treatment through some trials which were done by the government, research scientists, veterinarians as well as the University of Queensland, University of Sydney and the University of Tasmania all bringing their knowledge together.
Lobster	Have the capacity in their constitutions to bring in external expertise if they need to on that need basis they can engage a Scientist or Economist or different people to assist them on different issues.
Oyster	There is always an opportunity to put your ideas out there and run them pass the Researchers and Scientists.
Vertical	There is a little more scientific stuff behind it, and we are actually going through that at the moment with a Research Institute.
Research and development	
Tuna	With the Australian Fishery Research and Development Corporation (AFRDC), we do quite a bit of investigations and research and development projects.
Lobster	They have a sort of industry representative and this body deals a lot with research and development.
Oyster	The sectors spent a lot of money looking at new techniques, new species, products, services, new husbandry and sciences, and some of these activities are based on outputs or recommendations from the Australian Fisheries Research and Development Corporation (AFRDC).
Lateral	There are R&D [Research and development] that goes on.
Vertical	With R&D comes things like innovation like the clean-up systems that we are developing.
Innovation	
Tuna	The first innovation is developing the concept of the whole tuna farming. Then the next innovation is reducing the cost and increasing the quality by different technology of tuna farming. And the third is an incremental step after that. So incremental steps like stocking rates, feeding systems and seasonal feeding patterns and you really need to get the knowledge.
Lobster	Invented a thing called Seal Plum or Seals Pipe, the one that you put in the pots to stop the Seals from coming in.
Oyster	Industry is always the innovators, if you want a good idea, you go to the industry, there will be someone there who has got a good idea.
Vertical	Innovating new ways, innovating new procedures, new techniques for packaging, filleting, freezing, chilling, and transporting are ongoing innovation.
Product development	
Tuna	We tried to develop a growing Tuna from the Spa.
Oyster	The association is very much into the production and development side.
Vertical	Just through continuous product development. Creating different products again. And they were extracting oil from Lobster and creating another whole market of products.
Lateral	Sharing ideas about how they can develop their products.
Value addition and creation	
Tuna	We are catching and value adding.
Lobster	It is the Fishermen that value add as much as possible to the products.
Vertical	We were the first that know how to take the Southern Bluefin Tuna which was traditionally harvested and sold whole. We were the first to take that product, value add it and created one kilo portions individually, packed them in a pack and eventually created a retail and restaurants markets within Australia and overseas.
Lateral	From commodity to a value adding growth.

Summary Table 4(b): Theme – Knowledge Influences

Sub-theme (organisational actions)	Evidence
Decisions and direction	
Tuna	It is science-based, so if you are basing all your decisions on science if it goes up, your TACCs [Total Allowable Commercial Catches] goes up, or your money goes up, but if it goes the other way, then it goes bad.
Lobster	Sitting around the table we have got a hundred years' worth of information from people with which we think we can guide people in the right direction.
Oyster	With age comes wisdom. And I think this is my time to contribute my wisdom to help stir our industry in the direction that I think it is good and proper. This means presenting information to them so they can use that information to make better decisions.
Lateral	Go a long way to making sure the fishermen have the information to make a good decision about their businesses.
Change and continuous improvements	
Tuna	The need to continue to improve gets people thinking about their own knowledge and how they can apply knowledge.
Lobster	The way they fish now, a lot of things have changed.
Oyster	We always have a headset about how we can improve our practices. It is the continuous improvements model sitting in our heads.
Vertical	When new products come along or new ideas, it is just a matter of altering packaging and stuff.
Lateral	If we want to make changes or if they want to make changes, it is a lot easier process because we are all listening and talking together.
Problem solving	
Tuna	It was clear that it was not sustainable, the quota was too high, there was overfishing it was made clear to me by the Japanese, so you can bring that knowledge about sustainability.
Lobster	The marine parks, when they first hit us, we formed a thing called Alliance and that was all the Sectors. We all sat and knowledge it out.
Oyster	Had an issue this year that was important so I went and saw both of those people and I got information from them about how we should so when you really do need information and that is there and that is very handy to tap into it.
Vertical	We have the best sustainably managed wild catch fishing industry in the world. The Spencer Gulf Prawns Industry 35 or so years ago they realised they can fish themselves out of existence and there will be no industry left. So they invited the government to help do some research and to see whether it is sustainable, whether it is at sustainable level and whether we get to continue to have an industry forever. So industry and government came together and now it is the best wild catch fishing industry in the world and sustainable forever. Now it is not up and down anymore and that is brilliant knowledge sharing. Put your hands up and say I need some help. Maybe we can all share and with that knowledge we can continue to fish.
Lateral	They comes to us if they got queries, problems or whatever, and we can advise them about what they can do within the rules.
Efficiency	
Tuna	Open their eyes to new ideas and new methods to make the job more efficient.
Lobster	Scientific type project is around efficiency and this is across the two zones so it is relevant.
Oyster	They want to be productive. They want to be efficient. They want to take advantage of opportunities. They want to be better than their competition you know. All those skills that you learn you can put them into the industry.
Vertical	Tuna improving the technology which is improving the procedures which means less waste which means better for the environment and more efficient working practices which means less cost which is not good for jobs but it means everyone is working more efficiently.

Summary Table 4(c): Theme – Knowledge Influences

Sub-theme (commercial activities)	Evidence
Industry competitiveness	
Tuna	How do you get ahead of the competition? It is the development and application of knowledge. What we have in Port Lincoln that gives us the competitive edge is the knowledge. The thing that makes this place able to compete with Taiwan just almost is the knowledge.
Lobster	It is a competition as well as and Fishermen lie to other fishermen and you may not want to pass on any knowledge to any of the boats out there.
Oyster	They want to be better than their competition you know, so all of those skills that you learn, you can put those into the industry.
Marketing strategies	
Tuna	The seafood industry is quite well marketed and there are marketing strategies so they are on that path. Let talk marketing there is opportunity there. Once people gets the knowledge of this place more opportunities will come.
Lobster	Get together a few times a year to talk about marketing and what can be done.
Oyster	Have an association and comes together and market it.
Vertical	There has been some collective marketing efforts.
Market expansion	
Tuna	They are currently working on their products into China and their knowledge of working with the Japanese will help them.
Lobster	Making sure that all products remain and get exported from the Eyre Peninsula which is something a little bit different from the mentalities of some of other sectors.
Oyster	A lots of their products are sold overseas. So that creates markets and knowledge about this area that we couldn't have done on our own as Oysters.
Vertical	We were the first that we know of how to take the Southern Bluefin Tuna which was traditionally harvested and sold the whole sold and eventually created a retail and restaurants markets within Australia and overseas.
Products quality and reputation	
Tuna	The industry has been around for a long time and they know it and they know how to produce a good product. We have built a reputation for Port Lincoln as great area for seafood in general. It is not just in Port Lincoln but the whole of the Eyre Peninsula is renowned for its quality of seafood.
Lobster	It hasn't gotten any direct competition as far as quality.
Oyster	We believe we've done all that we can to bring in the best products. That is what people like in the Restaurants, the Coffin Bay Oysters, so that has got a good reputation.
Vertical	How it is handled as per Australian guidelines as strict as possible way, so we can ensure that the customer is getting the best quality seafood that comes from our particular region.
Promotions	
Tuna	Promote sustainability a lot more. The only way is to promote the products and make sure that the industry is sustainable.
Lobster	Promoting their products through Port Lincoln Clean Green.
Oyster	We all get along reasonably well. All the different sectors and we all get an opportunity as Farmers to be part of the seafood frontier to be able to promote seafood generally with our ideas.
Vertical	I personally love promoting the oyster industry because am passionate about education people about the benefits of eating oysters and sharing a life experience with wine and then that is marketing experience.
Price Determination	
Tuna	Always upping things a bit more, and trying to shape for a better prices.
Lobster	What the processors are saying to us is that if you want to maximise price on your offshore quota you will catch in June -July.
Oyster	If our industry wants to expand and become more profitable and successful, then we probably have to look at marketing to raise the prices.
Vertical	Is international demand, increasing population, and just people realising, and more mature people that are into their health realising they should be eating more seafood and paying more for it.
Lateral	Not the parks! [Marine Reserved Parks].

Summary Table 5(a): Theme – Regional Sustainable Development

Sub-theme (environmental sustainability)	Evidence
Environmental protection	
Tuna	The key problem of the seafood industry is ecological sustainability. We protect what we've got here.
Lobster	Because every single thing you take out of that local economy is actually a detriment in the long run. It is in our best interest to always look after the environment out there.
Oyster	We are doing everything right environmentally and looking after the water that we grow our oysters.
Vertical	We've got the fishing technology to rape the sea a hundred times over, and we have to educate them not to do that. We have a more gentle impact on the environment.
Lateral	The current generation or kids are better educated and they are a lot savvier in relation to looking after the environment and looking after resources so we don't have a few shit.
Recycling	
Tuna	We are getting a plastic recycling that would actually be helpful for us to chip our used Tuna pontoons.
Lobster	We look after the environment very well. We have a rubbish bin and we have a recycle bin on board. So everything goes in, everything is recycled now and is much different to our days.
Oyster	We put together with Tuna. We are so much into how to recycle all the plastics that are coming from our baskets and their big pontoons. So that is helping the whole environment and the image of the Eyre Peninsula.
Vertical	Regionally, we can take that pipe and chap it and recycle it.
Clean-up exercises	
Tuna	Our size means that we can do beach clean-ups and pick-up debris from Oyster, Abalone and other seafood sectors like the Prawns and Rock Lobsters.
Oyster	We do clean-ups of the bays. Keeping our bays clean is like when stuff breaks we pull it out of the water so we don't have the Oyster farms littered. So we keep the harbor clean and keep the area tidy.
Vertical	There is got to be a fine line because you have to be commercially viable but it is more than just selling that equipment but trying to assist things like clean-ups.
Managing stocks, mortalities, and depletion	
Lateral	They can certainly contribute to the region as a whole because it is a very sustainable industry. It is good. Their husbandry systems and their mortality. But in years go by, there was 8-10% mortalities which are a lot of mortalities. It feels like 50,000, or 100,000 fish in your farm. But last year, there was a farm and that farm had 32 mortalities out of 25,000.
Lobster	We have something on our Cray Pots called Seal Protection Devices. We used to put them in when we are around Seal activity and now we have got these devices on 24/7 even if we are not in areas that are affected by Seals. We just introduced some new management arrangements in our fishing industry to ensure that we don't cause any species depletion.
Oyster	QA [Quality Assurance] management in place for better management…and look after our industry with help of government with a stocking density so you don't overstock.
Vertical	There is wildlife that is coming back, there is bird life that is coming back in balance with nature. We got to the point that we nearly killed it.

Summary Table 5(b): Theme – Regional Sustainable Development

Sub-theme (economic sustainability)	Evidence
Wealth creation	
Tuna	The fishing industry is the greatest wealth generator in the Eyre Peninsula by far even though there is wheat here but it doesn't generate the type of wealth that seafood does.
Lobster	Give more revenue honestly speaking on the fishing side from the lobster than the tuna, the abalone or the prawns.
Oyster	$5-6 million in a small country town is quite a substantial industry.
Vertical	Some of the people here are very wealthy.
Lateral	The seafood industry being probably the second largest revenue generator in the region is probably prime for that. It creates wealth on the Peninsula and without it, it will be terrible.
Foreign currencies ($$$)	
Tuna	Tuna fishing has provided the region as the Eyre Peninsula and the state with it largest GDP and exports. It brings dollars in and every dollar that Tuna industry earns it is an extra dollar for the region.
Lobster	These small sectors they are very important than even the government that everyone thinks about. Because they don't make those connections between sustainable products that is replacing itself and bringing back overseas currency. That is the major way the sectors are contributing to Eyre Peninsula.
Vertical	When I think of sustainability of the Eyre Peninsula, we talk about exports dollars coming into the area, the more those dollars get turn here locally and spent.
Local employment	
Tuna	At the moment it is creating a lot of work for a lot of people and has for a lot of years and I hope it will continue to do so.
Lobster	They create a massive amount of employment and then you add the Tuna, Oyster, Abalone and Marine Scale Fish.
Oyster	We employ a lot of people and sustain townships like Coffin Bay and Smoky Bay and places like that that have no employment.
Vertical	In terms of our contribution, we run our business to employ people locally, they live in the area, and these are part of the sustainable local community and economy.
Income and spending	
Tuna	They do come on board for the tuna industry to keep work going and to get the income going.
Lobster	One of the sectors that generate a lot of income to the communities and to the State.
Vertical	Money is circulating. They are buying houses. They are spending money. And they are buying a lot of beer every day.
Lateral	The money that is brought into this region through the fishing and employment is what sustains not just one or two families, but ten or fifteen families and it is really crucial for the coastal communities.
Reinvestments	
Tuna	I have never seen in the world where the people in the seafood industry or Tuna particularly reinvest all their profits or surpluses in this region. There is no other town in Australia or city in Australia that is dependent on the re-investment of one industry.
Lobster	Put money back to the town so that would be important for the towns and the Eyre Peninsula.
Vertical	There is more money and things put back into the communities.
Lateral	They all pick something they are all passionate about that fulfill the community needs and have invested in that area.
Supporting local industries	
Tuna	We support a lot of businesses including the processing industries, maintenance, suppliers and all those sorts of businesses. If this industry falls over, all these other industries are falling over too.
Lobster	Even though we fish in a lot of the areas from Kangaroo Island through to Western Australia, we always try and support the local businesses.
Oyster	They get few better services. Might get a Chemist shops opening or a supermarket. Probably one of the reasons they are doing that is already there is an industry that employs a lot of young

	people in our town.
Lateral	If you were to look at the growth and tourism of the Eyre Peninsula, I will say probably 90% of them will be marine-based. Swimming with sharks, swimming with Tuna, swimming with seals, turtles, fishing tours and bay tours especially is through the fishing industry.

Summary Table 5(c): Theme – Regional Sustainable Development

Sub-theme (social sustainability)	Evidence
Regional branding	
Tuna	We have got farming and fishing in this town. They are the two big businesses in this area. I think it is a bit of a trademark for this area and it is very important for this area.
Lobster	There is no doubt that if you were to take away the whole rock lobster fishing out of the Eyre Peninsula, I can assure you that half of the Chinese will forget where Eyre Peninsula is because Abalone and Lobster are without a doubt the two products that all the Asians markets know. Tuna yes but in Japan and not in China. So the seafood industry and the Eyre Peninsula are connected.
Oyster	In marketing regions, the Eyre Peninsula region and the outputs from there are obviously a the relationship that can work together and should work together.
Vertical	Some of these different sectors have done some work on regional branding.
Sponsorships and philanthropy	
Tuna	In the tuna sector, the way they contribute is through sponsorships.
Lobster	Donating to charity and all that sort of thing.
Oyster	We always have a strong sense of giving back to our communities.
Vertical	Community-minded and wanting the best for the towns as a whole.
Lateral	The philanthropist side of their nature is that they all pick something they are all passionate about that fulfill the community needs and have invested in that area.
Infrastructural developments	
Tuna	All these developments in Port Lincoln is Tuna money.
Oyster	The region is dependent on our seafood industry to keep things going for the areas and develop our towns and areas. You don't want to lose the infrastructures in the towns.
Vertical	There is a spot ground there that was basically built for the community, so it pretty good way of giving back to the region.
Lateral	The seafood industry in particular and the Tuna fishermen like they have got a bigger income so they contribute to things like buildings, swimming centres, purchasing buildings and opening gymnasiums and all sorts of wonderful things within the communities.
Sustainable living and quality lifestyle	
Tuna	If we make money we live and live comfortable life. We can buy a nice car, we can buy a nice boat, we can go fishing and enjoy the area and that is what the seafood sector brings.
Lobster	Worth a lifestyle and if not just for me, it is for my family and future generations.
Oyster	I think it is more of a lifestyle than anything else. And it provides a way of life and a vein for life.
Vertical	We saw the evidence that if you want to make a sustainable living for yourself, your family, for your friends and for your town, then you have to fish and farm sustainably.
Lateral	It is really crucial for the coastal communities and for the fishermen to have an opportunity to have a reasonable living.
Population density	
Tuna	If you keep the tuna sector out, then a lot of people will leave.
Lobster	If there is no work, there is no industry, and there is no community, then people leave, and if there is no work, people can't stay.
Oyster	They have all got families and so then it adds to the critical density of the population of the towns.
Lateral	The seafood contributes largely to the Eyre Peninsula as a region because it draws people here. If there is no opportunity for work and family to have a good life then obviously they are going to move away or not come at all so our population will decrease.
Longevity and resilience	
Tuna	The history of fishing towns in the world is not a good one because their collapse is quite prolific and they collapse for a whole range of reasons. A lot of towns have collapsed because of the introduction of say 200-mile limits. Some have collapsed because the fishing industry has collapsed. If it was not here, Port Lincoln would be a ghost town I think and a shitty little dusty town.
Lobster	If you took the fishing industry out of Port Lincoln, Port Lincoln will be died. In the long run, it is the heart of the bloody town really.

Oyster	As a region, the industry contributes in a huge way because there are a lot of towns here that wouldn't have existed.
Vertical	Maintaining the quality and longevity of the region.
Lateral	There are some areas of the Eyre Peninsula that rely heavily on commercial fishing sector for their viability.

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