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Helen Cripps
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**COLLABORATIVE BUSINESS RELATIONSHIPS AND THE USE OF ICT:
THE CASE OF THE MARINE, DEFENCE AND RESOURCES CLUSTER,
WESTERN AUSTRALIA.**

**Helen Cripps
B. Com., Grad. Dip. Rec., M. Com.**

**This thesis is presented in fulfilment of the requirements for the degree of
Doctor Philosophy**

Faculty of Business and Law

Edith Cowan University

June 2007

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ABSTRACT

The research project was developed from an Australian Research Council Grant designed to investigate collaborative commerce and its impact on regional economic development. Through a process of consultation with the industry partner, the South West Group, the research was designed to investigate the drivers and inhibitors of collaborative relationships and the factors that impact on the creation and sustaining of these relationships. The role of Information Communication Technology (ICT) in facilitating and sustaining collaborative relationships and the perceived benefits and drawbacks of collaborative relationships were also investigated. The research sought to identify models of the best adoption of collaborative relationships.

Data was gathered from the literature, overseas experts, a pilot study and a pilot case study. This information was used to design a research instrument which was administered in the marine, defence and resources cluster located in the Henderson/Rockingham region located south of Perth, Western Australia. In total 35 interviews were conducted with firms in the cluster as well as external organisations such as education institutions, government departments and industry peak bodies.

The study found that collaborative business relationships were present in the Henderson/Rockingham cluster and the drivers, inhibitors and benefits of these collaborative relationships were identified. The research found that the drivers, inhibitors and benefits of collaboration varied by firm size and by industry. The role of ICT in these relationships was not significant due to a number of industry characteristics displayed across the cluster, such as secrecy, a high need for security and low ICT adoption.

In identifying models of best adoption of collaboration the research also investigated the role of organisations external to the cluster and their involvement in the economic development of the region. A number of distinct characteristics of the Henderson/Rockingham cluster made the application of regional economic development strategies, such as the facilitation of ICT adoption, extremely difficult. The characteristics of the region included: the skilled labour shortage; the

hierarchical nature of the relationships; the risk adverse and technologically conservative Navy culture; the high level of competition for multi-million dollar contracts and the lack of the use of collaborative ICT were found to be inhibitors to the application of the strategies for economic development and collaborative relationships as identified by the literature and expert interviews.

The research provides interesting insights into the application of economic development strategies, theories surrounding collaborative relationships and the use of ICT in an Australian setting. The majority of the strategies, models and theories have been developed in Europe and the USA and have often been applied unsuccessfully in the past in an Australian context. From the literature review, the expert interviews and the findings of the research a framework for the development of regional economic strategies and the facilitation of collaborative business relationships has been created. In light of this research it would seem that the application of any framework or model must first assess the anomalies present in a given situation before they can be applied.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

- (i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education.
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Chapter 1: Introduction to the Research

1 Introduction

In today's global economy organisations no longer do business only within the same neighbourhood, city or region but now, through the advent of Information Communication Technology (ICT) and the World Wide Web, organisations can interact with customers and suppliers all over the world in real time (Lawson, et al., 2003; Markus & Robey 1988; Grover, 1993; Leek, et al, 2003). The increased level of interconnectedness and information exchange between organisations has also created greater competition both in the local and global marketplaces. Growth in the business application of ICT, the growing complexity of the global marketplace and the increased level of interconnectedness amongst organisations has extended the importance of business relationships beyond the trading of goods and services. According to Walters (2004, p.219) "markets have globalised, technology has become all embracing, and relationships with suppliers, customers and competitors are undergoing constant change".

As global competition intensifies many organisations are forming partnerships to share knowledge and innovate to keep up with the market or access unique or 'pioneering' resources (Ring & Van de Ven 1992). According to Blomqvist, et al., (2005) the changing environment has meant firms are now extending their boundaries, becoming lean and agile and engaging in business networks. Interconnectedness through business relationships can take many forms such as partnering, alliances, joint ventures, collaboration or networks (Jarrett, 1998).

In the uncertain environment of acquisitions, mergers and outsourcing, a growing emphasis is placed on business relationships and their link to organisational innovation, competitive advantage and business performance (Blomqvist, et al., 2005). The need to innovate and access new resources has contributed to the rise of collaborative relationships (Ritter, et al, 2002; Pittaway & Morrissey, 2004) which

are now an inescapable part of every organisation's environment. Collaborative business relationships have become critical for organisations to gain greater value (Holsapple & Singh, 2000; Walter & Ritter, 2003). Ritter, et al, (2002) point out organisations cannot avoid relationships with other organisations, they just have to choose which ones to enter and how they will manage those business relationships.

Thriving in this increasing competitive environment of a global marketplace and the growing importance of ICT in all facets of commercial interaction (Martin & Matlay 2001; Daniel & Wilson, 2004; Jones, 2004) has created particular challenges for Small to Medium Enterprises (SMEs) as they do not always have the resource base and expertise to respond to change and capitalise on opportunities. In the high tech knowledge economy, SMEs have to compete or collaborate with the larger firms who have significantly more resources, expertise and power. SMEs are often approached by larger firms seeking to access innovations or outsource (Etemad, et al, 2001), however they often experience a power asymmetry which can lead to take-overs, the SME having difficulty in maintaining control in the relationships, loss of intellectual property and difficulties in finding suitable partners from whom they are not at risk (Lawton-Smith & Dickson, 2003).

Within the Australian context SMEs are central to the economy as they make up 95% of firms in the private non-agricultural sector (ABS, 2005a). Their predominance in the economy means that SMEs are often the focus of government economic development policy. State and Federally funded agencies such as the Small Business Development Corporation, Austrade, AusIndustry and Business Enterprise Centres all provide programs designed to assist small to medium sized businesses to grow locally or enter into the export market. To overcome some of the issues relating to the size of SMEs a solution is to encourage them to work with similar firms to form industry clusters. These groups of related industries assist in generating jobs, income and economic growth (Blandy, 2004).

This research project explores collaborative business relationships and the use of ICT in this environment. In the next section the context in which these relationships between firms exist will be explored.

1.1 Development of the Research Project

The focus on economic development, collaborative business relationships and the use of ICT was arrived at through the interplay of the dynamics of research funding, industry participation and the regional context in which the research was to be undertaken. The theme of regional economic development arose from the desire for increased regional economic development by a group of geographically interconnected local governments in Western Australia, called the South West Group. This group in collaboration with Edith Cowan University, obtained funding from the Australian Research Council (ARC) to establish a research project dealing with the aforementioned themes in the context of the South West region located on the southern periphery of the Perth metropolitan area.

The original research proposal submitted to the ARC was to investigate the concept of collaborative commerce or c-commerce as the basis for sustainable competitiveness and business growth within a region. The concept of c-commerce is that it is a progression or a next step in online business, where the firm moves beyond simply transactions to collaborative business relationships as illustrated below in Figure 1.1. C-commerce can be defined as the integration of an organisation's information systems, knowledge management and business interactions with its customers, suppliers and partners in the business communities in which it operates (McCarthy, 1999; GartnerGroup, 1999; Burdick, 1999). An organisation's interactions using c-commerce can be vertical along the supply chain or horizontal with competitors (Levy, et al., 2003). Essentially this means that firms, including competitors, come together to exploit opportunities as they arise. C-commerce signifies an organisational shift in focus from transactions and exchange, to one of relationships between firms (Sheth, 1996). The concept of progression in the use of ICT in business practices is illustrated in Figure 1.1.

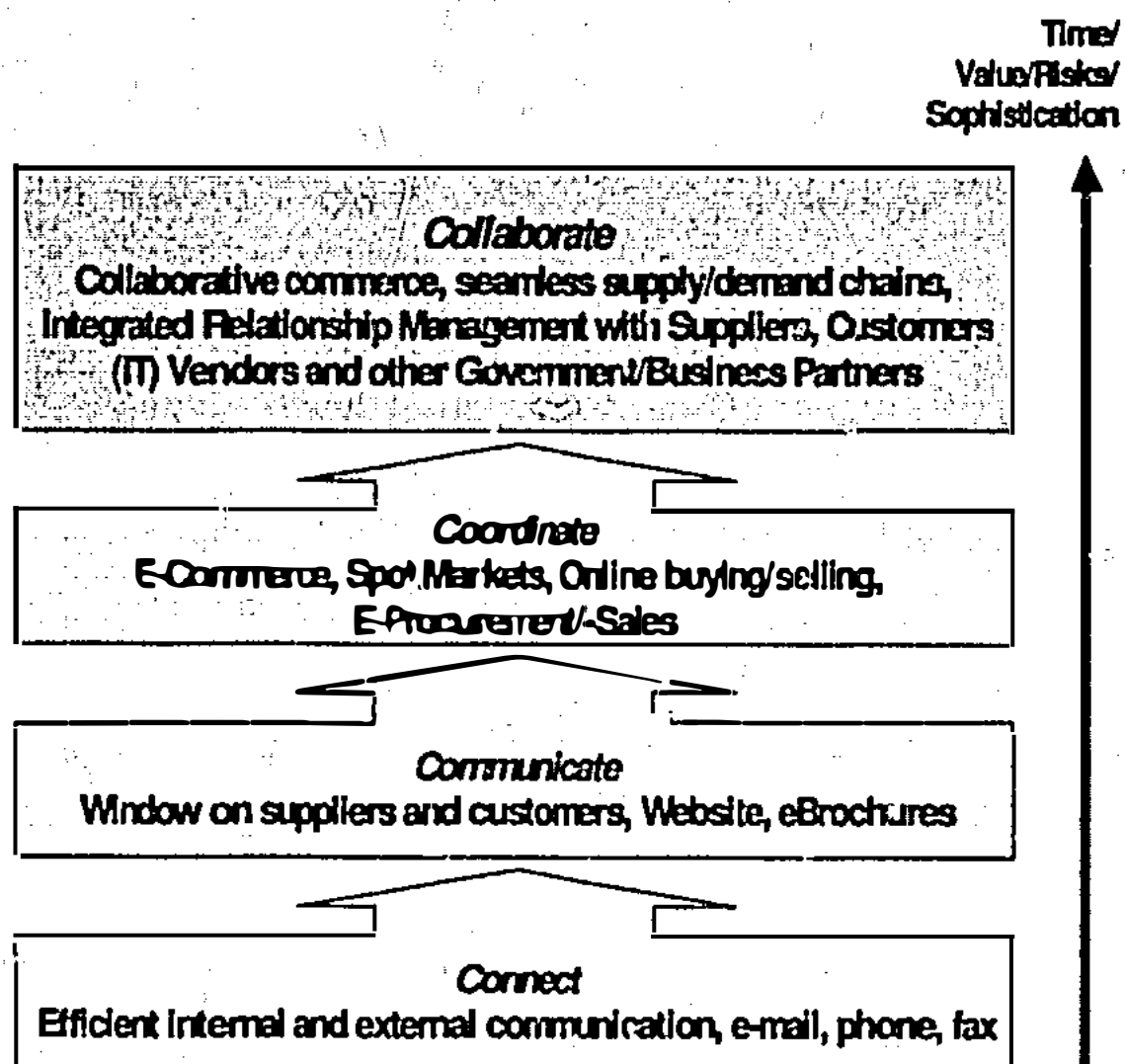


Figure 1. 1 Electronic Business's Evolution Towards Collaborative Commerce

Initially the South West Group, the industry partners for this research project, focused on the adoption of ICT by businesses in the region as a means of supporting regional economic development. The adoption of ICT by business in order to participate in the global economy has been promoted at a number of government levels in Australia (National Office for the Information Economy, 2003; Department of Communications, Information Technology & the Arts, 2004) and has formed part of government economic policy (Western Australian Technology & Industry Advisory Council, 2003). In the past few years government policy has shifted away from getting the private sector online to the provision of government services through the Internet. Yet in 2005, only 27% of all business had a web presence (ABS, 2006) and 33% of business placed orders on the web but only 12% of the businesses were set up to receive orders on the web.

As SMEs constituted the majority of employers in the region being studied there was a strong focus by the industry partners on encouraging the adoption of ICT by SMEs as a means of boosting local employment. It is a popular belief amongst those involved in regional economic development that if these SMEs are encouraged to grow so too will local employment and the region's economy (discussions with South West Group representative, 2005). In contrast to this belief Ryssel, et al.

(2004) found that in relationships it is not the adoption of ICT that creates value but that value creation was a function of the relationships itself not of the ICT deployed.

Under the terms of the ARC grant the research project was to focus on a group of six local government municipalities who formed the South West Group. In initial discussion with the South West Group's representative it was proposed to conduct the study across the whole of the south west region incorporating over 3,000 SMEs. Following the consideration of a number of factors including current political issues, the funding focus within the region and the perceived usefulness of a broad based study in effecting change at the local level it was decided to conduct a more localised study. Through a process of consultation with the South West Group's representatives and the review of secondary data sources the region to be studied was narrowed down to the industrial region around Henderson and Rockingham (See Figure 1.2).

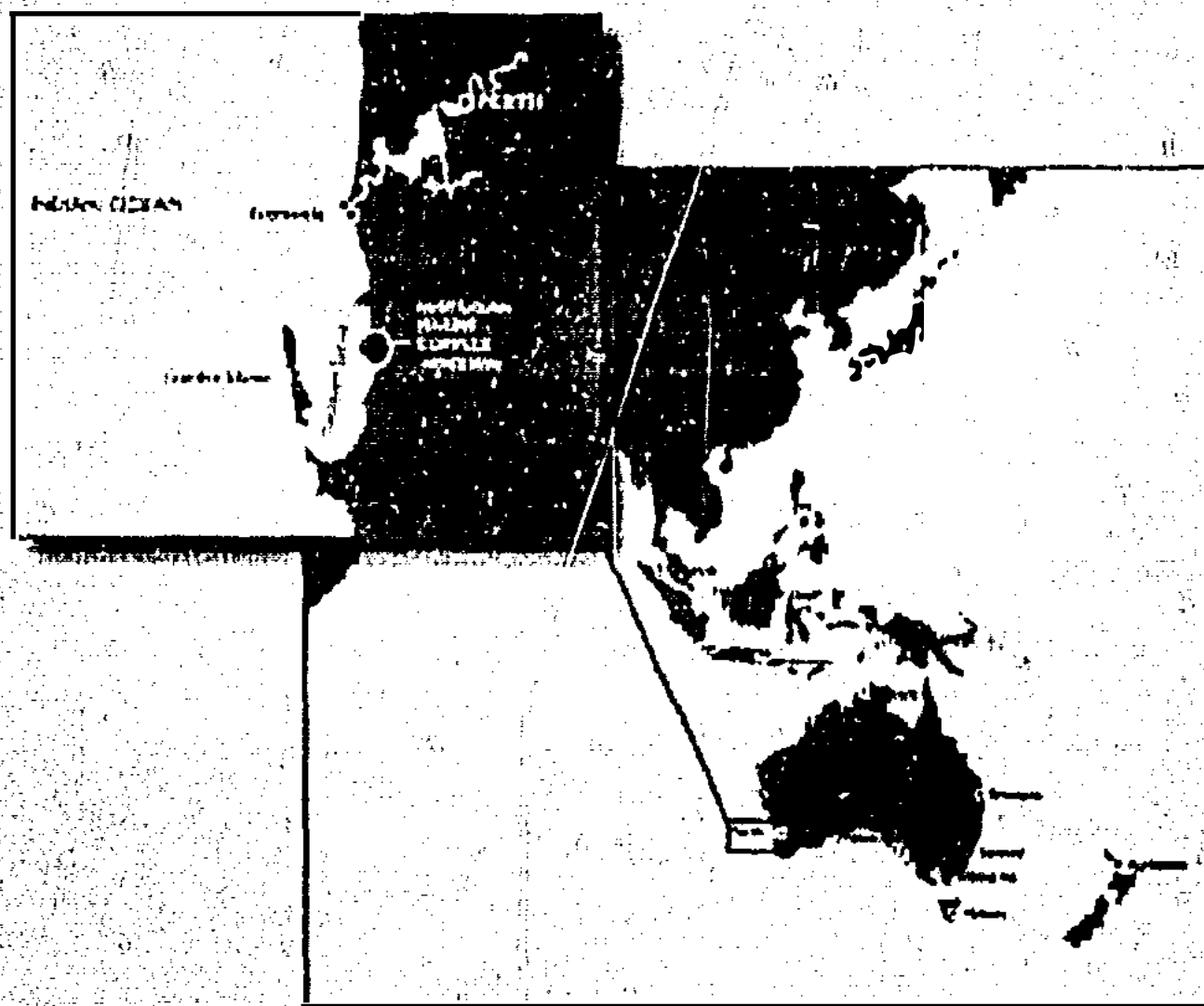


Figure 1. 2 The Region's Location in Relation to Australia and South East Asia (Australian Marine Complex, 2005)

In figure 1.3 the specific region is illustrated. This region is the focus of significant State and Federal government funding, was adjacent to some of the lower socio

economic suburbs in the region and had an active business lobby. The map also illustrates its location adjacent to Australia's major western naval base HMAS Stirling and the industrial area of Kwinana.

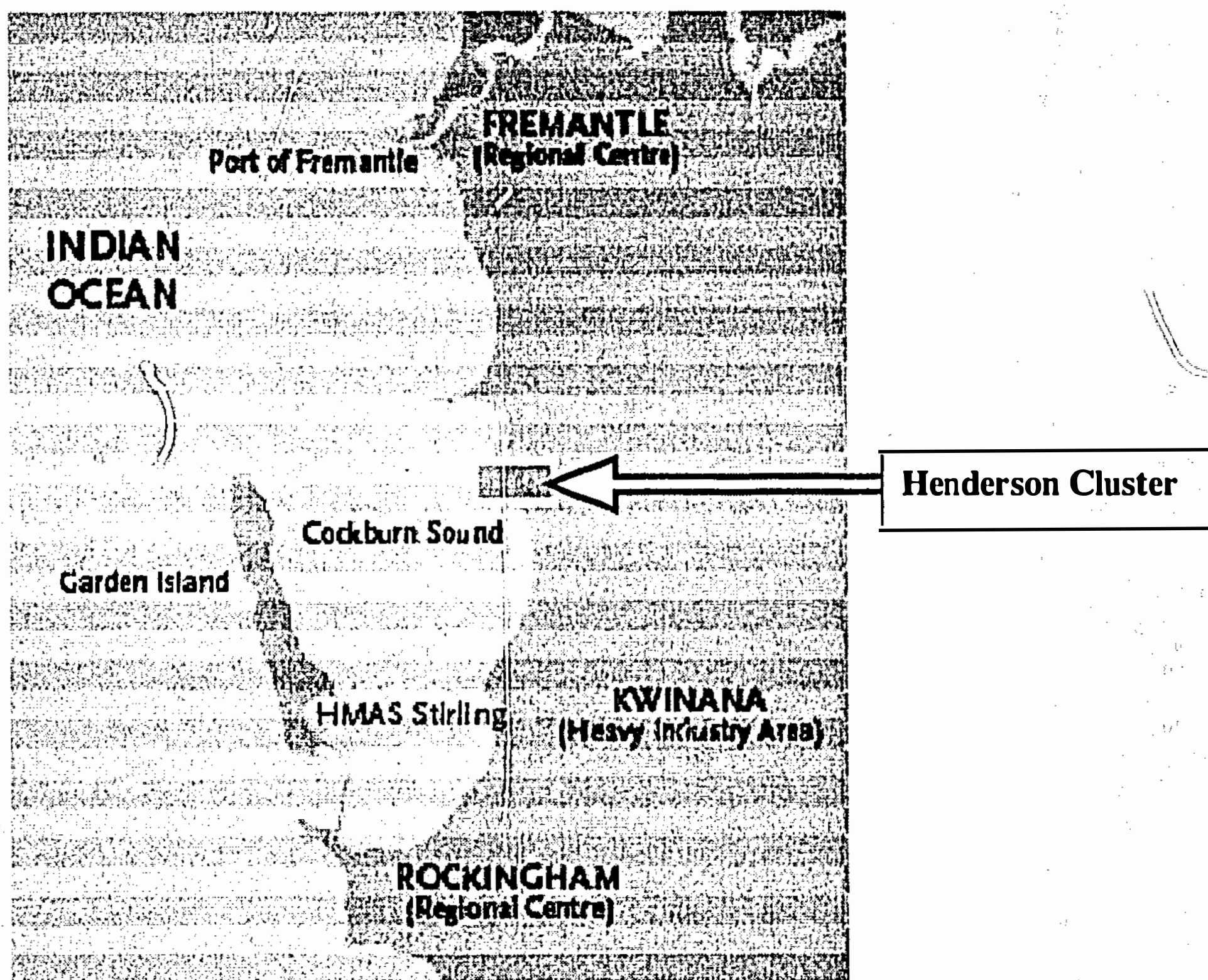


Figure 1. 3 The Henderson Rockingham Region Australian Marine Complex (2006a)

It was proposed that this area would be developed into an industry cluster through the creation of a critical mass of companies working in a similar field and in the particular location. According to Porter (1998) clusters located in a specific geographic area can provide long-running economic growth. This promise of regional economic growth and the inter-connected nature of the industries has prompted the local authorities to propose the development of a Marine, Defence and Resources cluster at Henderson. A number of factors are significant for a dynamic cluster including local rivalry, entry of new competitors, cooperation and

collaboration among firms, access to increasingly specialised resources such as labour, linkages with related industries and sophisticated and demanding customers (Solvell, et al., 2003). One important factor in cluster development is the relationship between firms that allow for activities such as local purchasing, collaborative ventures, information exchange and the creation of innovations.

1.2 Research Setting - Western Australian Economy

The Western Australian economy, the setting of the study, is a small economy with some distinguishing features which may impact on the region being researched. The economy is heavily dependant on minerals, energy and agricultural resources. According to Department of Education, Science and Training (2003) resources alone will not guarantee the future of the State but the development and application of science and technology to support innovation are central to participation in the knowledge economy.

Among the areas to build on identified by the Department of Education, Science and Training (2003) as strengths for Western Australia were minerals and energy and fisheries and marine science. Though the State has a reasonable level of business related research it is focused on the minerals and energy sector. According to the Department of Education, Science and Training (2003) for the WA economy to be sustainable after the current minerals boom the State Government's focus should be on innovation as a driver for economic and technological development, the development of the education and research capacity, the maximisation of industry and education commercialisation and expanding exports and employment.

1.3 The Research Region

Although originally an industrial hinterland, the South West Metropolitan area of Perth has now become a major residential area with rapid population growth. Much of this region has historically been the site of industrial development and shipping as

it lies on the coast and is home to Perth's major port facilities and infrastructure servicing industries in the region. As the most isolated city in the world, Perth has relied heavily on the ocean for import and export activities.

The major industries in the region include petrochemicals, mineral refining, ship and boat building, and is the site of the Naval Base HMAS Stirling, the home port to Australia's Indian Ocean fleet of Frigates and Submarines. The Kwinana industrial area is in the centre of the region. The Kwinana industrial area has a combined annual output valued at \$8.7 billion per and directly employs approximately 4,000 people (70% live locally) and creates indirect employment for approximately another 24,000 people (Kwinana Industries Council, 2005).

There has been increasing pressure on heavy industry in the region due to environmental concerns, this has seen a move to more technologically based industries with less environmental impact (Kwinana Industries Council, 2005). The region includes a marine technology enclave featuring heavy engineering, instrument design and manufacture, fishing and seafood processing, aquaculture and marine communications and refit services (South West Group, 2002).

The region is attempting to diversify from a predominantly heavy manufacturing base by styling itself as an 'IT Smart' region (South West Group, 2002). To this end the South West Group aims to promote the uptake of electronic commerce and communication technology throughout the region. Yet in the most recent census available (2001) it was found that whilst 51% of the population within the south west region stated they used a computer at home Internet usage at home was only 21% and those that used it at work were even less at 5% (ABS, 2001). According to the Regional Economic Development Plan for the South West Group (2007, p.2), their economic goal for the region is to "create strong, vibrant local economies and a diverse economic base that encourages opportunities for both businesses and for employment". The ABS Census for 2001 identified the three main industry groups in the region as manufacturing, wholesale retail trade and education and health (ABS, 2001).

The South West Group has attempted to promote SME growth across the whole south west region by establishing an online database of SMEs called Industry Direct. This database is provided as a free service for fabrication, engineering, manufacturing and related supply companies based in the local government areas of Fremantle, Melville, East Fremantle, Cockburn, Kwinana and Rockingham (South West Group, 2002). At the commencement of the current research project the contents of this database had become outdated, however the group had insufficient funds to undertake the necessary research to update the database (personal communication with South West Group Representative, 2004).

1.4 Henderson/Rockingham Region

The history of boat building in the region dates back to the 1970s fabrication of aluminum crayfish fishing boats and composite fibre yachts. The production of aluminum crayfish boats created a strong tradition of aluminum fabrication which has led to world leadership in this area. The design and construction of Australia II, which won the 1983 America's Cup, also strengthened Western Australia's reputation for building composite fibre yachts.

More recently the focus has been on defence industries with the opening in 1987 of HMAS Stirling on Garden Island and the Australian Marine Complex in Cockburn Sound. Within the region there are a number of interrelated industries operating including marine defence, marine commercial, yachting and pleasure craft, resources industry and engineering. The interrelated nature of the industries located in the region is illustrated below in Figure 1.4.

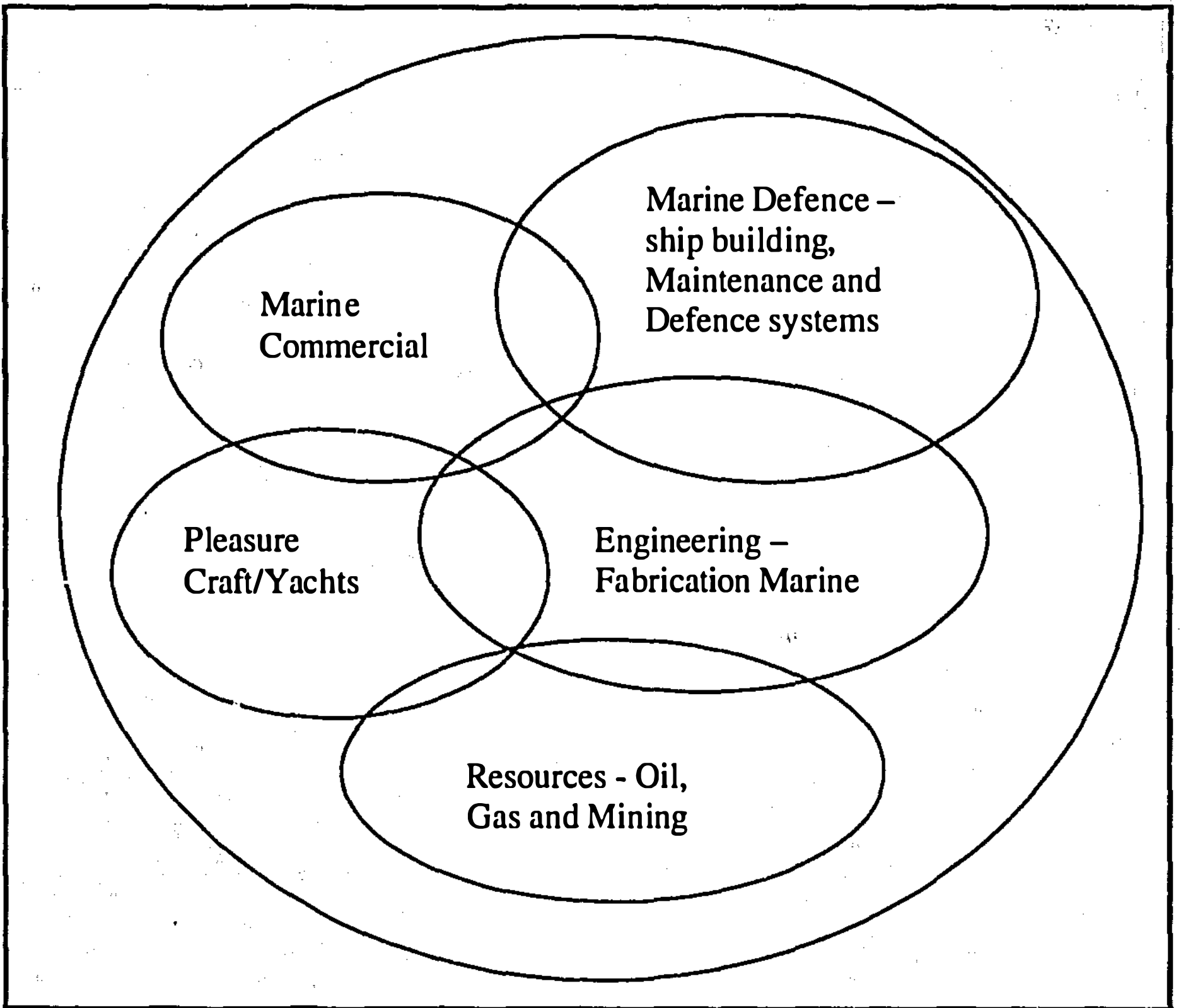


Figure 1. 4 Industries in the Henderson Rockingham Region

To build on the strengths in the region in 2004 the Western Australian State Government funded a strategy to develop a “world - class defence shipbuilding hub in Western Australia” (Department of Premier and Cabinet 2004, p.1). Since that time the Western Australian Government has continued to invest in the development of the region, focusing primarily on the defence industry with the “Logical Choice” campaign launched in July 2006 designed to promote the Australian Marine Complex (AMC) located in Henderson as the premier location in Australia for modular fabrication, ship consolidation, repair and maintenance for naval and commercial vessels (AMC, 2006a). The “Logical Choice” campaign also addresses one of the major issues in the Henderson region which is the shortage of skilled labour in the region. This in part is due to the resources boom in the north west of Western Australia, and the high wages being offered has attracted skilled labour

away from the marine, defence and resources industries in the Henderson/Rockingham region.

According to their webpage the AMC is “Australia's largest commercial shipbuilding precinct” (AMC, 2006b) which produces 55% of Australia's shipbuilding production with 95% of vessels for export. The companies in the region undertake repair, maintenance and construction of vessels and infrastructure such as platforms and modules for offshore oil and gas production. The region has developed a range of capabilities in the marine industry including the manufacture of aluminium high speed ferries, super yachts, pleasure/recreational craft, composite fibre craft, fishing vessels, steel shipbuilding and their repair. The Western Australian production of light weight high speed vessels accounts for around 20% of the world market and the region has developed a strong reputation for the manufacture of aluminium vessels.

There are a number of facets to the Henderson region, including the Shipbuilding Precinct, a Marine Support Facility, a multi-purpose Support Industry Precinct and a Technology Precinct. The Fabrication Precinct focused on meeting the demand for modular fabrication, assembly and load-out of pre-assembled units by the defence, marine, petroleum and mining sectors (AMC, 2006b). As part of the ongoing marine focus in the region the State Government announced in 2006 the development of a Sub-sea cluster designed to support the growing oil and gas industry (AMC, 2006b). The primary driver of development of the Henderson/Rockingham region is the Western Australian State Government as Local Government does not have the financial resources to be a major player in the region.

The conglomeration of marine and defence based organisations has prompted the local government authorities in this region to seek to facilitate the development of a Marine, Defence and Resources cluster. The defence industry dominates the region with a number of multinational prime contractors who have high levels of innovation and competitive advantage. Below these large multinationals are second and third tier suppliers or subcontractors. While the prime contractors are high profile, the subcontractors are frequently smaller firms with fewer resources. It appears that subcontractors within this sector are experiencing severe pricing pressures and that this may have a negative impact on the quality and profitability of their businesses.

Such price-driven activity is also detrimental to the creation of enhanced innovation within the sector (communication with representative of the State Government, 2005). As part of the research, attention was given to this subcontractor group of firms within the AMC defence sub-segment, to identify its specific needs and develop strategies to assist in sustainable business growth.

In business relationships large and small firms are now under pressure to optimise production and this can lead to a trade off between independence and greater interdependency between firms (Etemad, et al., 2001; Blomqvist, et al., 2005). According to one of the industry representatives interviewed, the dominance of a few large organisations within the region and their preference for dealing with other large organisations has seen the exclusion of local SMEs from the local and international marketplace (communication with State Government Representative, 2005). From these comments it seemed that power asymmetry between firms of differing sizes in the Region could have been present in their business relationships. This led to the inclusion of business relationships between firms of differing sizes into the research project. Also the role of firm size in economic development in the region and its impact on collaborative business relationships particularly between SMEs and large firms and the role of ICT were to be investigated in the context of the Marine, Defence and Resources cluster located in the Henderson Rockingham region.

1.5 Significance of the Research

According to Maude (2004) a number of the areas not well developed in previous economic development research in Australia included technology parks or incubators, regional innovation systems, industry networks, learning regions and regional development in general. Researchers have tended to focus on ideas coming from the USA and Europe rather than from the study of regional economies in Australia (Maude, 2004; Roberts & Enright, 2004). This study of the Marine, Defence and Resources cluster at Henderson assists in expanding the research into regional economic development in Australia.

Working from the micro to the macro level the research investigates collaborative business relationships in the context of the Marine, Defence and Resources cluster. The study provides insight into the formation of collaborative relationships within a predominantly heavy manufacturing cluster. Although some research has been published on the supply chains in the defence industry (Humphries & Wilding, 2001; Dowdall, 2004; Bishop, 2003a) little research has been undertaken into collaborative relationships and the use of ICT in the Australian Defence industry. In comparison with Organisation for Economic Co-operation and Development (OECD) countries there has been little research into clustering in Australia (Roberts & Enright, 2004).

In the UK, Europe and the USA there has been a concerted effort to introduce ICT in to the supply process in the defence industry through online tendering, purchasing and distribution. However owing to its unique characteristics, such as the single customer in the form of national governments, limitation on globalisation due to national security policy and a high level of secrecy, change has been slow (Hayward, 2005).

Many of the firms participating in the research are involved in asymmetric business relationships, an area that has not received a lot of attention in the extant literature. Previous research has indicated that the drivers and benefits of collaborative business relationships vary (Wilson & Gorb, 1983; Blomqvist, 1999; Etemad, et al., 2001; Lawton-Smith & Dickson, 2003). This study investigates the factors that sustain collaborative relationships, the measurement of benefits and the use of ICT to support these relationships, giving an in depth view of both parties in the relationship.

By examining the collaborative relationships in the cluster, the research seeks to inform both academics and practitioners in the creation and sustaining of these relationships and the application of ICT in such relationships. Due to the risks for SMEs in collaborative relationships (Lawton-Smith & Dickson, 2003) large firms often find it difficult to engage smaller firms in collaborative relationships, however greater insight into both sides of the dyad may assist in the development of more successful relationships.

Finally, the collaborative relationship will be viewed in the context of external factors such as government agencies, peak industry groups, economic and defence policy, education and training, and the economy, thus viewing the topic from a firm level, a relationship level, an industry level, a cluster level and an external environment level as illustrated in Figure 1.5.

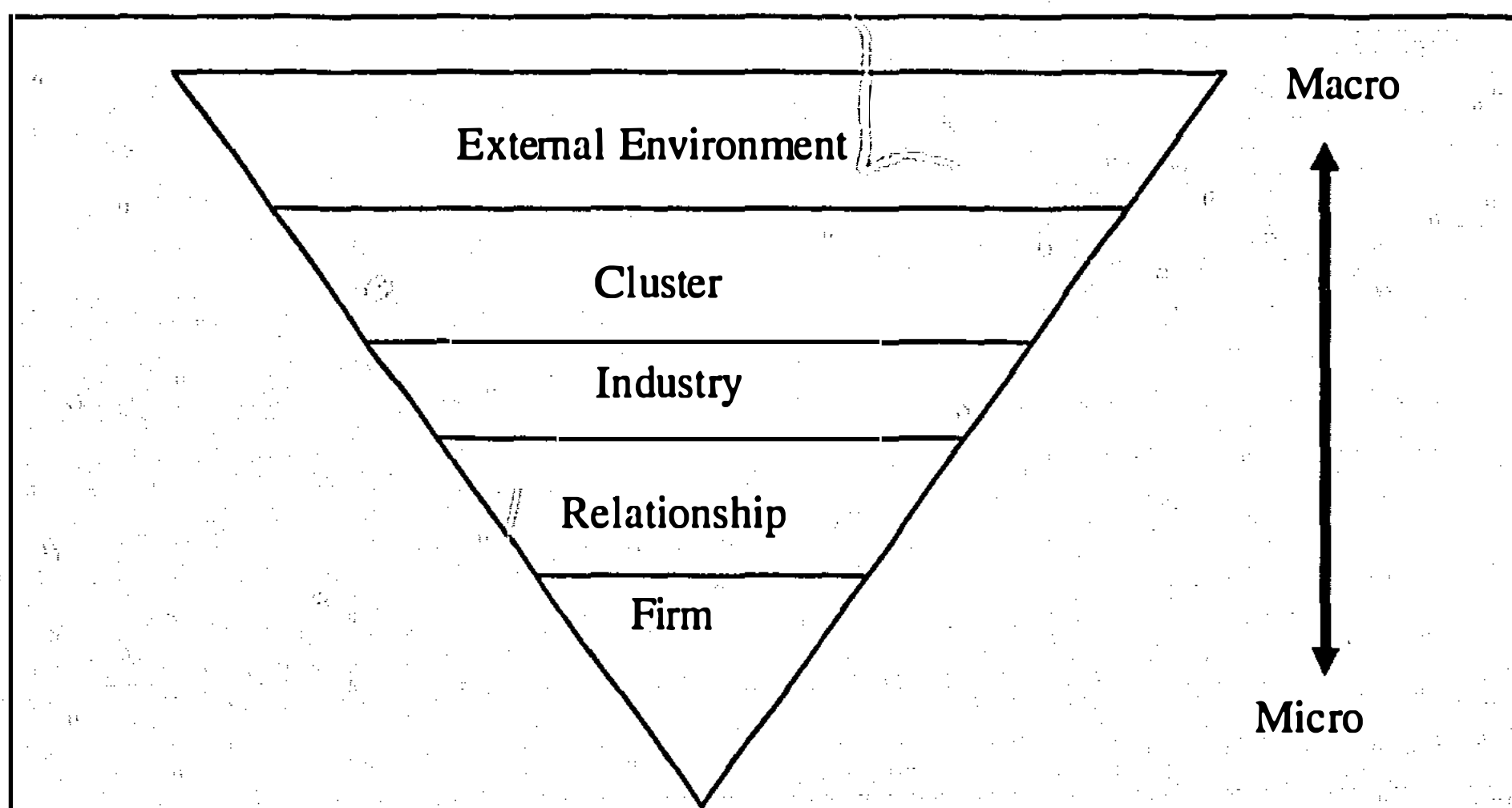


Figure 1.5 Level of Analysis

1.6 Research Questions

The research seeks to examine collaborative business relationships and the firm level drivers, benefits and sustaining factors in collaborative relationships. The research will also examine the impact of the industries in which the relationships take place, marine, defence and resources industries, the role of ICT and the influence of external factors such as government policy and strategies as illustrated in Figure 1.6 below.

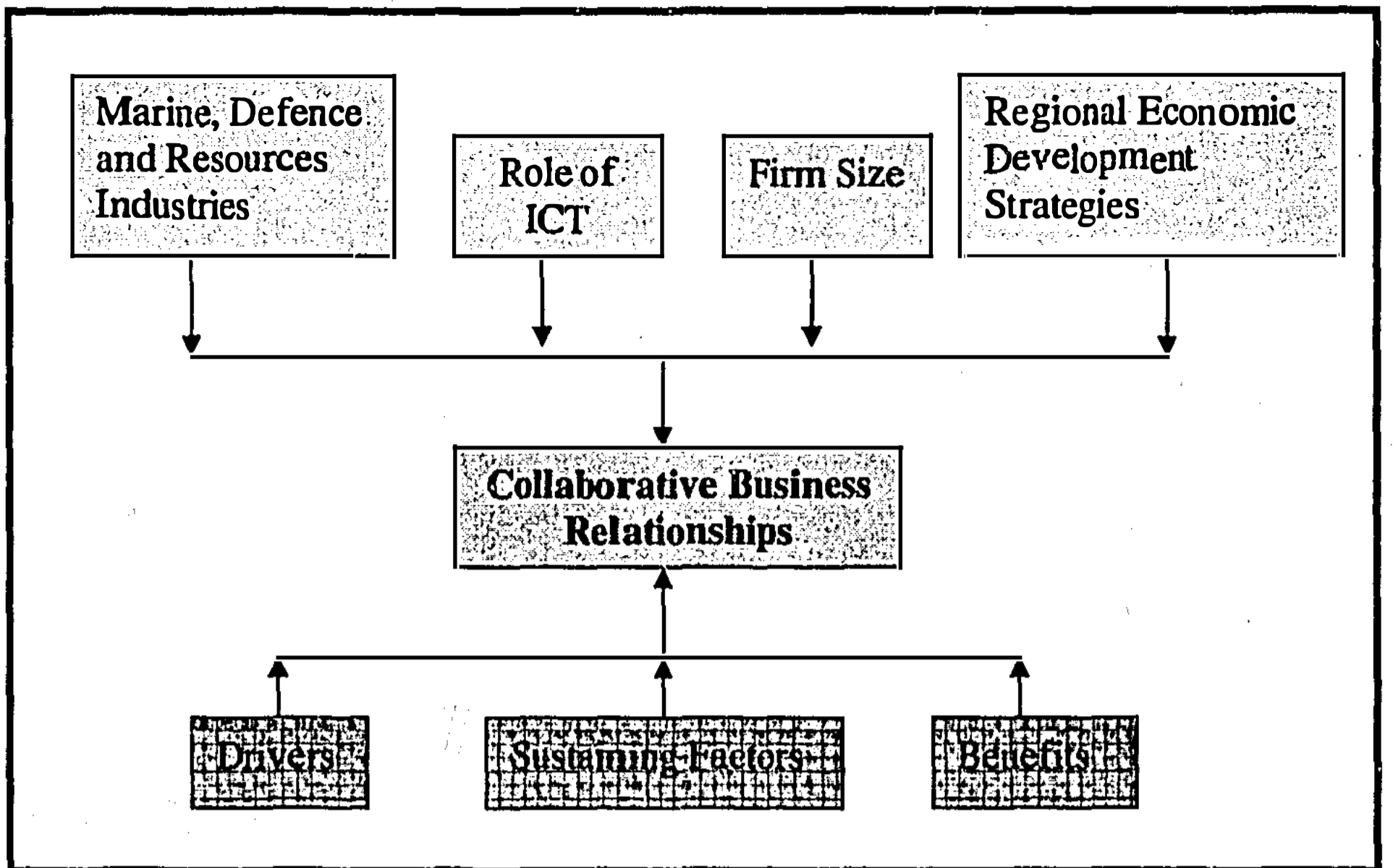


Figure 1. 6 Research Diagram

The following research questions have been devised to investigate the following:

1. *What are the drivers and inhibitors for organisations to enter collaborative relationships?*
2. *What are the factors that impact on the creation and sustaining of collaborative relationships?*
3. *How does ICT facilitate and sustain collaborative relationships?*
4. *What are the benefits and drawbacks of collaborative relationships?*
5. *Are there models of best adoption of collaborative relationships?*

1.7 Research Approach

To address the research questions in the context of the Marine, Defence and the Resources industry located at Henderson the following initial research was undertaken by gathering information from academic literature, government and industry reports, unstructured interviews and secondary data. The researcher was new to the area of research and the industries hence the extensive nature of the

literature search. This research is summarised in Table 1.1 and detailed in the following three chapters.

Table 1.1 Background Research Sources

Chapter	Topic	Sources
2	Regional Economic Development	Academic Literature; Government and Industry Reports
3	Collaborative Business Relationship and the use of ICT	Academic Literature
4	Industry Context for the Research	Unstructured Interviews; Secondary data; Government and Industry Reports; published cases.

From the knowledge and insight gained from this research a detailed research methodology was developed based on the conceptual framework drawn from the literature, unstructured interviews and secondary data. The process for the data collection was developed and further refined by pilot process, which is contained in chapters 5 and 6.

1.8 Contribution of the Thesis

As part of the funding for the research was provided by industry partners it is anticipated that the results of the research will inform the economic development process in the Henderson/Rockingham region. Findings in relation to the creation and sustaining of collaborative business relationships and the use of ICT will be made available through feedback mechanisms such as industry workshops and reports to the participants. Presentations have been made and conference and journal papers have been published during the course of the research.

On an academic level it is anticipated that the research will provided further insight into collaborative business relationships, the impact of power asymmetry and the adoption of ICT in the context of marine and defence and resources industries.

1.9 Chapter Summary

As outlined in this chapter the research project was instituted through an industry and university collaboration and is focused on regional economic development in the Marine, Defence and Resources cluster located south of Perth. The main themes of the research are collaborative business relationships and the role of ICT in facilitating these relationships which has been outlined in this introduction chapter. The structure for the thesis is set out in Figure 1.7 below.

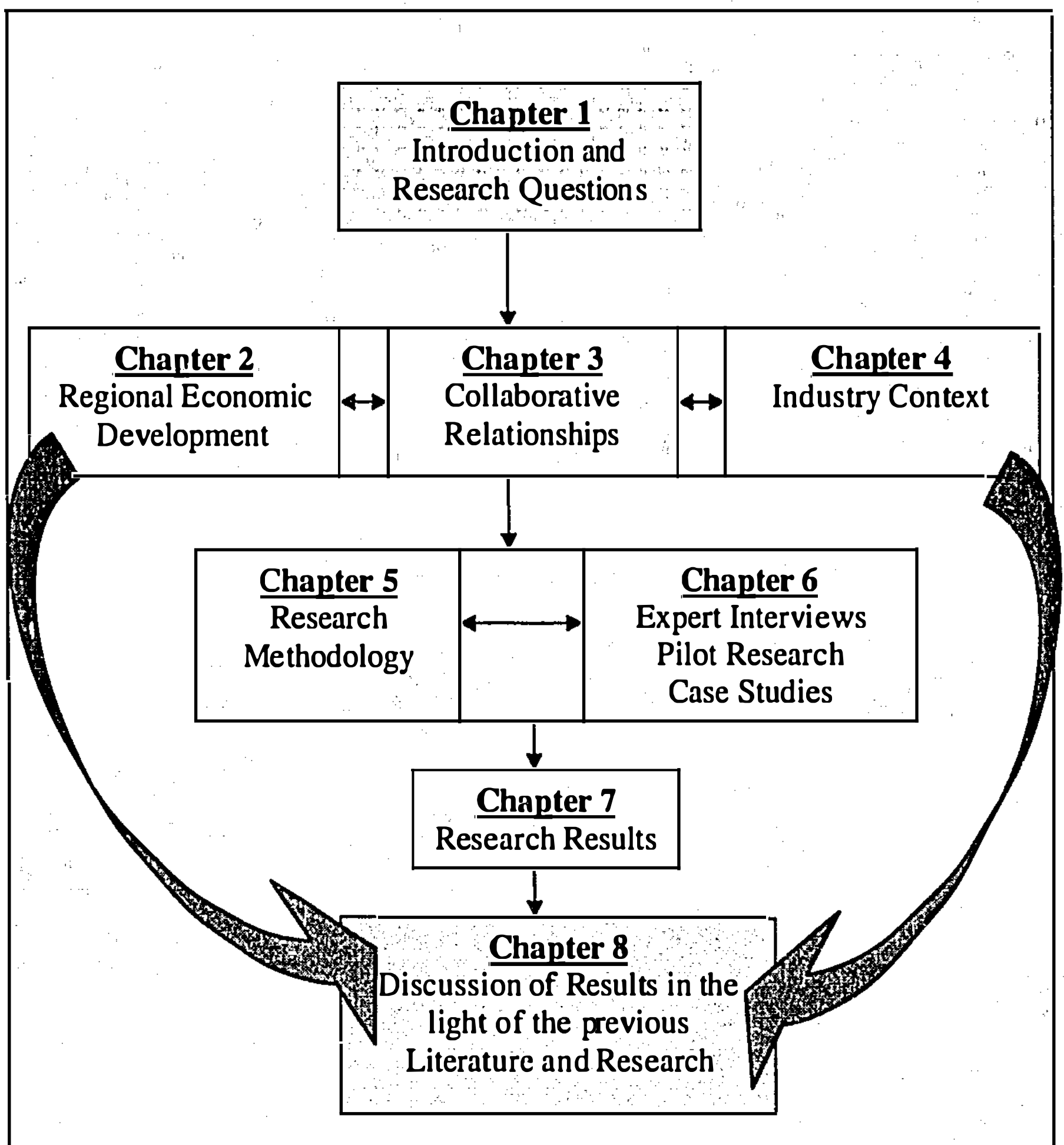


Figure 1. 7 Thesis Structure

In the subsequent three chapters the following will be discussed, regional economic development (Chapter 2), the central themes of the research collaborative business

relationships and the use of ICT (Chapter 3) and the primary industries in the research being the marine and defence industries (Chapter 4).

In Chapter 5 the research methodology for the project will be detailed followed by the process for the piloting of the research in Chapter 6. The results of research undertaken will be detailed in Chapter 7 followed by the summary and conclusions of the research in Chapter 8.

Chapter 2: Regional Economic Development

2 Introduction

The main research themes of this study are collaborative business relationships and the impact of the use of ICT, the industry in which collaboration occurs and external factors such as regional economic development strategies and activities that were set out in Chapter 1. This chapter will explore the environment in which collaboration takes place, including regional economic development policy and strategies. The focus on regional economic development is due to the desire of the industry partners involved in the research project to identify suitable tools and strategies for the development of the region. Chapter 3 will focus on collaborative business relationships and the use of ICT in those relationships. In Chapter 4 the industry context of the region will be examined specifically describing the marine and defence industry and outlining a number of previous studies and cases on marine and defence clusters with parallels to this study.

2.1 Framework for the Chapter

This chapter will focus on regional economic development strategies and their purported outcomes for regions and firms. The common themes from these strategies will be synthesised and discussed. This will be followed by a review of the regional economic development in an Australian context, followed by the chapter summary as illustrated in the chapter framework in Figure 2.1 below.

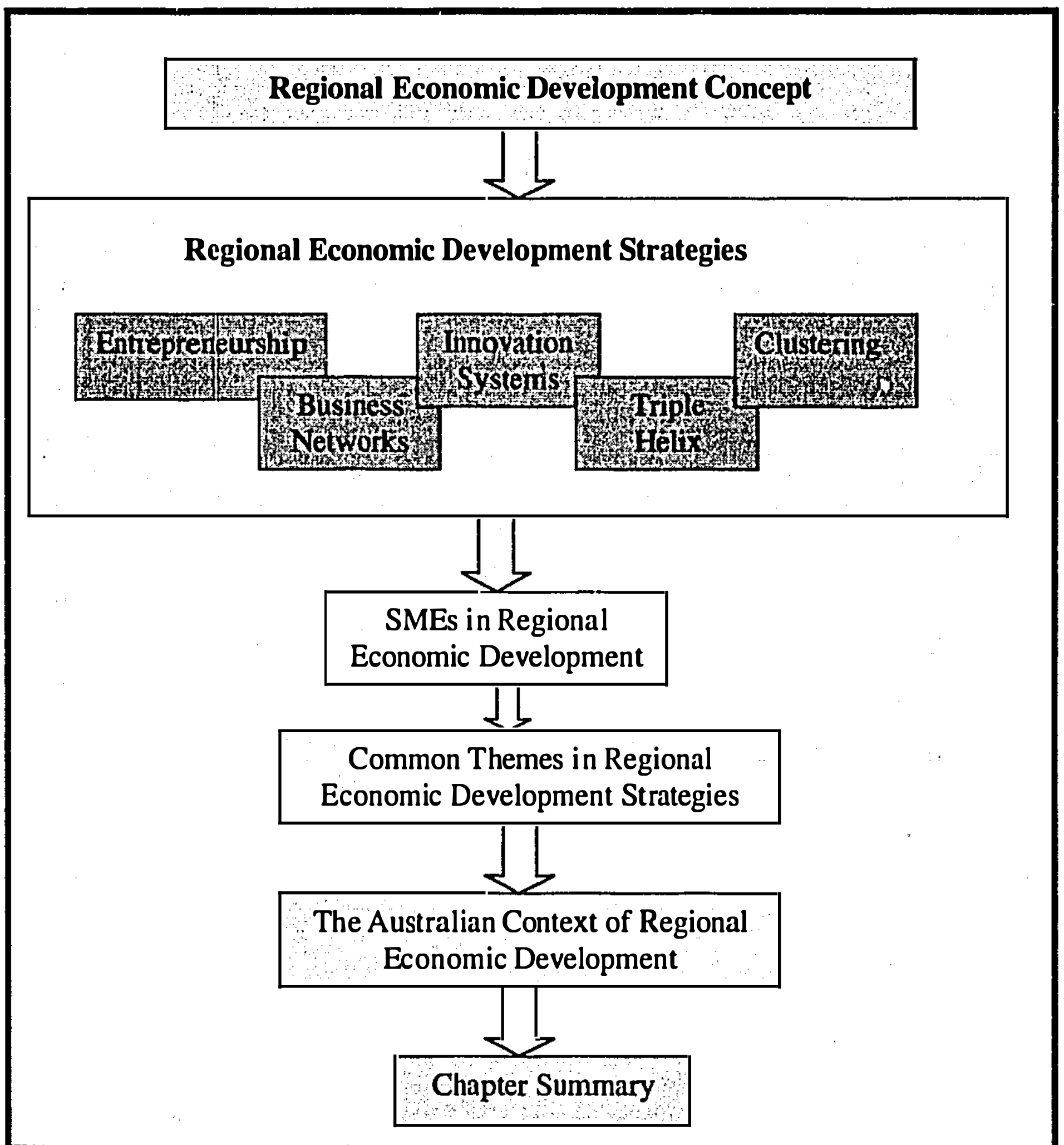


Figure 2. 1 Chapter 2 Framework

2.2 Regional Economic Development Concept

Within industrialised countries one of the main producers of wealth and prosperity has been “well coordinated and sustainable systems, capable of converting technological innovation assets into substantial levels of local industrial productivity and global competitiveness” (Scheel 2002, p.356). The creation of such systems has become the focus of government policy and strategies around regional and national economic development. Regional economic development or growth is not always

the result of government policies and strategies in regions such as Silicon Valley (Sorenson, 2003).

The definition of regional economic development can vary within a specific context or according to the standpoint of the audience or the institution driving the development. Regional economic development from a government policy perspective is often linked to economic restructuring of existing industries on the one hand and the stimulation of growth on the other (Drabenstott, 2005). In the past government economic development policies have often focused heavily on provision of infrastructure such as industry parks and business incubators (Drabenstott, 2005).

In the mid 1990s there was a move within economic development policy to a more collaborative relationship between government and industry, moving beyond funding and infrastructure provision to collaborative projects (Bradshaw & Blakely, 1999). Government initiatives are now focusing on leadership, the provision of information to support business and the brokering of relationships between organisations (Bradshaw & Blakely, 1999). In 1997 the OECD published its first report on Innovation Systems in which it identified the importance of knowledge in economic development and the use of technology for its communication and transfer (OECD, 1997).

The process of generating economic development can present significant challenges requiring new skill sets in networking and collaboration; the provision of infrastructure; new government policy; new technology; new organisational models and new production systems (Scheel, 2002). Within the literature a number of strategies of regional economic development have been highlighted and they fall into five groupings of strategies based around: Entrepreneurship; Networks; Innovation Systems; Triple Helix and Clusters. In the next section each of these strategies will be expanded upon and the common themes identified.

2.3 Regional Economic Development Strategies and Policies

Globalisation and the rise of technology have reduced the role location plays in competitive advantage as knowledge, resources, capital, and technology can now be sourced from global markets and it is no longer necessary for firms to locate near the markets they serve. At the same time these global forces have diminished the impact of governments on their local economies (Porter, 2000). Yet government intervention in regional economies continues with a dual approach focusing on the development of existing natural resources and the provision of incentives to those who relocate into the region being developed (Etzkowitz, 2006). The development or revitalisation of regional economies that have suffered an economic downturn has been the focus of programs and policies across Europe, the USA and Australia (Maude, 2004).

In the past these policies were based on natural assets in a given region but now economic development policy is seeking to create and capitalise on knowledge-based niches. As we move from the industrial age to the knowledge economy the human and intellectual capital located in a region or an industry has become the equivalent of a natural resource (Etzkowitz, 2006; Carlsson & Mudambi, 2003).

The creation and sharing of knowledge underpins the knowledge economy and is central to the economic development strategies used for stimulating the entrepreneurship of the individual organisations or regions and the creation of innovation systems across firms and regions. The common themes of knowledge sharing and collaboration are present across the facets of economic development strategies including regional or industry clusters or industry networks and on a broader scale the interface between government, education and industry which has been termed "Triple Helix" created by Leydesdorff during the 1990s to describe the intertwined nature of the institutions (Leydesdorff et al., 2005).

Of the strategies suggested for the facilitation of regional economic development the following have been selected: Entrepreneurship; Networks; Innovation Systems; Triple Helix and Clustering. In this chapter these strategies will be outlined and their

application in regional economic development discussed. There is some overlap between the strategies as they all involve some form of organisational interaction or collaboration and knowledge sharing.

2.3.1 Entrepreneurship

The stimulation of an entrepreneurial culture within and between firms has been one of the methods used by governments seeking to create economic growth on a regional level. According to Hindle & Rushworth (2002, p.9) “entrepreneurship is the creation and management of a new organisation designed to pursue a unique, innovative opportunity and achieve rapid, profitable growth”. It is considered that entrepreneurship generates economic growth because it serves as a vehicle for innovation and change, and therefore as a conduit for knowledge spillovers which lead to the creation of new products and processes (Stevenson & Lundström, 2001).

The concept of entrepreneurship is linked with networking between firms, the creation of innovation and collaboration by firms with government and academia (Carlsson & Mudambi, 2003). Entrepreneurs often collaborate with other firms to access new resources of expertise to assist with the innovation process. To work collaboratively requires a willingness to take on some form of risk, and risk-taking is considered one of the key traits of the entrepreneur (Carlsson & Mudambi, 2003).

SMEs are often the focus of entrepreneurship development policy and a review of literature and websites relating to SME development programs and policies for Europe and the USA identified seven main areas of policy support, these being financial; information and consultancy services; technological and innovation development; growth and export entry; educational and training; business networking facilitation and relocation/infrastructure support (Guijarro, et al., 2005; Parrilli 2005; Shapira, 2001; Audretsch, 2005; Clower, et al., 2004). There is a wide variety of SME entrepreneurial policy, frameworks and models and to apply a single framework to a situation without consideration to situational factors can be fraught with danger (Massey, 2004).

The promotion of entrepreneurship is only one form of economic development strategy used by governments on a regional level. The next economic development strategy to be examined is business networks between organisations.

2.3.2 Business Networks

In a 2003 report for the OECD Pezzini (2003) noted a policy shift in regional economic development towards the encouragement of business networks for the exchange of knowledge and expertise and the diffusion of innovation. Though policy can be put in place to facilitate networks it does not necessarily advance economic development, as it is the level of entrepreneurship of the individual member that determines if they exploit the opportunities presented by the network (Casson, 2000).

Business Networks have grown in significance due to the knowledge based economy, which is characterised by increasing technological complexity, global competition and digital information. In this environment no firm can master all the activities in the production value chain and therefore needs to work with other firms to take a product to market (Moller, et al., 2005). In this interconnected environment firms operate in various kinds of relationships with other firms and these relationships comprise the network in which a firm works.

Ford and Redwood (2005) argue that networks are not a new phenomenon, however the advent of digital communication has facilitated their further development. Electronic communication channels teamed with databases have provided firms with access to unlimited opportunities to interface with other firms (Moller & Halinen, 1999). Although networks of firms were present before the development of the World Wide Web, the advent of ICT and globalisation has brought new dimensions to networks. Now business networks can be geographically dispersed (virtual) with each firm working and communicating concurrently, using web based collaborative enterprise tools for the coordination of vast resources and information across a network of firms to produce and supply products and services (Lee, et al., 2003).

Moller & Halinen (1999) suggest that there are four levels to network relationships management: understanding the network at an industry level and the individual organizations that comprise it; how the firm itself relates to or fits into the network environment; how a firm manages its relationships with the group of firms (portfolio) it deals with in the network and finally how it manages individual relationships.

In networks, relationships can go beyond one off transactions to form networks that display some degree of organisational aggregation that exist above the level of the individual firm (Hakansson & Ford, 2002). These inter firm relationships involve a mixture of cooperation with others to expand resources, markets and competition to create competitive advantage through superior customer value. The relationships that make up the network can have an impact on a firm's performance (Wilkinson & Young, 2002) with the tension between cooperation and competition in relationships leading to continual reorganisation of relationships within the network in a drive for great efficiency, effectiveness and competitive advantage (Wilkinson & Young, 2002; Moller, et al., 2005; Ojasalo, 2004).

The churn and instability within networks as relationships between firms change due to environmental instability has been noted by a number of researchers. There is also a position which considers that long-term stability can also exist within networks (Gaddea, et al., 2003; Sutton-Brady, 2005). The interrelated nature of the network means that over time firms tend to modify their behaviour in order to work with others within the network (Wilkinson & Young, 2002). This tension between the actions of the individual firms in the network and their impact on the network itself means that even a few positional moves or changes by a firm can lead to a significant change in the network itself (Ford & Redwood, 2005). The strength of relationships with others in the network determines a firm's network position in proximity to the focal firm or firms in the network.

A firm's network position also determines access to knowledge and resources (Wilkinson & Young, 2002). According to Moller, et al. (2005) knowledge rich environments foster the creation of networks and these can surpass more formalised markets and hierarchical organisations (Halinen & Tornroos, 2005). There are varying views on the level of control any one organisation can have in a network and

the level to which networks are organic or can be strategically formed by organisations or governments.

Just as with physical resources a company's relationships need to be managed as they are resources in themselves (Gaddea, et al., 2003). The management of business relationships within a firm's networks provides gains in efficiency through demand-supply coordination, facilitates business process improvements by incremental innovation and change, and creates more effective technological applications and business concepts by means of radical innovation and business system change (Moller & Svahn, 2006). The outcome of these activities is growth for the firm and for the region in which they are located.

The process of network management involves "marketing, technology transfer, information exchange, accounting and finance, as well as public and interpersonal relations" (Ojasalo 2004, p.195). By identifying a key network within an industry a firm can then develop strategies to manage the dominant actors in the network in an effort to bring about the improvement in its position in areas such as products and services, organizational structure, information exchange, and individual relationships (Ojasalo, 2004; Gaddea, et al., 2003).

Casson (2006, p.6) distinguishes between physical networks that connect "road or river system, connects natural features, buildings and plants" and social networks which connect people. Networks can be natural or engineered through some form of human agency. Engineered networks are often built on pre-existing networks that have evolved over time, however the process of creating major networks requires a high level of entrepreneurship and leadership (Casson, 2006). Local networks are linked by bridges or connections and according to Casson (2006) the value of the network is often derived from the number of external linkages. The structure of a network is governed by the following factors: "the size of the network, as measured by the number of elements; the membership of the network, as reflected in the types of element that belong to it, and the extent to which different types are mixed; the types of relationship between members, which reflect the roles that they play; the configuration of the network, which describes the pattern in which the different elements are connected up" (Casson 2006, p.22).

Moller, et al. (2005, p.222) classify networks as “vertical value nets” which can be supplier, channel or customer based. Alternately, networks can be horizontal covering competition; resource/capability access; alliances or networking forums. Vertical networks are comprised of suppliers usually directed by a central organisation such as a car manufacturer. Horizontal networks are usually formed cooperatively between competitors or institutional actors such as government; industry associations; research institutes and universities seeking to access resources or develop new ones (Moller, et al., 2005). Finally, multidimensional value nets which are a combination of vertical and horizontal nets which form “core or hollow organizations,” (Moller, et al., 2005, p.1277) complex business nets and new value-system nets. Often these networks are developed in response to opportunities to compete in a global market place. Moller & Halinen (1999) illustrate this complex interplay between the firm and the networks in which it may be situated in the following diagram (Figure 2.2). The firm is involved in vertical relationships with their suppliers and customers and vertical relationships with competitors, government and universities. Welch and Wilkinson (2004) also recognised the impact of “political actors” such as government departments and agencies on business networks.

The arrows between each sector indicate the interrelated nature between the external actors. The arrows at each corner of the diagram are the four major driving forces of networking (Moller & Halinen, 1999).

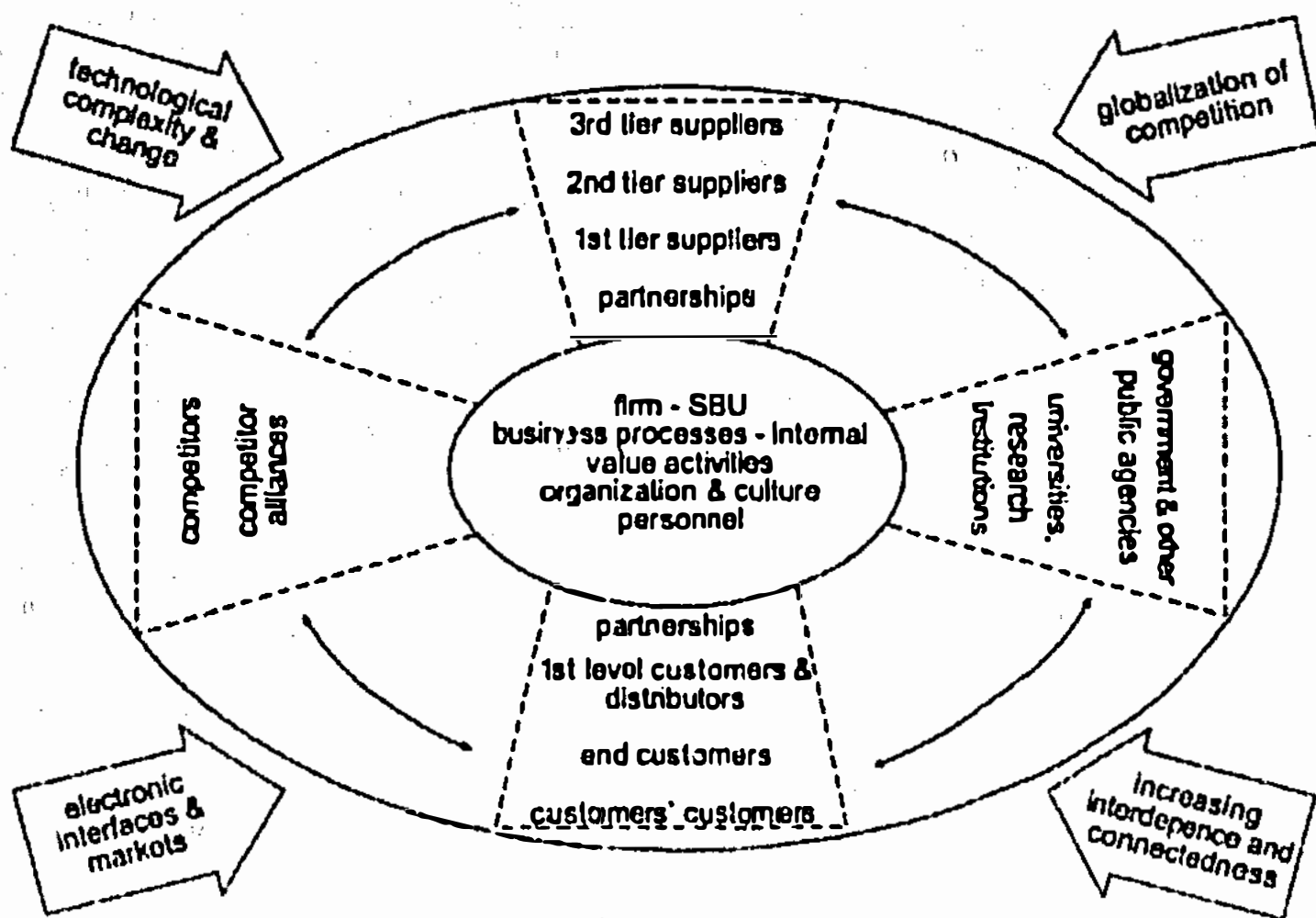


Figure 2. 2 Interplay between the Firm and the Network (Moller & Halinen 1999, p.415).

Business networks are often set within the context of the regional system with the interactions and knowledge flows between firms leading to innovation and economic growth, Pezzini (2003). One of the ways to promote economic growth has been through the focus on innovation at a regional level which has been termed regional innovation systems.

2.3.3 Innovation Systems

Innovation itself can be observed throughout history and the ability to innovate has been present in every civilisation (Hisrich & Peters, 1998) however there has been exponential growth in knowledge since WWII with innovation becoming the norm within western society. The technology revolution has been based on ever increasing innovations coming in rapid sequence (Burgelman, et al., 2001).

Government policy to facilitate innovation on a regional level in Europe grew out of the need for reconstruction after WWII. These policies focused on supporting key national champions such as large firms, universities and national research organisations (Héraud, 2003). From the 1980s more emphasis was placed on

networking between actors within a region and there was also a shift in focus towards the SME's role in the system. Héraud (2003, p.43) suggested that innovation should be seen outside of the institutional structure of firm and region instead at the level of the "improvement of managerial skills and organizational methods, better access to different areas of general knowledge are as important as R&D or technology transfer, particularly for SMEs, one of the typical actors of the regional scene".

On an aggregated level the understanding of the linkages among the actors involved in innovation is the key to developing a regional system or economy (OECD, 2002). Research by Langvik, et al., (2005) considered that innovation is the driving force of sustained regional growth and that it underpins the concepts of regional development, clusters and networks. Innovation systems can exist at the firm, regional or national level and are based on the generation, diffusion and absorption of new knowledge, technology and innovation (Iammarino, 2005).

Relationships among actors that are producing, distributing and applying various kinds of knowledge results in innovation and technical progress within a region, and how these actors relate towards each other can to a large extent determine the innovative performance of a region. The actors are primarily private enterprises, universities and public research institutes and the people within them and the linkages can take the form of joint research, personnel exchanges, cross patenting, purchase of equipment and a variety of other channels (OECD, 2002).

Many of the characteristics of innovation systems are similar to those of networks and clusters. In their pioneering report, the OECD (1997) identified three areas that assisted in the creation of innovation systems; the facilitation of interaction between actors, the use of ICT and the creation of intellectual property. These are outlined in Table 2.1.

Table 2. 1 Characteristics of Innovation Systems (OECD, 1997)

Theme	Actions
Interaction between actors	<ul style="list-style-type: none">● Improving the interaction of actors and the interplay of institutions within regional innovation systems● Encouraging the development of innovative clusters● Facilitation of informal flows of knowledge and access to technical networks● Establish appropriate competition policy frameworks● Implementation of intellectual property rules, labour market policies and exchange programmes to facilitate collaboration
Use of ICT	<ul style="list-style-type: none">● Supportive information technology policies and infrastructures● Improving enterprise ability to access the appropriate networks, to find and identify relevant technologies and information, and to adapt such knowledge to their own needs● The upgrading of technical, managerial and organisational capabilities on the part of firms.● Develop technology policies aimed at firms with lesser technological capabilities, in traditional and mature industries, and in services sectors.
Creation of intellectual property	<ul style="list-style-type: none">● Facilitation of joint research activities among enterprises and public sector institutions● Promotion of research and advanced technology partnerships with government● Facilitation of high levels of co-patenting, co-publication and personnel mobility● Investment in internal research and development, personnel training and information technology

Regional innovation systems can be inhibited by a lack of organisational openness to innovation, institutional exclusiveness, fragmented social networks and an anti development ethos that relies on the inflow of external innovations rather than internal creation (Iammarino, 2005).

Innovation systems can also be created at the national level which are described by the Australian Business Foundation (ABF) as “all economic, political and other social institutions affecting learning, searching and exploring activities (i.e. a nation’s universities and research bodies, financial system, its monetary policies, and internal organization of private firms)” (ABF 2005, p.4). This complex system is

illustrated in Figure 2.3. Often the focus of government policy is on the cluster alone, however according to the ABF's model clusters are influenced by a number of external factors such as education, research and development and technology transfer from research institutions. This view of clusters in a broader context was taken into account in the research by the inclusion of representatives from the public sector and educational institutions.

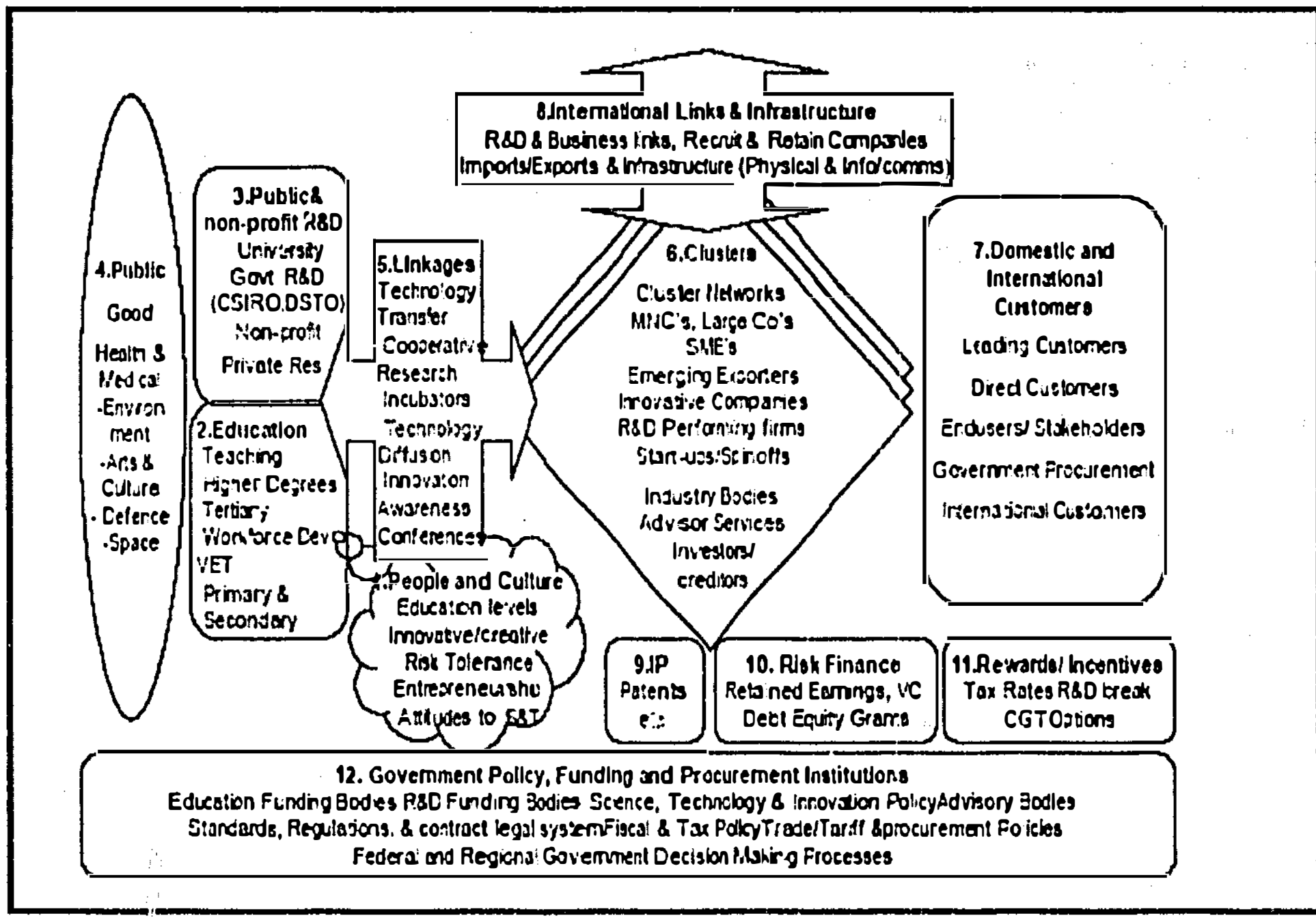


Figure 2. 3 National Innovation Systems (ABF 2005, p.4)

National innovation systems works from the firm level up to the national level as firms interact with other firms and public policy makers, regulators and other institutions such as universities. Creating an ideal innovation system is not the aim. The goal is to facilitate synergy between a firm's specific advantages and those of the country as a whole directing investment into these areas of strength (ABF, 2005). This process is described in Figure 2.4.

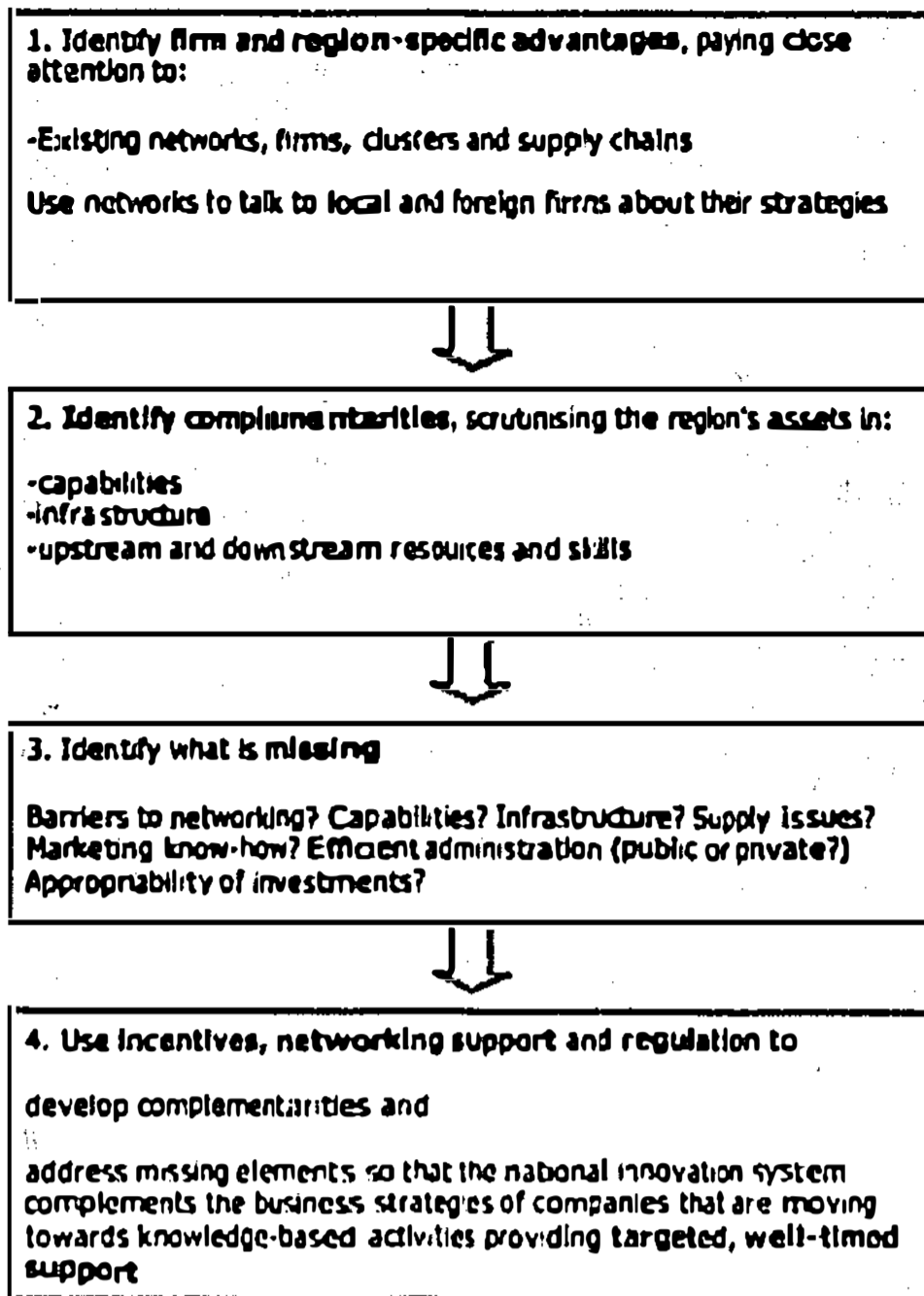


Figure 2. 4 Innovation System Process (ABF 2005, p.15)

There have been detractors from the national innovation systems model with some arguing that it places too much emphasis on the structures such as institutions and economic growth and not enough focus on the knowledge that flows between these structures (Leydesdorff, et al., 2005). Another holistic approach to regional economic development is the Triple Helix model which combines education institutions, government and the private sector to bring about innovation and growth.

2.3.4 Triple Helix

The Triple Helix model was developed from the investigation of institutional interaction at the level of knowledge infrastructure and an analysis of the knowledge economy during 1994 (Leydesdorff & Meyer, 2006). Originally a model of discontinuous innovation in networks of players in institutional spheres, Triple Helix has been applied as a means to integrate disconnected resources in collapsed

innovation systems and to enhance incremental innovation in developing countries (Etzkowitz, 2003).

The Triple Helix model focuses on the institutional interactions of university-industry-government relations and the knowledge that passes through their network of relationships (Leydesdorff, et al., 2005). Building on the idea of national innovation systems Triple Helix sees innovation as being driven through the exchange of knowledge between the institutions. “The Triple Helix thesis is that the interaction among university-industry-government is the key to improving the conditions for innovation in a knowledge-based society” (Etzkowitz 2003, p.1). Like a DNA helix the knowledge flows combine and split creating new knowledge trajectories and innovations.

To facilitate the knowledge flows across the Triple Helix of university-industry-government, Etzkowitz (2003, p.11) suggests the following strategies: spread entrepreneurial education throughout the university curriculum; create networks between incubators and incubator firms; give incentives to regional actors to collaborate and cooperate; create an array of venture capital sources; develop multiple knowledge bases and create an entrepreneurial academic entity.

This university-industry-government interface, leading to a tri-institutional model of society, is according to Etzkowitz (2003) the great transformation of late 20th and early 21st centuries and has seen the shift from manufacturing to service occupations; from the individual firm to strategic alliances; from tacit to codified knowledge and from technical to organizational innovation.

2.3.5 Clustering

Michael Porter in his book “Competitive Advantage of Nations” (1990) defined clusters as “geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standards agencies, trade associations) in a particular field that compete but also cooperate” (Porter 2000, p.15). A major study of clusters

undertaken by the OECD, (Boekholt & Thuriaux 1999, p. 381) defined clusters as “networks of production of strongly interdependent firms (including specialised suppliers), knowledge producing agents (universities, research institutes, engineering companies), bridging institutions (brokers, consultants) and customers, linked to each other in a value-adding production chain”. Clusters differ from networks in that membership of a network is often defined whereas a cluster is an informal grouping of firms (Boekholt & Thuriaux, 1999).

According to Steinfield (2002) clustering is important for the vitality of local businesses, cities, regions and nations. The success of business clusters depends on the following: the exploitation of social capital through proximity which affords interaction opportunities; a common language and culture which enhances shared understanding; relationships to facilitate knowledge sharing yielding innovation, and trust arising from relationships which lubricates commerce and reduces transaction costs. The advantages of clustering include the increased supply of specialised inputs; access to new and expert knowledge; access to institutions, public goods and government incentive programs. Clustering also provides complementarities in areas such as products for customers where buyers can access a range of complementary products and services and marketing activities, the banding together of like firms to access larger markets and finally the better alignment of the supply chain activities between firms (Porter, 2000).

As with networks the continual interaction experience in clusters has a normalising effect according to Porter (2000) and interactions are more reflective of the long-term interests of the cluster. This interaction between firms can also lead to increased innovation and up grading of technology and expertise (Porter, 2000).

Lundequist and Power (2002, p. 697) describe four types of clusters: “industry-led initiatives to build competitiveness and competence within an existing base; top-down public policy exercises in brand-building; visionary projects to produce an industry cluster from ‘thin air’; small scale, geographically dispersed, natural resource based, temporal clusters that link, or dip, into global rather than national and regional systems and sources of innovation, competitive advantage and strategic assets”.

Though many governments have backed away from direct intervention in cluster development, Lundequist & Power, (2002) suggest that government still has a role as a source of resources for regional development. The provision of meeting places within the cluster can foster trust, collaboration and information and knowledge exchange.

The common strategies for regional cluster development policy include the creation of regional identity through location incentives, recruitment of existing business to the region, the support of business networks and the provision of business development services, the support and expansion of research and development through building university research competencies, creating non-university laboratories and research centres, R&D incentives, subsidies and awards. Also important is the provision of physical infrastructure for business development such as business incubators facilities including laboratory space, buildings and business parks. Other areas include the provision of training and basic education, regulatory assistance and regulatory enforcement, procurement and supply chain development (Feser, 2002; Sölvell, et al., 2003; OECD, 2005).

From research Benneworth (2002) suggested that successful clusters are based on real assets and advantages related to the history of a region with these advantages having been built up over long periods of time. Similarly, Lundequist and Power's (2002) research found that to build a successful cluster requires the identification and development of existing sources of regional competitive advantages and turning these into commercially viable products and services. There must be the right mix of economic, business, political, geographic and even sociological or cultural characteristics that are unique to that region to support the development of a cluster. The pre-existence of these factors assist in cluster development and that is why it is difficult to start a cluster from scratch and may not always be appropriate for a region (Palazuelos, 2005).

The creation of and facilitation of relationships between government, education and industry institutions will assist in the process of cluster development (Lundequist and Power, 2002). Benneworth (2002) sees relationships as the basis of clusters and

contends that it is these relationships that lead to innovation and creativity (Porter, 2000).

In a cluster creation project the creation of a distinctive cluster vision and the empowerment of specific individuals or organisations as cluster drivers who act as network brokers is also significant (Lundequist and Power, 2002). Though clusters may be based around similar industries, no two clusters are the same and policy makers need to keep this in mind (Benneworth, 2002).

According to Lundequist and Power (2002) actors within the cluster need to identify their core competencies and create a division of labour where different parties bring skills to the cluster, sharing in the work and not competing against each other. These unique capabilities must be collaboratively marketed as a clear cluster brand which attracts resources, creates a shared identity and builds on the marketing of individual firms. The role of the public sector can be important in assisting branding.

For a cluster to be successful there needs to be continual improvement of the government policies and strategies that support the cluster's informal networks, knowledge exchange and targeted education programs (Lundequist & Power, 2002; Boekholt & Thuriaux, 1999).

According to Porter (2000), for successful development of clusters a number of factors need to be in place. There needs to be a shared understanding of how competitive advantage functions within a cluster with the focus being on productivity and innovation not government subsidies. Participants with a cluster initiative need to commit to the goals and competitive environment of the cluster not seek to maintain the status quo. To achieve this there needs to be strong champions for the cluster in both the public and private sectors as "entrepreneurial leadership and the involvement of opinion leaders characterize virtually all successful initiatives (Porter 2000, p. 32).

Leadership from the private sector reduces the level of political involvement and agendas. The involvement of a wide range of firms and institutions of varying sizes that are willing to work towards the improvement of conditions within the cluster is

necessary. Communication and interpersonal relationships which provide the conduit for information flows are the backbone of clusters. In a national or state perspective cluster policy should take into account the spectrum of clusters that exist within the region or country seeking to work in harmony not competition with these clusters. Clusters need defined boundaries based on industries and institutions with linkages or spillovers regardless of the political boundaries such as local government areas (Porter, 2000). Finally, Porter (2000) suggests clusters are a long term process which requires constant re-adjustment and institutionalisation of goals, relationships and linkages.

As part of an OECD investigation into the value of clusters in boosting the innovation of nations Boekholt and Thuriaux (1999, p. 378) carried out a review of cluster policies across a number of countries mainly focusing on the federal level, though there were some regional cases included. The authors found that clusters have different levels of aggregation “mega-level (i.e. agro-food), meso-level (i.e. the machine tool building or yacht building sector), or micro-level (i.e. a collaborative network of individual firms)”. Similarly Boekholt and Thuriaux (1999) identified models of cluster policy; national advantage, inter-firm networking, regional development and industry-research. Verbeek (1999) summarised these policies into a global context. Table 2.2 provides a comparison between the cluster policies of different nations.

Table 2. 2 Cluster Policy Comparison (Verbeek, 1999)

	Level	Aim	Typical Action	Associated countries with these models
National Advantage Model	Mega/ Meso	Focus resources on 'National Advantage' in certain sectors or value chains	Identify Clusters and create supporting conditions	Canada, Denmark, Finland, Sweden, Netherlands
SME Networking Model	Micro/ (Meso)	Improve SME competitiveness	Increase interactions with external sources of knowledge to increase capabilities and improve innovation	Australia, New Zealand, Norway, USA
Regional Development Model	Meso/ Micro	Promote the attractiveness, economic performance and development of a region	Generate areas of specialisation and attract inward investment	Canada, Scotland, USA, Wales
Industry-Research Link Model	Micro/ (Meso)	Collaboration and networking between industry and research	Creation of 'critical mass' in emerging technologies by attracting research facilities, investors and firms.	Austria, Germany and the Netherlands

Although Boekholt and Thuriaux (1999) have attributed specific countries to each model, facets of each model can be seen in clusters across nations.

The SME Networking Model which Boekholt and Thuriaux (1999) attributes to Australia is based on creating a multitude of inter-firm networks and according to the authors for many countries clusters equal the development of networking. In this model the focus is on the regional based networks which allow for the direct interpersonal networks to be created. The facilitation and brokering of the collaborative networks between firms and knowledge providers is actively encouraged by the public sector. These networks are based around a common resource, a supply chain or collaboration with competitors. It has been argued that

clusters cannot be sustained amongst competitors as there is a lack of trust between parties.

Elements of the Regional Development Model may also be relevant to Australia with its focus on public agencies and policies working to build traditional or emerging areas of strength through development agencies and innovation centres set up for the task. There is also a focus on the facilitation of informal contact between members of the cluster.

The Industry-Research Link Model centres on knowledge creation from research to commercial application through micro-level networks of co-located industrial and research organisations for identified knowledge sectors (Boekholt & Thuriaux, 1999). This would be similar to the technology parks or technology precincts which have been used in Australia.

As every case is unique there is no magic formula for cluster development, so Boekholt and Thuriaux (1999) suggested a broad set of cluster policies should be developed with coherency between the various levels of administration to form a comprehensive cluster policy package. According to Peck and McGuinness (2003) cluster policy can be viewed at the common denominator level of attempting to improve the competitiveness of business with a common link within a region. Alternately cluster policy can be used to legitimize the targeting of resources toward a particular group of businesses, technologies or a location. In their review of policy in the UK, Peck and McGuinness (2003) raised concerns that cluster policy had been used to address competitive disadvantage rather than building on areas of strength.

In their survey of 250 cluster initiatives, Sölvell, et al. (2003) found that policies had a positive impact, and 80% of respondents improved the competitiveness of the cluster. However, this success often depends on government funding and they often struggle to become self sustaining. Success factors for clusters include a clear strategy for the development of goals and performance measures. Secondly, there needs to be a blending of standard cluster approaches with factors that reflect the unique qualities of the individual clusters. Finally, cluster initiatives need to be embedded in the broader policy context of the micro economic environment.

Clustering as a means of regional economic development has been popular, particularly in Europe, although the Porter model has not received universal acceptance as the answer in every situation (Palazuelos, 2005). The development of a cluster also holds potential risks such as driving up costs, free riding by firms and the risk of over specialisation of firms. For the successful implementation of cluster policy there must be a rigorous analysis of the aforementioned characteristics of a region to ascertain what is appropriate to that region (Palazuelos, 2005).

2.4 SMEs in Regional Economic Development

As noted in Chapter 1 the research project incorporates relationships between firms of varying sizes and the identification of strategies to assist the development of SMEs within the Henderson region. Although the role of SMEs in regional economic development has been mentioned previously in the chapter this section will focus on the issues faced by SMEs in a regional development context.

In the Australian context regional economic development has tended to focus on Small to Medium Enterprises (SMEs) as they comprise 95% of the private non-agricultural sector (ABS, 2005a). As a result the Australian government has promoted them as a driver of economic growth with particular emphasis on e-commerce (DCITA, 2004).

The parameters defining SMEs vary between national economies and industry sectors. What is considered small in the manufacturing sector could be considered large in the agricultural sector. Table 2.3 below identifies a number of definitions of SME based on the number of employees.

Table 2. 3 SME Definition/Classification (Bode, 2002)

Source	Micro-Business	Small Business	Medium
The Small Business Development Corporation (SBDC) of Western Australia's	< 5 employees	Less than 20 employees (<100 in the manufacturing sector)	
The Australian Bureau of Statistics (ABS)	< 5 employees	5 to 20 employees	21 to 200 employees
United States Small Business Administration (SBA)	< 5 employees	5 to 99 employees	>100 employees
Department of Trade and Industry UK (DTI)		< 50 employees	51 to 249 employees
European Union		SME's employing less than 250	

As the research is set in an Australian context a definition of SMEs needs to be identified and as the relationship with larger organisations is to be examined that also needs to be defined. Bode (2002) identified four categories of SMEs based on staffing levels including owner operators and micro business. For the purposes of this study the following categories of firms by number of employees was used. From secondary data and industry sources it was inferred that there were few firms with between 100 and 200 employees as firms that have over 100 employees were usually branches of national or multinational organisations with employee numbers over 1,000 which would not classify them as a medium sized firm.

Table 2. 4 Categorisation of Firms by Employee

Small Business	6-20 employees
Medium Business	21 to 100 employees
Large Business	>101 employees

In a globalised economy SMEs need to be more competitive on a national and international level, however they do not always apply the innovative techniques and technologies required to access new opportunities (Libutti, 2000). Clustering has been used as a tool to give SMEs leverage against the larger firms in both their

traditional domestic markets and new global markets (Caniels & Romijn, 2003). Research conducted by Caniels & Romijn, (2003) found an increased capability of SMEs at a firm level was fostered through geographical clustering and policies that focus on networking and cooperation facilitate inter-firm learning. Policies that stimulated technological innovation are more effective for SMEs when targeted at the cluster level and the supporting of a few progressive firms within the cluster creates increased competitiveness overall (Caniels & Romijn, 2003).

Although there has been a significant focus on SME growth not all firms and their owners are orientated towards growth with some owners seeking other outcomes such as quality of life, following a passion or craft, an opportunity to employ their family members and seeing self-employment as the only viable option (Massey, 2004).

2.5 Common Themes in Regional Economic Development Strategies

The basic ethos of all of these strategies is the combining of existing firms, resources and knowledge to create something new and subsequently gain competitive advantage. This sharing of resources, expertises, knowledge and skilled labour through some form of collaboration assists in the creation of new knowledge and this knowledge often leads to technological innovation. Collaboration can be face-to-face or it could take place in the digital realm through ICT. One of the main sources of new knowledge is the technology transfer from educational institutions and the interface between industry and academics and students. Not all of the models are aimed at SMEs and the use of ICT is often implied.

Collaboration is central to clustering, significant to innovation and can be used as a tool by entrepreneurs. The similarities across the strategies are illustrated in Table 2.5 below.

Table 2. 5 Comparisons of Regional Economic Development Strategies

Model Characteristic	Entrepreneur ship	Network ing	Innovation Systems	Triple Helix	Cluster ing
Knowledge Creation & sharing		X	X	X	X
I.P./Technology transfer			X	X	X
Technological Innovation	X		X	X	X
Growth and Export	X				X
Collaboration	X	X	X	X	X
Education/ Training	X	X		X	X
Use of ICT		X	X		X
Infrastructure Provisions	X				X
Focus on SME	X	X			X

Though the strategies are focused at different levels of economic development, firm, industry, region or country they all touch on interactions at the firm level. It is these business relationships and specifically collaboration which will be investigated in greater depth in Chapter 3. It would appear that clustering covers all of the characteristics identified as part of regional economic development. Case studies of clustering in the marine and defence industries will be presented in Chapter 4. The following section will elaborate on regional economic development in the Australian context.

2.6 The Australian Context of Regional Economic Development

The previous literature reviewed in this chapter concerning regional economic development has been derived primarily from European and US sources where the majority of the research has been undertaken. In contrast to the USA and the majority of European countries Australia can be characterised as a small country in economic terms which is heavily reliant on natural resources rather than high tech and knowledge intensive industries (Maude, 2004). As highlighted in Chapter 1 Western Australia is particularly dependant on the minerals and processing industry

which accounts for around half the State's GDP. This dependence on the minerals sector means that the domestic market provides limited opportunities for economic development. However, R&D surrounding the resources industry could provide the opportunity for the development of high-tech clusters around the industry that can compete on an international level (Maude, 2004).

A comprehensive review of economic development in Australia was undertaken in 2002 by the Department of Transport and Regional Services (DoTaRS). The report concluded that the key considerations for government in supporting regional economic development were the use of a top down strategic approach to further Australian industry and the engagement of all economic stakeholders in this process. DoTaRS (2002) suggested that beneath the overarching government strategy regions must themselves develop a bottom up approach based on their regional assets and strengths. The integration of the two approaches is where Australia has failed in the past. Australia needs to develop linkages between businesses at a regional level, education and research institutions to facilitate knowledge flows, create collaboration and collectively leverage future development opportunities (DoTaRS, 2002).

In the Australian context the impediments to regional economic development identified by DoTaRS, (2002, p.197) include: "difficulty in accessing skills, in particular, difficulties with the recruitment and retention of skilled labour; a lack of awareness of new business opportunities; under-developed business skills; a lack of supportive infrastructure; perceived shortfalls in an area's 'lifestyle' and 'livability' attributes; a lack of access to capital; and a low take up rates of government business assistance." DoTaRS, (2002) found in previous research that there was considerable criticism of the government's performance in regional economic development including the lack of a clear framework, poorly defined objectives of programs, insufficient resources to achieve the stated task and not addressing stated local needs. The business support programs were often poorly communicated and confusing to their target audience. Research by the Industry Commission cited by DoTaRS (2002) indicated that government financial incentives did not play a significant role in the success of a company locating into a new region.

In the Australian context DoTaRS (2002, p.197) suggested that public sector regional economic development strategies could be improved if: “public sector strategies reflected the economic context in which regions must develop; artificial interventions by government were limited; picking ‘winners’ is based on the dual principles of market failure and local value chain integration; long-term Strategic infrastructure was invested in; coordination between all levels of governments is maximised and the local community is more effectively engaged in the development process”.

DoTaRS (2002, p.195) suggested that from the literature there are a number of ways that government can encourage regional economic development as presented in Table 2.6.

Table 2. 6 Regional Economic Development Overview (DoTaRS 2002, p.195)

Area	Strategy
Infrastructure	Invest in the fundamentals of regional competitiveness by providing a conducive and stable business environment, an efficient and high quality ‘hard’ infrastructure base, a collaborative and highly skilled ‘soft’ infrastructure base, attractive environments providing quality of life opportunities for residents and visitors, and engaging and responsive bureaucracies.
Research and Development	Investment in research, commercialisation and entrepreneurial capacities in the region, backed up with building regional networks to ensure that knowledge and technology transfer is maximised and the innovation process is institutionalised.
Focus on Strengths	Invest in regional strengths, aiming to consolidate the inherited assets within a region and to promote regional specialisation.
Connectedness	Develop the relationships between city and city-hinterland regions, acknowledging that they play different roles in the value chain and can work cooperatively to their mutual benefit.
Incentives	Strategically targeted financial incentives, which may take the form of ‘seed’ grants, tax incentives or a combination of these.

**Table 2.6 Regional Economic Development Overview (DoTaRS 2002, p.195)
Cont.**

Area	Strategy
Marketing the Region	Market regional strengths to existing and potential investors effectively, by establishing and maintaining up to date information systems, mapping regional assets, providing information and advisory services, and streamlined investment facilitation processes.
Public/Private partnerships	Establish public-private sector partnerships that espouse a commonly held vision and priorities for facilitating new business investment. Engage and communicate to the local/ regional community, regional business development objectives.

2.6.1 Australian Regional Economic Development Strategies

Australian research into the regional economic development strategies and their effectiveness is outlined in this section. Of the five strategies previously mentioned the Triple Helix model has received the least attention in the Australian literature. Gunasekara (2006) applied the Triple Helix model to a study of Australian universities and their engagement in regional innovation systems and found that although universities generated knowledge with commercial application there was not a clear path to commercialisation. The links between the institution, the regions in which they were located and those with industry and government were still weak and not reflective of the university-industry-government tri-institutional model of economic growth (Etzkowitz, 2003).

According to a 2004 study conducted by Global Entrepreneurship Monitor, Australia was in the top five countries on their Entrepreneurial Activity Index of the OECD countries (Fitzsimons, et al., 2004), however, when SMEs from individual industry sectors are considered it was found that the level of entrepreneurship varied widely (Parker, 2006). The perceived flexibility and innovativeness of SMEs has made them a target for economic government policy in Australia (Killen, et al., 2003). The current government policy stance is to “invigorate entrepreneurial activity and promote SMEs, which are widely regarded as critical to the solution of current economic problems” (Parker 2000, p. 239). Parker (2000) found that the support of entrepreneurship and SMEs only was not sufficient for the creation of industrial

competitiveness. Plummer and Taylor (2004) found that the differing levels of economic growth in Australia were linked to broad based entrepreneurial education, targeted skills development and a local culture of enterprise.

In contrast to the level of entrepreneurship Australia as an innovative nation is outside the top 10 of OECD countries. Australia has a number of strengths including “a broad scientific base, world class in some areas; success in converting knowledge into patents; and high growth in several areas including biotechnology, pharmaceuticals and office and computing equipment”. It also has some notable weaknesses including “insufficient attention to the development of human capital (for example, entrepreneurship); low average company size which may impede ability to compete in new industries and innovate; in international terms, business expenditure on research and development is poor; and many research institutions have poor linkages with potential users of research” (ABF 2005, p.19). For Australia to become an innovative nation government policy must address the gap between R&D and commercialisation in both the public and private sectors, boosting the capacity at a firm level to create, diffuse and apply knowledge to form a strong innovation system within the country (ABF, 2005).

In their research into business networks between Australian and Chinese firms Batonda and Perry (2003) found that those participating in the newer networks were unfamiliar with the network process and lacked the skills and experience to operate effectively within the networks.

For SMEs the time and resources required to set up networks are often prohibitive, however SMEs were the focus of the Federal Government Business Networks Program established in 1995 (Killen, et al., 2003). Only 2% of SMEs participated in the program compared to between 10-15% in an equivalent program in Denmark (Fulop, 2000). The program used independent network brokers to facilitate the network between firms. Though the program finished in 1998 it did serve to increase awareness of the opportunities open to firms through business networks (Killen, et al., 2003). Fulop (2000) found that none of the participants in the networks studied in her research were committed to business growth in the network. The research found that the use of formal contracts rather than relationship building lead to

reduced levels of trust between firms in the networks (Fulop, 2000). However there were examples of significant levels of integration of networks where the business had high levels of complementarity. Killen, et al. (2003) note that the Business Network Program ran only three years compared to similar programs in other countries which ran for considerably longer and were more successful (The Department of Industry, Tourism and Resources, 2004).

2.6.2 Clusters in Australia

According to the OECD as cited by the Australian Department of Industry, Tourism and Resources (2004), clusters can be described as geographically confined and operating on the lower end of the 'collaborative chain', whereas networks are broader entities. Alternately, if clusters are defined according to Porter (cited in Department of Industry, Tourism and Resources, 2004) then they are seen as broader entities actually encompassing networks. The Department of Industry, Tourism and Resources (2004, p.1) defines clusters as "a system of inter-related companies, institutions and networks with common understandings, a desire for continual growth, and a level of trust which enhances the flow of knowledge".

Of the regional economic development strategies, clusters seem to have been the most extensively applied in an Australian setting. The creation of industry clusters has been growing in popularity in Australia since the 1990s with particular focus on regions that have suffered economic hardship much of which rose out of the economic restructuring of the 1980s (Roberts & Enright, 2004). The 1980s were characterised by "the restructuring of the manufacturing sector; growth in the development of business services, especially financial services; corporatization of many State owned enterprises such as Qantas and the Commonwealth Bank; reform of the public sector under National Competition Policy; improvements in productivity gains; removal of protective tariffs and financial deregulation and Australia mimicking the structure of the US economy" (Roberts & Enright 2004, p102). These changes saw the decline in the old manufacturing industries with many moving off shore or being acquired by multinationals.

The environment of the 1990s saw two forms of cluster develop in Australia. Firstly, single industry clusters, which usually rise out of old industries that have been restructured. Secondly, groupings of industries regional based and connected through networks. These clusters are often facilitated by public policy support directed at industry innovation and collaboration between firms to build the cluster (Roberts & Enright, 2004). These clusters tend to be weaker as they lack the strength of a national industry. For clusters to succeed they require “substantial capacity building to support regional strategic infrastructure...to turn a local or regional network of firms and industries into a cluster” this often requires significant long term commitment from government sources (Roberts & Enright 2004, p.117).

Of the clustering programs initiated over the 1990s many failed due to a lack of resources, experience, expertise in regional development and failure to create linkages with international markets. Though originally driven at a Federal level the majority of the support and funding for cluster programs came from State governments (Roberts & Enright, 2004; Department of Industry, Tourism and Resources, 2004). Often these programs were based around technology parks or innovation centres.

In 1995 the South Australian Government initiated a cluster project with prototypes in defence and multi media. As part of the project, cluster working groups were formed and industry leaders were recruited to Chair the working groups. The Chairs were chosen for their leadership ability, credibility and collaborative mindset to harness the general enthusiasm and turn it into concrete outcomes. In the 2004 assessment of the cluster programme it was found that a greater level of trust and understanding had been developed among the cluster members. In the case of the South Australian cluster development project key factors that assisted the project's success were leadership, vision, long-term commitment to capacity building and a sense of crisis which made industries open to accepting alternative ways of doing business. Early results maintained momentum through the early period of learning and trust development (Roberts & Enright, 2004).

Other benefits included reduced transaction costs, increased joint activities and investment in joint venture initiatives. It was suggested that the programme could

have been used more efficiently to identify and fill local economic gaps. It was considered that clustering made participants more aware of supply chains in South Australia and facilitated new economic groupings, such as water, sport and recreation and the environment. It was found that the clustering process facilitated the development of a leadership group which created the collective success for the industry, but this was often dogged by competition (Roberts & Enright, 2004).

The cluster programme has been effective in the development of export programmes especially in defence which will be discussed further in Chapter 4. The cluster programme has focused on SMEs working together, however it is suggested that it may be more effective if large companies championed the development of the clusters and the SMEs experience flow on benefits of this (Roberts & Enright, 2004).

It was suggested by the Department of Industry, Tourism and Resources (2004) that clusters fall into the following broad categories by structure or purpose.

Table 2.7 Categories of Clusters

<i>Structure Based Categories</i>	
Category	Characteristics
Marshallian	Mostly locally-owned SME's focused on inter-firm trade
Hub and Spoke	Dominated by one or several large firms with smaller suppliers
Satellite platforms	Dominated by Multinational's Branch Facilities
State-anchored	Dominated by public entities
<i>Purpose Based Categories</i>	
Category	Characteristics
Customer based	Leading edge users, major markets, industries supplied, etc.
Product based	Grouping to produce an end-product, service or solution
Needs based	Grouping of SMEs working cooperatively to overcome problems
Technology based	Grouping around a product or process technology ie. Manufacturing
Resource based	Grouping around supply of skills, materials, funding, etc

The key factors that must be considered when developing a cluster are: organic growth in response to changing circumstances; maximisation of the creative

conditions and facilitation of spin off and growth opportunities (The Department of Industry, Tourism and Resources, 2004).

According to Blandy (2004) the development of clusters over time stemmed from a region's economic foundations including existing companies and local demands for products and services. Clusters emerge from the local community to become economic champions for the region's progress. There is an ongoing cycle between the cluster's development and its original foundations and this interplay assists in the stimulation of the industry cluster. Blandy (2004) suggested that the interest in the development of local economies through Government policy seems to have a universal appeal.

Generally, the clusters in Australia are not well developed compared with those of the US and Europe due to the small size of the domestic economy, lack of critical mass within industries, lack of suitable local partners, multinationals conducting R&D offshore, the strength of the export focused resources industry over other industries and the lack of regional specialisation which reduces the opportunity of cluster building (Maude, 2004). Parker (2006) also noted that there was little evidence of regional industry specialisation, co-located firms or clusters in Australia. Many of the government facilitated clusters reviewed by the Department of Industry, Tourism and Resources (2004) had failed.

The drive to develop clusters has come from the need to improve local or regional social and economic conditions and the perception that a high level of interaction between small enterprises will create flexibility, technology diffusion and competitiveness. Government policies have been aimed at enhancing the processes within clusters and so the wealth generated (Innovation Lab Australia, 2002).

Three critical issues hamper the development of clusters in Australia "insufficient critical mass, lack of focus and distinctiveness and political and administrative difficulties" (Roberts & Enright 2004, p.116). According to Roberts and Enright, (2004) there has been a lack of cohesive policy and action between all three levels of government in Australia and a lack of buy in from industry had meant that Australia has yet to fully reap the benefits of clusters that have been experienced by other

OECD countries. A lack of knowledge, expertise and commitment among those agencies that are to facilitate the process has hampered effective cluster development. Further research is required into the effective building of clusters within the Australian context as they will assist Australian industry to compete in the global market place (Roberts & Enright, 2004). Clustering has only had minor acceptance in urban Australia where it is argued by Roberts and Enright, (2004) it would be most effective.

It has been recognised that “Cluster development on its own is not a panacea for economic development, but rather, depending on the sustainability and effectiveness of the cluster model, a powerful tool for growth” (The Department of Industry, Tourism and Resources, 2004). There has been a move away from direct intervention by Government towards the facilitation of collaboration between firms within the cluster and between public and private organisations (Innovation Lab Australia, 2002). Regional development agencies, large industry associations, corporations and industry alliances can assist in the development of clusters by attracting high-level functions and services that are critical to the needs of firms in the cluster (Roberts & Enright, 2004).

The physical proximity within clusters supports communication, the development of social networks, collaboration and competition which are enhanced by knowledge exchange and market flows (Innovation Lab Australia, 2002). Clusters provide a means for SMEs to overcome the disadvantages of their size and their lack of access to knowledge, thus enhancing their ability to innovate both in local and international markets (Innovation Lab Australia, 2002).

Multinational firms are attracted to clusters where there is innovation, technology and market intelligence. Clusters are likely to be successful if there is a commitment to the process of building trust, respect and collaboration to reach a common goal (Roberts & Enright, 2004).

Clusters are a powerful tool for growth and Australian companies need to learn to collaborate to take advantage of them. It is suggested that Australian clusters should look for early wins to encourage ongoing commitment to the cluster. Balanced

against this idea is the need to build trust to facilitate knowledge sharing and the establishment of joint relationships which hold the cluster together (The Department of Industry, Tourism and Resources, 2004). The Department of Industry, Tourism and Resources (2004) suggest fast tracking the development of trust structures such as formalised membership and codes of conduct and ethics.

The other significant factors in cluster development identified in the report include: the development of social capital and a willingness for participants to invest in the cluster's future; fostering of a long range collaborative environment; industry leaders within the cluster that are driven by a collaborative rather than a competitive view; sufficient structural and administrative agreements for the protection of intellectual property including the identification of core cluster members with higher levels of knowledge sharing and finally the development of high levels of trust which hold the cluster together (The Department of Industry, Tourism and Resources, 2004).

According to The Department of Industry, Tourism and Resources (2004, p.5) "Australia should now generate its own clustering traditions, taking account of its own unique geographical, cultural and historical factors....establishing a benchmark for a sustainable cluster in its own right, rather than be shackled to past 'truisms' that may (or may not) apply to the Australian environment".

2.7 Chapter Summary

Following on from the introduction to the research in Chapter 1 this chapter has reviewed the literature concerning regional economic development strategies and provided a synthesis of the core factors in each strategy to identify collaboration as a central theme. In the second half of the chapter the literature concerning the application of the regional economic develop strategies in the Australian context was reviewed with clustering being the most prevalent of these strategies.

In Chapter 3 collaborative business relationships and the use of ICT will be expanded upon and in Chapter 4 the industry context will be discussed.

Chapter 3: Collaborative Business Relationships

3 Introduction

The previous chapters have dealt with the development of the research project, regional economic development and the marine and defence industry context of the study. This chapter will deal with business relationships and specifically collaborative relationships.

The first section of this chapter will examine business relationships in general terms and then look specifically at collaborative business relationships addressing the literature concerning the research questions including the drivers for collaborative relationships; firm level factors that impact on the creation and sustaining of collaborative relationships; the role of ICT in facilitating and sustaining collaborative relationships and the benefits of collaborative relationships as illustrated in Figure 3.1.

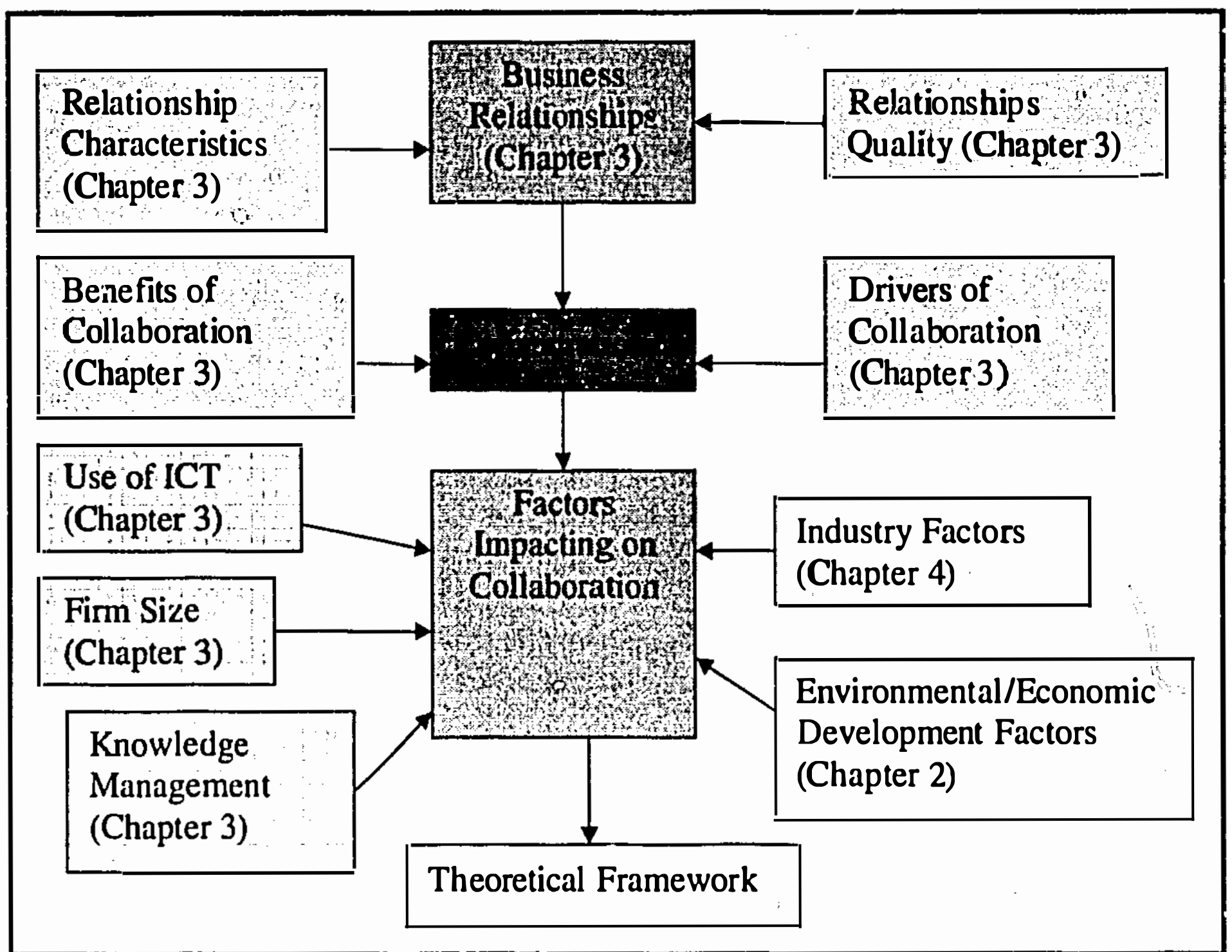


Figure 3. 1 Chapter 3 Framework

3.1 Business Relationships

There is a vast spectrum of business relationships possible, ranging from an arms length contractual relationship to an obligatory contractual relationship. In the arms length contractual relationship there is a high level of codification of the tasks and duties of both parties, with no familiarity or ties between the two organisations. In contrast, obligatory contractual relationships tend to be more socially based and are characterised by mutual trust and on the exchange of information. There is also a shared incentive for both the parties to do more than is expected under the contractual agreement (Skjott-Larsen, et al., 2003).

According to Jarratt (1998) business relationships or alliances can be described by their degree of commitment and infrastructure linkage. From tight relationships where an organisation has a controlling interest or full merger with retained identity of subsidiary, through to partial acquisition and equity participation, joint ventures,

equity participating alliances, international alliances with central secretariats, co-market agreements, national buying clubs and at the other end of the scale - loose affiliations. Barringer and Harrison (2000) also identified a similar continuum of collaborative relationships commitment from a tightly coupled joint venture to a loosely coupled interlocking directorate.

Svensson (2002) has identified various dimensions of dependence between organisations, including the technical interface between organisations, the timing of the synchronisation of activities between the organisations, the knowledge shared between the organisations on their strengths and weakness and problem solving ability, the social interactions based on personal relationships and the economic and legal connections such as contracts. A firm requires a mixture of business relationships both vertical and horizontal in order to keep its position within the network of businesses in which it functions (Bengtsson & Kock, 2000).

Business relationships can be described according to the level of structure or codification within the relationship between the two companies or the level of interdependence between organisations. They can also be defined according to whether the relationship is in a structured linear form such as in an integrated supply chain with shared ICT infrastructure or part of a more nebulous formation such as a virtual network or electronic hub. Business relationships can be part of various structures from one to one business relationships called dyadic relationships, or many to one, such as suppliers to a dominant firm or one to many. In these relationships either the supplier or the customer will be dominant. In the relationships where it is many to one or one to many the suppliers or customers will generally conform to business practices of the largest organisation in the relationship (Thuraisingham, et al., 2002).

Much of the literature surrounding business relationships focuses on buyer-supplier relationships from a marketing perspective, which has been the subject of discussion since the early 1980s (Moller & Halinen, 1999). The literature has moved away from just the dyadic relationship between one supplier and one buyer to examining relationships outside the dyad that are part of the network in which each organisation

is involved and the impact of those other relationships on the focal relationship (Moller & Halinen, 1999; Anderson, et al., 1994).

The interactions of one organisation with other organisations outside the dyadic relationship may have beneficial or detrimental effects on the organisations within the dyadic relationship (Anderson, et al., 1994). Organisations no longer prosper on their own efforts alone but their performance is to an extent interdependent with that of other organisations (Wilkinson & Young, 2002). Every organisation is also part of a network of business relationships (Moller & Halinen 1999; Donaldson & O'Tool, 2000). The focus is now on the management of business relationships across all of an organisation's functions rather than just transactions between organisations (Holmlund, 1997).

3.2 Business Relationships Characteristics

When discussing business relationships there is an array of different characteristics used to describe and analyse these relationships and how the firms within the relationship interact with each other. The models used to describe the characteristics of business relationships range along a spectrum from being structural and focused on factors such as money and manpower, to the social characteristics of business such as trust, commitment and relationship satisfaction.

Holmlund and Tornroos (1997) provided a model summarising a number of these business relationship characteristics, describing dimensions of relationships as Structural, Economic and Social. The structural dimensions of a business relationship are the resource links, connections with other organisations through the business relationships and the institutional bonds such as contractual agreements. The economic dimension deals with the financial investment made in the relationship and expected economic returns from the relationship. Both these dimensions are visible and tend to be quantifiable, thus easier to measure.

The third relationship dimension, the social dimension, deals with how people interact within the respective organisations and to one another. These relational concepts include concepts such as trust, commitment, attractions, atmosphere and social bonds. Though Holmlund and Tomroos (1997) have tried to delineate these three dimensions they concede that the delineation between them is artificial as the dimensions tend to interweave with communication being the “glue” that keeps the relationship together. These factors are qualitative and harder to measure.

The dimensions proposed by Holmlund and Tomroos (1997) have been used to build a taxonomy of business relationship characteristics illustrated in Table 3.1. An additional dimension of “organisational” has been added to encompass characteristics that relate to how the organisation interacts with other organisations. The characteristics described in the literature reviewed for this research have been placed in a tiered framework with sub-categories used to amalgamate similar characteristics.

The presence of these business relationship characteristics, their quality and or strength will assist in facilitating the success of the business relationship.

Table 3. 1 Summary of Business Relationships Facilitators (Rowe, et al., 2005)

Dimensions	Category	Authors
Structural/ Infrastructure	Information Technology Institutional Bonds (such as contracts) Infrastructure	Humphreys, et al. (2001); Sherer (2003); Vyas, et al. (1995); Kauser & Shaw (2003); Holmlund & Tornroos (1997); Lawton-Smith & Dickson (2003); Grieger (2004).
Economic/ Financial	Investment in the Relationship Value Creation Reduced Productions costs	Holmlund & Tornroos (1997); Ryssel, et al. (2004); Vyas, et al. (1995); Ritter, et al. (2002); Holmlund & Strandvik (1999); Humphreys, et al. (2001).
Organisational	Compatibility Flexibility Intellectual Capital Organisational Interactions Communication Organisational Interconnectedness Relationship Management	Vyas, et al. (1995); Lawton-Smith & Dickson (2003); Sherer (2003); Pearce (2001); Ritter, et al. (2002); Walter & Ritter (2003); Kauser & Shaw (2003); Humphreys, et al. (2001) Grieger (2004) Marshall (2004); Holmlund & Strandvik (1999).
Social	Commitment to the Relationship Trust Organisational Culture Individual Interaction	Holmlund & Tornroos (1997); Marshall (2004); Ritter, et al. (2002); Kauser & Shaw (2003); Walter & Ritter (2003); Holmlund & Strandvik (1999); Ryssel, et al. (2004); Sherer (2003); Lawton-Smith Dickson (2003); Ritter, et al. (2002); Humphreys, et al. (2001); Sherer (2003).

From the 60 plus characteristics reviewed in the literature 17 main categories have been identified. Of these trust, commitment and communication, and to a lesser extent value, stand out as the most significant facilitators to successful business relationships. Of the significant characteristics trust and commitment are difficult to quantify and measure, especially trust, as it is a concept that is located within the mind of the individual.

The framework describing business relationships according to structural, organisational, economic and social categories has yet to be validated by research.

This could be due to many of the categories and sub-categories that contain characteristics that are not easily identified by the systems within organisations that are set-up to measure the performance of business relationships. These less measurable characteristics may be an unseen factor in the success or failure of relationships.

3.3 Business Relationship Quality and Life Span

When talking about business relationships quality, Holmlund (1996) suggested that quality in business relationships emerges when performance of the relationship is compared against standards or criteria. Relationship performance can be measured by tangible criteria such as income and goods exchanged however, quality is based on “the person’s perceptions of the interactions and exchanges in the relationship” (Holmlund 1996, p.11).

In business relationships the relationship aspect of quality needs to be considered (Holmlund, 2001) as the views of individuals within a firm may differ due to their involvement at different points of the business relationships and therefore, each individual’s perception of quality will differ. An individual’s perception of relationship quality is based partly on their comparison with the standards set for that relationship and partly upon their experiences within the relationship and the outcomes from the relationship. In complex business relationships the content and nature of the exchanges between organisations can include “social contacts, products, product ideas, information and money”, all of which will differ depending upon the department that is managing the relationship (Holmlund 1996, p.10).

Business relationships have a life span and often organisations move in and out of relatively stable relationships over a period of time. However, what determines or defines the qualities of a highly successful compared to a moderately successful or even a failed business relationship still requires further investigation. Despite the benefits of business relationships the failure rate of business relationships is quite high with greater than 50% failing (Barringer & Harrison, 2000; Marshall, 2004).

When partners begin to sense mistrust in the relationship, their response to the situation is to breach their commitments and begin to put on “life jackets” and adopt a more formal and structured arrangement in order to safeguard their position. Business relationships depend upon players who encourage collaboration rather than being adversarial, and individuals within organisations can see themselves as being motivators of collaboration rather than just players instructed to be part of someone else’s game (Marshall, 2004). There can be a gap between the documented organisational aims and those of the individual enacting them within the business relationships however according to Pearce (2001) the role of individuals in business relationships has been left unexplored by research.

Ring & Van de Ven (1994) suggested four main reasons for the conclusion of a business relationship, including: excessive formalisation and scrutiny of the relationship; conflict between the organisational role and behaviour of individuals; violations of trust and failure to follow through on commitments.

Although business relationships involve the exchange of goods and services between organisations it is individual’s perceptions and action that determine the quality and sustainability of the relationship.

3.4 Collaborative Business Relationships

The term business relationship has been used to describe interaction between firms across the spectrum of interaction, however collaborative relationships are those where activity goes beyond just trading or exchange and a common goal or task is undertaken. These relationships can exist in an infinite range of forms and configurations with various levels of structure, connectedness and organisational integration, from cooperation to a coercive supply chain relationship to a strategic alliance and can have a mixture of coercive and competitive elements (Wilkinson & Young, 2002).

According to Veludo, et al. (2004) a number of authors consider that a clear definition is missing from the literature for partnering and collaboration. The framework put forward by Veludo, et al. (2004) for collaboration includes dimensions of trust, win-win benefits, long term orientation, co-ordination and problem solving flexibility. Under these dimensions sit characteristics of “inherent trust, sharing of risks and rewards, increased joint competitiveness, expectation of continuity, continuous improvement focus, supply and development, joint strategy setting, joint planning, joint R&D, two way communication, willingness to help one and other, conflict resolution, flexibility in delivery and flexibility in agreements” (Veludo, et al. 2004, p.145).

According to Humphries and Wilding (2001), there are a number of enhancing activities and processes for collaboration that they have identified from the supply chain literature, including: contractual framework; corporate culture matching; long-term cost and investment sharing; information sharing; all level management; frequent interactive communication; joint planning; cross firm control and coordination teams; joint service level systems; technology sharing and product development; joint problem solving; joint quality systems; linked information systems; joint performance measurement; joint logistics and purchasing roles and joint marketing. As the list illustrates there is a strong emphasis on joint activities and processes to help sustain the relationship (Humphries & Wilding, 2001).

Within all forms of business relationships there are both formal and informal commitments. Within co-operation there is a redefining of organisational boundaries due to the sharing of resources and responsibilities and co-ordinated activities. It is suggested that firms have a portfolio of relationships within their business networks with each relationship being appropriate to the specific set of circumstances. In the situation where there is a high level of interdependence between firms and prohibitive penalties for non compliance by either party then partnering is the preferred form of relationship. Veludo, et al. (2004) found that a firm’s wider networks both facilitates and inhibits their relationship within a buyer-seller dyad.

The activities-actors-resources model analyses businesses relationships according to the bonds between actors, activity links and resources ties between the firms in the

relationship. The actor bonds can be either between individuals or organisations and are based on their level of trust and understanding of each other. Activity links are based on actions that the firms in the business relationship take together and resource ties describe inputs and outputs that flow between the organisations (Veludo, et al., 2004). The authors see collaboration as part of partnering relationships but less formal in nature. Within any partnering situation co-operation and competition will be present (Veludo, et al., 2004).

Through the effective management of its collaborative relationships an organisation can synchronise both the business to business and business to customer relationships in order to gain greater competitive advantage (Holsapple & Singh, 2000). Collaboration occurs vertically along the supply chain or horizontally where competitive or complementary organisations collaborate to innovate, create economies of scale or access new markets (Anderson, et al., 1994).

This balance between collaboration and competition has been termed "Coopetition" by Bengtsson and Kock (2000) who suggest that firms can both collaborate and compete with each other depending on the circumstances. When firms have heterogeneous resources in the research and development stage then competitors collaborate to access unique resources but when the firms go to market they compete. This collaborating and competing with competitors is important for firms to utilize their resources (Bengtsson & Kock, 2000).

According to Lawton-Smith and Dickson (2003), collaborative relationships are a combination of social and spatial relationships in which new agreements are embodied through a set of power relations and norms of cooperation between the two entities. The make-up of any collaborative relationships is influenced by a series of factors unique to the context in which the collaboration is formed (Lawton-Smith & Dickson 2003).

3.4.1 Drivers of Collaborative Relationships

A number of theories have been put forward to explain the drivers for the formation of business relationships these include: Transaction Costs Economics; Resource Dependence; Strategic Choice; Stakeholder Theory; Organisational Learning Theory; and Institutional Theory. In their review of the respective theories in relation to the formation of business relationships Barringer and Harrison (2000) suggested that these six theories could be placed along a continuum as illustrated in Figure 3.2.

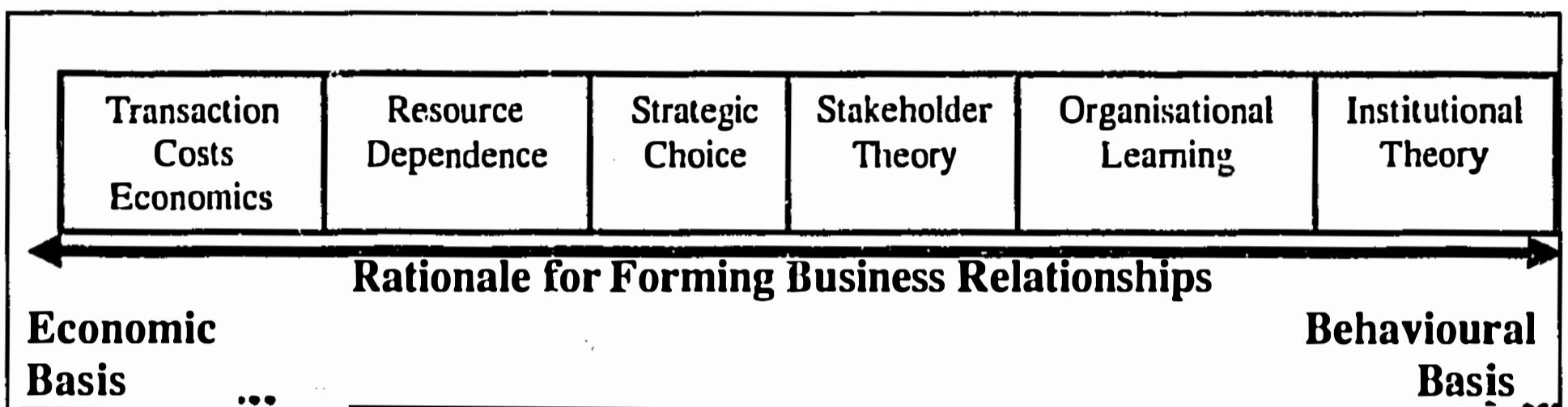


Figure 3. 2 Theoretical Foundations of Business Relationships

These theories attribute a range of drivers to the formation of business relationship which are outlined in Table 3.2 below.

Table 3. 2 Drivers of Business Relationships (Barringer & Harrison, 2000)

Theory	Driver
Transaction Costs Economics	Seeks to reduce the production and transaction cost through business relationships and reduced risks associated with possible market failure.
Resource Dependence	To meet the organisation's need for resources from external parties. Create competitive advantage through control of scarce resources.
Strategic Choice	Enter into business relationships to increase competitiveness or market position and so to profit and growth. Business relationships assist in creating superior products and reducing competition.
Stakeholder Theory	A firm is part of a network of stakeholders and seeks through business relationships to align itself with others to reduce environmental uncertainty.

Organisational Learning Theory	Forms business relationships to gain and absorb knowledge from others to increase organisational competency and value.
Institutional Theory	Business Relationships are formed to mimic other firms and gain legitimacy within a particular environment.

Barringer and Harrison (2000) suggested these theories are holistic in nature, describing business relationships from different points of view and as such a blend of these theoretical frameworks may be more useful in the understanding of the formation of business relationships.

There are many other reasons that business relationships are formed not described by the framework. Oliver (1990) suggests that business relationships can be formed based on a variety of factors which can vary at different stages of the relationship or can vary from relationship to relationship. The factors also vary, with necessity; the need to create stability and to gain legitimacy being driven by the external environment. The creation of asymmetry and reciprocity in relationships and efficiency in production are concerned with processes within the firm.

Table 3. 3 Business Relationships Formation (Oliver, 1990)

Factor	Impetus
Necessity	To meet legal or regulatory requirements
Asymmetry	To exercise power of control over an organisations or its resource
Reciprocity	Pursuing mutual benefit or goals
Efficiency	Improve internal input output ratio
Stability	Reduce environmental uncertainty
Legitimacy	To justify organisational activities and appear to hold to prevailing norms

The reasons for forming business relationships are varied and so too are the formats that the business relationships take once they have been established, such as arms length, or more closely aligned, such as collaborative.

For firms collaborative relationships and networks are an inescapable part of their environment and they define an organisation's actual existence. In search of competitive advantage organisations are driven to collaborate through business relationships to access new markets, resources and knowledge which in turn leads to innovation and organisational competitiveness (Ritter, et al., 2002). Globalisation has seen a shift away from a pure price focus to customer satisfaction, the improved quality of products and services and need for innovation to differentiate products. The combining of these forces has contributed to the rise of collaborative relationships (Pittaway & Morrissey 2004).

Apart from the pressures of global competition and constant innovation the drivers for firms to collaborate have been identified as: access to resources; complementary skills; to enable geographical coverage; creation of higher profits; a growth in trade volumes; a facility for selling over capacity; the capacity to develop new products and innovations; access to new markets; information on customers' future intentions and access to important third parties (Dodourova, 2003; Ryssel, et al. 2004; Veludo, et al., 2004).

The drivers listed above could be seen as benefits but the bottom line is that the collaboration has to improve business performance. Robson and Bennett (2000) found that competitive conditions are the stimuli for SME growth, not government support which is interesting as often government policy is focused on facilitating collaboration.

3.4.2 Benefits of Collaborative Relationships

The benefits for organisations being involved in collaborative business relationships are often the fulfilment of the drivers to enter these relationships. Benefits include: the creation of higher profits; a growth in trade volumes; a facility for selling over capacity; the capacity to develop new products and innovations; access to new markets; information on customers' future intentions and access to important third parties; the reduction of the cost of new product development; the reduction of lead times to market and the sharing of core competencies between firms; risk pooling;

achieving economies of scale and acquiring complementary resources and technologies (Bengtsson & Kock, 2000; Ryssel, et al., 2004; Briship 2003a). According to Ryssel, et al. (2004) these factors are important to successful collaborative relationships and help the parties involved to draw sustained competitive advantage from the relationship.

In a review of strategic outcomes of collaborative relationships, Jarrett (1998) identified that these relationships added new value to the organisation. The outcomes of these relationships included delivering a broader range of goods and/or services, increasing the quality of goods and/or services, accessing innovation and incorporating improvements in product offerings and facilitating new product development. Secondly, building current business capability in the areas of distribution, manufacturing, purchasing, finance, business knowledge, expertise and skills, new client groups, and accessing resources required for specific client groups. The final strategic outcome was defending market position through joint promotional activity, by building barriers against new entrants, accessing resources to compete against major claims, offsetting the impact of product substitutes and defence against environmental forces.

Barringer and Harrison (2000) point out that very little attention has been paid to the disadvantages of collaborative relationships and for organisations with limited resources a poor choice could be difficult to withstand. Therefore some consideration should be given to the formation of collaborative relationships.

Collaborative relationships along the supply chain were found to have a positive impact on business performance. Collaboration with customers and firms in the same line of business often had negative impacts (Robson & Bennett, 2000). Squire, et al. (2006) contend that the benefits of collaboration are not in the relationship itself but in the access it provides to new resources and enhancing existing capabilities otherwise unavailable to the firm. They found that collaboration between buyers and suppliers assisted with the firm's flexibility in product design and improvement. In relation to the proximity of the collaborators, Robson and Bennett (2000) found that collaboration in the context of international and national supply networks facilitated

growth in firm employee size and the volume of turnover. In contrast collaboration on a local basis leads to increasing profitability.

The measurement or evaluation of the benefits of collaborative relationships is less well defined and according Tuominen and Anttila (2006, p.216) the literature on the measurement of value creation from collaboration “remains in its infancy”. A study conducted by Coughlan, et al., (2003) looking at collaborative relationships found that measurements included quality evaluation, costing, forecasting and scheduling. Gajd (2004) suggested that an evaluation should be undertaken prior to the collaboration, setting quantitative and qualitative goals, strategies, and structures for the relationships, so providing an agreed baseline for ongoing evaluation among those collaborating. Continual evaluation throughout the life of a collaborative relationship is seen as vital to its success (Beach, et al., 2005).

Arroyo (2003) views collaboration in terms of cause and effect with the causes being positive expectations, factors that produce collaboration, factors that benefit collaboration and factors that harm collaboration. On the effects side are benefits, negative aspects and alternatives to avoid abuse. The factors detailed in this chapter relating to surrounding collaboration have been compiled in the following tables. Factors have been categorised under drivers and facilitators for collaboration, drawbacks and inhibitors and benefits of collaboration.

Table 3. 4 Drivers of Collaboration

Drivers	Factors	Authors
Economic	Obtaining and accessing resources Create competitive advantage through control of scarce resources. Increase competitiveness or market position and so to profit and grow. Access to new markets New opportunities Efficiency by improving input output ratio Reduce the production and transaction costs Creation of a superior products Reduced risks associated with possible market failure Reducing competition Enable greater geographical coverage Creation of higher profits Increase trade volumes Facility for selling over capacity	(Arroyo, 2003) (Oliver, 1990) (Barringer & Harrison, 2000) (Dodourova, 2003; Ryssel, et al. 2004; Veludo, et al., 2004). Rowe, et al., 2005)

Knowledge Skills	Need to access knowledge Need to access and develop new skills Increase organisational competency and value through knowledge Access complementary skills Capacity to develop new products and innovations Access information on customers' future intentions	(Arroyo, 2003) (Barringer & Harrison, 2000) (Dodourova, 2003; Ryssel, et al. 2004; Veludo, et al., 2004).
Relationship	Similar dependencies Reciprocity - Pursuing mutual benefit or goals To exercise power or control over an organisation or its resources To justify organisational activities and appear to hold to prevailing norms Access to important third parties	(Arroyo, 2003) (Oliver 1990) (Barringer & Harrison, 2000) (Dodourova, 2003; Ryssel, et al., 2004; Veludo, et al., 2004).
Environmental	Reduce environmental uncertainty To meet legal or regulatory requirements To align itself with others to reduce environmental uncertainty To gain legitimacy within a particular environment Environmental threats <ul style="list-style-type: none"> • Opening national markets • Deregulation • Globalisation • Privatisation • Non hierarchical structures • Race for the future • Organisational networks • Information age 	(Arroyo, 2003) (Oliver 1990) (Barringer & Harrison, 2000)
Other	Survival of the firm Crises within the firm Needs to be met	(Arroyo, 2003)

Through the process of reviewing the literature a subtle distinction between drivers of collaboration and facilitators was identified by the researcher. Drivers are usually reasons why firms would enter into collaboration, whereas facilitators tend to be factors that assist and sustain the collaboration. Drivers and facilitators could be considered interchangeable however the researcher has chosen to present them separately with the facilitators of collaboration in Table 3.5 below.

Table 3.5 Facilitators of Collaboration

Facilitators	Factors	Authors
Structural/ Infrastructure	Information Technology Institutional Bonds Infrastructure	(Rowe, et al., 2005)
Economic/ Financial	Investment in the relationship Accepting initial costs for future benefit Perception of benefit Creation of ongoing value Reduce ambiguity	(Arroyo, 2003) (Rowe, et al., 2005)

Organisational	Compatibility Flexibility Intellectual capital Organisational interactions Communication Organisational interconnectedness Relationship management Mechanism of coordination –formal and informal Standard Values Top management support Shared goals Collaborative environment Putting collaborative interest first Participant’s contribution to the solution Initiating and maintaining the collaborative relationship Competence Commitment Develop a common frame of reference	(Arroyo, 2003) (Rowe, et al., 2005)
Social	Positive expectations Share with others Commitment to the relationship Trust Organisational culture Individual interaction	(Arroyo, 2003) (Rowe, et al., 2005)

It could be argued that the inhibitors of collaboration are the lack or absence of the drivers and facilitators. Arroyo (2003) has provided an extensive list of drawbacks and inhibitors. Again the researcher considers that there is a subtle difference between drawbacks which are the negatives and risks of being in collaborative relationships, whereas the inhibitors are the factors that stop firms from entering into a collaborative relationship. The drawbacks and inhibitors to collaboration identified by Arroyo are listed in Table 3.6 below.

Table 3. 6 Drawbacks and Inhibitors of Collaboration

Drawbacks	Inhibitors
<ul style="list-style-type: none"> ▼ Fraud ▼ Corruption ▼ Chaos ▼ Conformity ▼ Group think ▼ Exclusion of non collaborators ▼ Insufficient coordination ▼ Increase dependency ▼ Malfeasance ▼ Collusion 	<ul style="list-style-type: none"> ▼ Uncertainty ▼ Individualism ▼ Risk ▼ Ambiguity ▼ Bad reputation ▼ Incompetence ▼ Lack of information ▼ Lack of fairness ▼ Conflict ▼ Lack of previous interaction ▼ Lack of knowledge ▼ Restrictions <ul style="list-style-type: none"> • Time • Inertia • Prejudice • Complexity ▼ Competitive environment
<p>Reduction of Harm Activities by the Other Party</p> <ul style="list-style-type: none"> ▼ Surveillance ▼ Reduced delegation ▼ Reduced commitment ▼ Reduce participation ▼ Reduce dependency <ul style="list-style-type: none"> • Increase self competences • Change partners ▼ Look for other alternatives sources of <ul style="list-style-type: none"> • Knowledge • Skills • Resources • Services ▼ Only work with well reputed parties ▼ Develop strong personal relationships ▼ Use formal agreements ▼ Stop collaborating ▼ Spread risk 	

Finally, the benefits of collaboration identified from the literature are listed below in Table 3.7. The benefits could be seen as the realisation of many of the drivers and facilitators of collaboration.

Table 3. 7 Benefits of Collaboration

Benefits	Factors	Authors
Economic	Save money Reduce costs Use complementary resources Less investment Access to resources Access to services New opportunities Creation of higher profits Growth in trade volumes Facility for selling over capacity Access to new markets Access to important third parties The reduction of the cost of new product development The reduction of lead times to market The sharing of core competencies between firms Achieving economies of scale Reduce and pool risk Acquiring complementary resources and technologies	(Arroyo 2003) (Bengtsson & Kock, 2000; Ryssel, et al., 2004; Briship 2003a).
Knowledge Skills	New skills New knowledge The capacity to develop new products and innovations Information on customers' future intentions	(Arroyo 2003) (Bengtsson & Kock, 2000; Ryssel, et al., 2004; Briship 2003a).
Relationship	Relationship network Satisfaction of a common interest	(Arroyo 2003)
Other Benefits	Increase the quality of results Increase effectiveness Increase efficiency Satisfactory results but not optimal Reward self-interest New solutions to problems Increased reputation	(Arroyo 2003)

3.5 Factors Impacting on Collaboration

The next section will discuss factors that impact on collaboration that relate to the research population that includes issues around firm size, power asymmetry, trust and the use of ICT within collaborative relationships.

3.5.1 Firm Size and Collaboration

SMEs can no longer choose to compete only in a protected domestic market as these are evaporating speedily with the increase of free trade and collaboration with larger firms can provide some form of protection for SMEs (Etemad, et al., 2001).

Globalisation has impacted on larger firms who have increased their level of outsourcing and value chain integration. This has led to greater opportunities for SMEs (Etemad, et al., 2001). The development of collaborative relationships could be the single most significant way for SMEs to maintain a competitive advantage in niche markets with short product life cycles, constant innovation and global competition (Suarez-Villa, 1998; Wincent, 2005).

Both SMEs and large firms are under pressure from globalisation to optimise production, which can lead to a trade off between independence and greater interdependency between large firms and SMEs (Etemad, et al., 2001; Blomqvist, et al., 2005).

In a 1999 study of hi tech firms, Blomqvist found that the motivation for small firms to engage in collaborative relationships differs from those of the larger firms as illustrated in Table 3.7 below. For large firms collaboration was an opportunity but for SMEs it was often a necessity.

Table 3. 8 Collaboration Comparison by Firm Size (Blomqvist 1999, p.26)

SMEs	Large Firms
Competition Competitive R & D Credibility and legitimatization Market-based competitiveness, marketing channels Risk reduction Technology and standard-based competition Time-based competitiveness Access to finances and higher profitability	Competition Competitive R & D Cost-savings and higher profitability Credibility and legitimatization Human-resource-based competitiveness Market-based competition Technology-based competitiveness Time-based competitiveness

While large firms have a number of concurrent partnerships SMEs do not have the resources to seek out and support multiple collaborative relationships (Blomqvist 1999).

A number of authors have noted that the drivers and benefits of collaboration differ between the SME and the large firm (Wilson & Gorb, 1983; Blomqvist, 1999;

Etemad, et al., 2001 ; Lawton-Smith & Dickson 2003) as does the power balance between collaborators, (Lawton-Smith & Dickson 2003, Hancké, 1998) with the SME having a level of dependence on the larger firm (Etemad, et al., 2001 Wilson & Gorb, 1983). Larger firms due to their size and resources tend to act as hubs maintaining a network of relationships with SMEs and often binding these groups or networks of SMEs together (Wincent, 2005).

3.5.2 Collaboration and Power

Conceptually, power within business relationships can be viewed from an economic perspective of exchange or a social perspective dealing with shared values and trust. In practice these concepts occur simultaneously with one form, either economic or social, tending to dominate in a given relationship (Pittaway & Morrissey, 2006). The power relationship between any two organisations involved in collaboration requires long-term adjustment of organisational behaviour, including the allocation of financial and personal resources that are required to sustain the collaboration, whilst protecting the firm's interests (Lawton-Smith & Dickson 2003).

The literature concerning business relationships and collaboration has been predominately focused on large firms. The literature on power and smaller firms in collaborative relationships is not extensive (Pittaway & Morrissey, 2005). Where organisations in a collaborative relationship are of a similar size, the risks tend to be equal, however there are a number of issues for smaller firms who are collaborating with larger firms and these include fear of take-over, difficulty in maintaining control, intellectual property and difficulties in finding suitable partners from whom they are not at risk (Lawton-Smith & Dickson, 2003). Also an SME's reputation and its future can become inextricably linked to that of the larger firm and the success of the relationship then depends on the larger firm's willingness for both parties to benefit from the relationship (Blomqvista, et al., 2005).

Collaboration often brings a lack of autonomy which is at odds with the philosophy of owner/managers in smaller firms that have sought autonomy through starting their own firms (Pittaway & Morrissey, 2004). The power of competitor firms can also

impact SMEs when large buyers choose to switch to another supplier. The party with the most power can then influence the adoption of new business practices, such as purchasing software. If a smaller firm does not have any way of differentiating itself in the marketplace through a unique product or capability then it will lack power within collaborative relationships. The size asymmetry in a relationship determines the level of collaboration with the larger firm dictating the level of collaboration or relationship (Pittaway & Morrissey, 2005).

The power balance is not only linked to the size of the firm but also to whether it is a vertical or horizontal relationship. Vertical relationships tend to have power asymmetries whereas in horizontal relationships there is equal power between collaborators despite size differences (Laine, 2002).

Collaborative relationships also have adversarial characteristics where power is used or abused to gain leverage over the other party and SMEs can tend to be cynical about the idea of collaboration with larger firms due to the power differential and often take more of an adversarial position to protect themselves (Pittaway & Morrissey, 2004). Although significant in collaborative relationships between SMEs and larger organisations, communication by itself was insufficient to overcome the problems associated with the lack of control faced by smaller firms when dealing with larger firms. Lawton-Smith and Dickson, (2003) discovered that most of the smaller firms in their study were the driving force behind building the relationships with larger firms. Where there is an imbalance of size and cultural disparity between collaborating organisations there needs to be the establishment of a common cultural base of participation through shared conventions.

The two forces that hold collaborative relationships together are contracts and trust with the success factors for collaboration most commonly cited as “agreement on goals, equality, mutual trust and ground rules” (Blomqvist, et al., 2005, p.498). Contracting allows for the securing of intellectual property, sets out the arrangement for an economic exchange and lays the ground rules between the two parties. It is pointed out by Blomqvist, et al. (2005) that the culture varies according to the size of the firm and this can impact on the contract process where large firms tend to be

bureaucratic and SMEs informal and have few resources at their disposal to ensure the contract is mutually beneficial.

A contract cannot cover all aspects of a collaborative relationship or all eventualities and it is in these gaps that trust functions (Blomqvist, et al., 2005). Trust and risk, economic and social (reputation) sit side by side in collaboration with trust reducing the need for formalisation and rigidity and this reduces the transaction costs (Blomqvist, et al., 2005). If one firm had no trust in the other it would be unlikely that they would enter into a collaborative relationship. The two seem to be an iterative process over time as trust is built within the context of long term contractual collaborative relationships (Blomqvist, et al., 2005).

The implementation of formal agreements is not sufficient to overcome the dangers of relying on trust to safeguard the interests, particularly of small firms. Although trust is central to collaborative relationships, Lawton-Smith and Dickson (2003) suggested for SMEs, due to imbalances in power in knowledge sharing and operating frameworks, it is generally advisable for them not to trust the larger collaborating organisation. Before entering into a collaborative partnership an organisation needs to know what the other firm's priorities, technical competencies and potential weaknesses are in order to assess if it is an appropriate alliance (Lawton-Smith & Dickson, 2003).

On the other side of the spectrum from power is trust (Pittaway & Morrissey, 2005) which has been more extensively explored in the literature in relation to business relationships and collaboration. There is a complex interplay between power and trust especially where SMEs are concerned due to the power disadvantage and SMEs' heavy reliance on social factors in collaborative relationships (Pittaway & Morrissey, 2006). The rise of mutual trust in collaborative relationships has been seen as a linear progression however according to Hancke (1998) it has been a cyclical process where control has stayed with the large firms despite changing technology. Although cooperative in nature there is still a hierarchy due to the power and control differential (Hancke, 1998).

3.5.3 Trust and Collaboration

The concept of trust is highly contextualised and multi dimensional and as yet there has been no definitive measure of inter-organisational trust (Bijlsma & Koopman, 2003; Seppänen, et al., 2005). Trust is linked to cooperation, with the higher the level of trust the more explicit the expectation of cooperation (Bijlsma & Koopman, 2003). Trust has been identified as being one of the most critical factors to collaborative relationships as it facilitates communication, information sharing and conflict management and without a certain level of trust these relationships fail to operate (Seppänen, et al., 2005). The level of trust between firms is linked to increased predictability of actions, adaptability between partners and strategic flexibility while reducing transaction and governance cost leading to improved business performance and competitive advantage (Seppänen, et al., 2005, Sharif, et al., 2005).

The creation and sustaining of trust in collaborative relationships has become more important for the accessing of resources, therefore firms must be able to build, signal and assess trust and well assess the trustworthiness of the information they receive from other parties (Blomqvist, 1999).

Medlin and Quester (2002) describe trust as having multiple levels as it exists between individuals and organisations, being based on past action and future expectations. The level of trust can be measured using various dimensions including ability, benevolence, competence trust, confidence, contract trust, credibility, dependability, expectation, fairness, frankness, goodwill trust, habitualization, honesty, institutionalization, integrity, likeability, judgment, openness, predictability, reciprocity, reliability, responsibility, risk and togetherness (Svensson, 2001; Medlin & Quester, 2002; Seppänen, et al., 2005)

According to Medlin & Quester (2002) the most significant facets of trust are benevolence, the likelihood that firms will assist each other and honesty in their dealing with the partner firm and with others. A firm's level of trust in another firm is strongly linked to past experience and a basis for future action (Medlin & Quester, 2002; Bijlsma & Koopman, 2003). The concepts of trust and risk are closely linked

and Bijlsma and Koopman (2003) suggest that trust is a solution for the problem of risk as when there is trust it allows for a level of risk taking.

It is not just trust between two collaborative companies that impacts business performance but also between other firms within the industry or network within which a firm operates (Medlin, et al., 2005; Svensson, 2001). While there can be trust between two parties there can be distrust of an external firm with which one of the partners has a collaborative relationship so affecting the level of trust between the two partners. This interdependence between collaborations and the network or supply chain in which they operate has often been overlooked by the literature (Medlin, et al., 2005; Svensson, 2001).

The trust in the context of SME collaborative relationships has not received the same attention as for larger firms (Sharif, et al., 2005). Trust is significant for SMEs as the development of trust is a means of attracting larger potential partners and improving their profile in the market place. In asymmetric collaboration with a larger firm the development of trust reduces the SME's vulnerability to actions of the larger firm (Sharif, et al., 2005). Sharif, et al. (2005) found credibility and benevolence to be the two central constructs of trust, with reputation followed by flexibility as having the greatest impact on the formation of trust.

Though SMEs face many disadvantages, Blomqvist (1999) identified a number of advantages they have over their larger counterparts including flexibility, ease of decision making, focused activity, innovativeness, ease of information flow and strong identification with the firm by the employees. For SMEs, trust is a significant aspect of collaboration more so than in larger companies that tend to rely on contractual agreements (Pittaway & Morrissey 2006).

3.5.4 Conflict and Collaboration

Another facet to collaborative relationships is conflict which is the result of incompatible activities by one or both of the firms in the relationships (Vaaland & Hakansson, 2003). Previous literature assumes that there is a causative effect

between power and conflict, the more coercive power that is exerted the more likely conflict will surface between the collaborators (Vaaland & Hakansson, 2003). However, Laine (2002, p. 9) contends that there are two views “conflicts are a result of power, while the other stream suggests that acts of power follow a conflict”.

Conflict can rise out of formal mechanisms such as predetermined outcomes, procedures, deadlines and contracts whereas informal sources are lack of trust, flexibility and the ability to handle the unplanned events. Though often considered to be dysfunctional within business relationships Vaaland and Hakansson (2003, p. 137) found that a “high degree of conflict and a high degree of collaboration are enhancing the value of the relationship in terms of innovations and mutual prosperity”.

Beckett, Hyland and Sloan (2003) suggest other factors that affect the success of collaborative relationships for SMEs are a lack of time and sustained effort on the part of the SME. Their willingness to stay in a relationship also depends on the level of complementarity and similarity and the benefits received.

3.6 ICT Use in Business Relationships

Since the 1970s ICT has changed the face of how business is conducted and a substantive body of research has been undertaken (Chatterjee & Ravichandran, 2004). ICT has been a major driver of organisational change and has in turn impacted on relationships between organisations (Markus & Robey 1988; Grover, 1993, Leek, et al., 2003).

The entry of ICT into business relationships has led to increased direct access to information and organisations and created new forms of business relationships (Leek, et al., 2001). Through ICT business relationships can be established and supported with information being accessed instantly through a wide variety of channels.

The continuous and instant exchange of information has impacted the nature of relationships and now there can be a blurring of organisational boundaries where organisations are autonomous yet co-operate with collaborative activity which spans across organisations and continents. The flow of information means organisations must create a balance between sharing knowledge and protecting their privacy and sensitive organisational information (Thuraisingham, et al., 2002).

Although ICT has increased the exchange of technical or commercial data a large amount of “soft” data such as product usage, conditions of agreement, general organisational information is still exchanged through personal communications channels. According to Leek, et al. (2003) the social role of interpersonal contact between organisations is important for the development of long term collaborative relationships. However, the digitization of these interpersonal contacts can lead to a more distant relationship compared to face-to-face contact.

3.6.1 The Adoption and Use of ICT by SMEs

ICT plays a central role in business relationships with the application of ICT moving from automation within a firm to inter-firm collaboration (Lee, et al., 2003). While the uptake of the Internet and related ICT has increased among SMEs they still lag behind the larger firms with SMEs still using ICT to upgrade and enhance their internal business process (Lee, et al., 2003).

ICT gives SMEs the potential to gain low cost access to the global markets which were traditionally the domain of multinationals (OECD, 2001). The rise of e-commerce (the use of ICT to transact with other companies) which allows businesses to trade across geographic boundaries has increased the need for SMEs to understand and access national and international markets in order to maintain their competitive position (Martin & Matlay, 2001). “E-commerce has the capacity to transform not only internal practices but also the methods SMEs used to interact with their trading partners, associates, and customers” (Chau 2004, p50).

For SMEs e-commerce provides them with an opportunity to compete on line with large organisations and has the potential to develop new organisational infrastructure, business relationships and value chains. Benefits of e-commerce include cost savings in communications and marketing, greater business exposure, access to new customers and trading partners (Chau, 2004).

E-commerce has been touted as the must have item for participation in the knowledge economy (Lawson et al., 2003) and as a panacea to all that ails organizations. The benefits of e-commerce to organisations include expanded marketplaces, potential cost reductions, productivity improvements, customization of products and services, 24 hour trading and information exchange and management (du Plessis & Boon, 2004; McIvor & Humphreys, 2004; Raisinghani et al., 2005).

In Australia in 2005, 27% of all business had a web presence, 33% of business placed orders on the web and only 12% received orders on the web. While the percentage of the businesses conducting transactions through the web has increased by 48% the income generated has increased by 266% (ABS, 2006).

Table 3. 9 Percentage of Business using ICT 2004-2005 (ABS, 2006)

No. Employees	Computer Use	Internet Use	Web Presence	Place Orders via the Net	Receive Orders by the Web
0-4	85	71	17	28	10
5-19	95	86	41	40	15
20-99	97	92	59	47	21
100 or More	100	99	91	74	25

The value derived from e-commerce is inversely proportional to organization size (Zhu et al., 2004), thus suggesting that smaller organizations can benefit more from e-commerce than larger organizations. This is the part of the paradox that, of those who could benefit most from e-commerce, SMEs are the slowest adopters.

According to the OECD (2004) the general business framework and ICT policies in a region have an important role in enhancing the conditions for small businesses to adopt and exploit e-commerce and internet strategies.

3.6.2 Barriers to Adoption of E-commerce by SMEs

Barriers to adoption of e-commerce can be both organisational and technological as it requires the coordination of functions, and issues such as a lack of awareness, skill shortages and the high cost of entry appear to be key factors in this lag in adoption by SMEs (OECD, 2001; Lee, et al., 2003).

Chau (2004) identifies six factors in the successful adoption of e-commerce by SMEs. These include the role of management, strategic direction, resources available, technical complexity of the system, IT knowledge and education and external factors. Martin and Matlay (2001) also consider that the human capital within organisations is vital in enabling them to recognise and exploit opportunities provided by e-commerce. The adoption of e-commerce by other companies is increasing both the awareness and pressure on SMEs to develop e-commerce capabilities (OECD, 2001).

Inhibitors include a lack of financial resources, lack of support from management, lack of technological skill and experience and concerns over privacy and security. Drivers for e-commerce can be both internal and external to the organisation (Chau, 2004). A number of issues relating to the adoption of e-commerce issues have been identified. They include a lack of technical expertise and experience, management support of e-commerce opportunities, telecommunications infrastructure, customer demand for online services, the size of the organization, applicability to the organization's business model, insufficient return on investment, and concerns with the security of online transactions (Lawson, et al., 2003; Zhu et al, 2003; Wu, et al., 2003; OECD, 2004). If e-commerce offers so much then the low participation in e-commerce by SMEs in Australia is of concern due to their dominance in the Australian economy.

Lawson, et al., (2003) suggest that the barriers to adoption of e-commerce by SMEs can be categorised from a technical or social perspective; the technical barriers include the provision of telecommunication infrastructure and security of

transactions. Social barriers include a lack of trust of technology, insufficient knowledge about doing business online and a lack of IT skill within the organisation. Other barriers include a lack of awareness about the possible uses of the Internet and the sense of a lack of personal contact between the organisation and the customer. The customer not being ready to do business online is also a significant barrier.

Despite these issues there are many drivers and benefits for SMEs in adoption of e-commerce and it has been shown that recognition and anticipation of achievable benefits motivates SMEs to adopt e-commerce (Chau, 2004; Jopko, et al., 200; OECD, 2001).

The OECD (2004) suggests the up take of ICT by SMEs would be assisted by:

- Shifting policies from a narrow focus of e-readiness, connectivity and awareness to a wider view of e-business integration of internal and external processes and mature e-business strategies which blend broad policies for the business environment with policies for particular areas.
- Focusing on facilitating SME participation in B2B product and sector value chains, including technology neutrality and interoperability among different systems. Encourage business and sector associations to provide tools to assess e-commerce/e-business opportunities, benefits and costs, and the development of niche products and services.
- Reducing discriminatory access to finance, and improve information regarding financing opportunities.
- Implementing training programmes for SME managers and employees focusing on both technical and managerial skills need to be provided in cooperation with business and sector organisations, training institution and commercial training services.
- Continuing to ensure open, competitive telecommunication markets that offer a range of interoperable technological options and network services (particularly broadband) of appropriate quality and price.
- Addressing security, trust and confidence through broad policy frameworks, regulatory and self-regulatory tools, trustworthy technologies and affordable redress mechanisms.

- Monitoring anti-competitive behaviour as e-business becomes more widespread, electronic marketplaces evolve and potential market power increases.
- Using e-government initiatives to provide incentives for SMEs to go on line by simplifying administrative procedures, reducing costs and allowing them to enter new markets (e.g. e-procurement).
- Continuing to address human resource issues as a priority. Training programmes for SME managers and employees are increasingly focused on both technical (ICT) and managerial (“e-business”) skills designed to improve abilities to benefit from e-business strategies.

Although many solutions to adoption have been suggested there is no “one-size-fits all” approach to policy and the policy mix used will depend on both regional and national circumstances.

3.7 Role of ICT in Collaboration

The use of internet technology to communicate, to trade, to collaborate, to partner and to integrate are all forms of electronic collaboration or collaborative commerce. Web enabled services such as web portals and auction sites have become the enablers of e-business and e-commerce. Businesses are now becoming embedded within “networks of collaborative relationships that influence the flow of resources among the stakeholders” (Ratnasingam 2004, p 382). The promise of the Internet for the transaction of business has increased the engagement in collaborative commerce (Ratnasingam, 2004).

3.7.1 Drivers and Barriers for Use of ICT in Collaborative Relationships

In their early research Barrett and Konsynski (1982) identified the incentives for organisations to be involved in ICT that spanned organisations, inter organisational systems (IOS), as cost reductions, productivity improvements and product market strategies. As the level of participation in the IOS increased so too the level of

commitment, resources consumed and the complexity of the operating environment has increased (Barrett & Konsynski, 1982). Since their work numerous models for IOS adoption have been developed and according to Chatterjee and Ravichandran (2004) the rationale for the adoption of an IOS can be placed along a spectrum from a purely economic approach focused on competitive position, efficiency and cost effectiveness to the prevailing inter-organisational relationships where factors such as the size and power of an organisation can determine its likelihood of adopting an IOS.

The perceptions of the benefits of IOS can vary between organisations within the same collaborative relationships. There can be a “relationship satisfaction gap” between the two organisations caused by differing levels of expectation, trust, dependence, commitment and power between the organisations. To one organisation the adoption of an IOS can be seen as advantageous and to another a necessary evil (Vlosky, et al., 1997). Factors such as the historical length of the relationship, the economic importance to the organisation and degree of inter organisational social and structural bonds tend to reduce the “gap” (Vlosky, et al., 1997).

Ratnasingam (2004) suggests the following when setting up a collaborative relationship around web enabled systems: the agreement on a common goal among the collaborative firms; finding or creating value and ongoing return for all partners in the project; integration of the organisation’s internal systems and implement security systems to protect information exchanged between the organisations.

3.7.2 ICT and Collaboration and Trust and Power

Previously, trust has been described in the context of collaborative relationships however, Ratnasingam (2004) identifies trust specifically in relation to the use of technology between firms. Ratnasingam, (2004, p. 383) defines technology trust as “the subjective probability by which organizations believe that the underlying technology infrastructure is capable of facilitating transactions according to their confident expectations”. Ryssel, et al. (2004) found that the introduction of ICT into a relationship alone does not create value. However, trust and commitment did have

a significant impact on value creation and the authors concluded that value creation was a function of the relationships in the collaboration and not of the ICT deployed. Trust and commitment were often cited as a precursor to the adoption of ICT. It must also be taken into consideration that use of ICT can also impersonalise collaborative relationships which can have a negative impact on the level of trust (Ryssel, et al., 2004).

Security is a major issue with any inter organisational system and without sufficient security there will not be the exchange of detailed information which assists in the development of trust between organisations (Ratnasingam, 2004). Ratnasingam (2004) identifies 11 facilitating conditions for technology trust: ability; integrity; availability; accessibility; efficiency; flexibility; standardisation; compatibility; performance; reliability and security.

Perry, et al. (2002), in their study of trust in e-commerce, identified social bonds for trust – equity, trustworthiness, conflict, benevolence and commitment, but also technical bonds for trust being competence and investment. Competence is the expected level of performance of business transactions and this level of competency is the determinant of amount of investment in ICT by the collaborating firm.

The introduction of inter organisational systems such as electronic data interchanges (EDI) has caused a shift in business transactions from labour focused to a capital focus. The adoption of such systems is not triggered by a desire to upgrade but is often the result of external pressure by a larger partner. The adoption of an EDI is often a means for further strengthening the bonds between firms (Morris, et al., 2003).

3.7.3 Knowledge Management and ICT

Knowledge management was once the domain of organisations that traded in knowledge based products. It is now embedded in part of every organisation's business operations and the competitiveness of a firm is linked to the management of intellectual resources (Grover & Davenport, 2001). Holsapple and Singh (2000,

p.160) define knowledge management as “making the right knowledge available to the right process (human or computer) at the right times in the right presentations for the right cost”.

Knowledge can be described as tacit which is of a personal nature held within someone’s mind or explicit which can be explained or codified for transmission to others in the organisation (Sanchez, 2004). The use of ICT has enabled explicit knowledge to be shared within and across organisations, however the more easily knowledge is shared the harder it is to protect. Tacit knowledge is harder to share but easier to protect (Sanchez, 2004). Individuals within a firm may see knowledge sharing between firms as a threat to their position within the organisation and respond by attempting to sabotage the collaboration, so to counter this there needs to be strong managerial leadership (Thuraisingham, et al., 2002).

Knowledge was first stored electronically in the 1950s on main frame computers which were located within large organisations. These centralised systems provided access to data processing which assisted with the deployment of resources. With the advent of the PC in the 1980s information was decentralised across individual computers which gave greater flexibility but far less control (Grover & Davenport, 2001). With the introduction of the Internet and the World Wide Web in the 1990s organisations gained access to vast quantities of data in real time. The question then became how to use this most effectively for competitive advantage (Grover & Davenport, 2001).

Grover and Davenport (2001) differentiate between data, information and knowledge. The first two are generally stored electronically whereas knowledge is usually a higher order concept stored in peoples’ minds (Badii & Sharif, 2003) The term knowledge management encompasses all three forms however it is the emergence of technology that has driven the development of knowledge management (Grover & Davenport, 2001).

Holsapple and Singh (2000) consider that there are four basic activities that organisations undertake in relation to acquiring knowledge from the external environment, selecting knowledge from within the organisation, internalising or

integrating it within the organisation and using it to generate new knowledge and or applying it to improve existing functions leading to innovation. This knowledge management contributes to a firm's value chain and to the decision making process and ultimately its competitive advantage.

The interconnected nature of ICT and knowledge management is highlighted by Thuraisingham, et al. (2002) who suggest that three areas have emerged in relation to ICT, these being collaborative computing, knowledge management and e-commerce and state that "collaboration is key to knowledge management and good knowledge management practices are essential for successful e-business" (Thuraisingham, et al., 2002, p. 43). The merging of these three through the web means firms, although autonomous, are collaborating with each other and blurring organisational boundaries which Thuraisingham, et al. (2002) term collaborative commerce (c-commerce). In c-commerce participants share information using ICT but at the same time protect their sensitive information within their organisations.

Knowledge management as sharing across organisations enables collaborative commerce, knowledge sharing is the basis of collaboration as it moves firms past simple trading relationships (Holsapple & Singh, 2000; Thuraisingham, et al., 2002).

Thuraisingham, et al. (2002) state that knowledge is like a resource which is shared across organisations in a collaborative situation however it is also a source of individual or organisational advantage and power which creates resistance to collaboration. For SMEs, knowledge is a significant asset both to be traded and to be gained from others (Echeverri-Carroll, et al., 1998). In their 1998 study Echeverri-Carroll, et al. found that SMEs benefit from relationships with larger firms by gaining access to a larger pool of information, in turn the larger organisation depends on the specialist knowledge of the SME. The study found little evidence of control by the larger firms over the SMEs.

SMEs are knowledge generators and players in innovation both within the firm and in collaboration with others yet due to their lack of formalised systems and focus on day to day survival often fail to make the most of the knowledge created (Kitching & Blackburn 1999; Levy, et al., 2003). According to Kitching and Blackburn (1999)

SMEs realised the significance of new knowledge and intellectual property to their business survival yet this did not directly affect their management practices.

The effective management of inter organisation knowledge is important for sustained competitive advantage and as such SMEs can end up the losers (Levy, et al., 2003). ICT is used to store and exchange explicit knowledge, however SMEs tend to be poor adaptors of ICT which hampers their knowledge management (Levy, et al., 2003).

3.7.4 Firm Size and Collaborative Factors

Through the review of the literature in relation to firm size a number of contrasts appear between experiences of small and large firms as seen below in Table 3.10.

Table 3. 10 Comparison between Large and Small Firms

Firm Size	Small	Large
ICT Adoption	Low	High
Power	Low	High
Type of Knowledge	Expert	General
Knowledge Management	Tacit	Explicit
Innovation (radical)	High	Low
Organisational Resources	Low	High
Flexibility	High	Low
Trust	High	Low

3.8 Theoretical Framework

Figure 3.3 below has been used to summarise the theoretical framework for the study. The blue arrows denote the macro scale of regional economic development, the strategies of which all have a common theme of collaboration between firms and institutions. This collaboration facilitates the sharing of knowledge and resources, which in turn leads to the innovation which drives competitive advantage and firm growth. Firm growth has a flow on effect feeding into regional economic growth.

The perceived drivers and benefits of collaboration can influence a firm's decision to enter a collaborative relationship. Other factors that may play a role in collaboration include firm size, power asymmetry, the level of trust, ICT adoption and knowledge sharing. The industry in which the firms participate may also impact the collaboration along with environmental factors such as regional economic development policy.

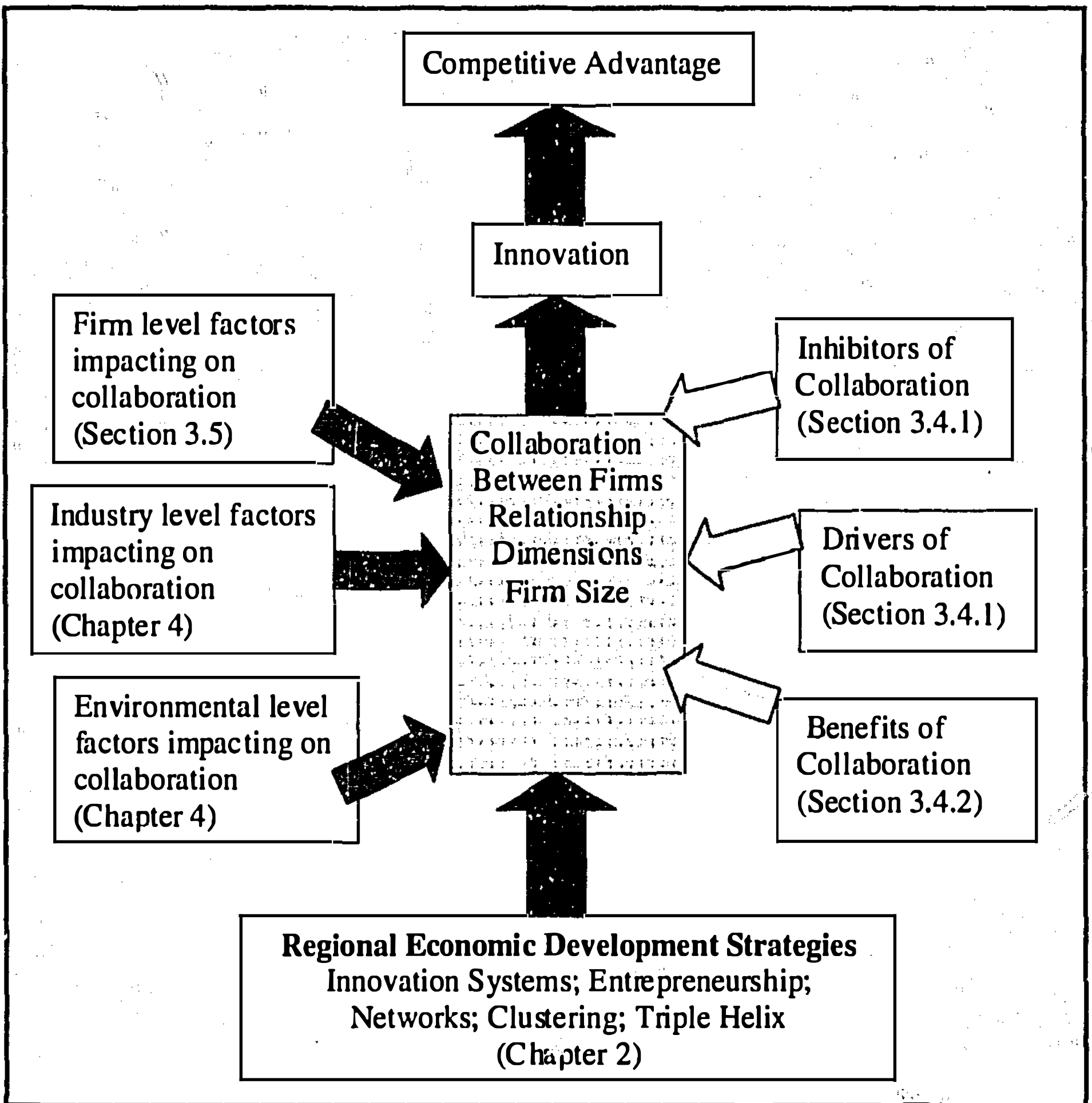


Figure 3. 3 Theoretical Framework

In the original ARC grant application it was assumed that collaboration around ICT was a progression in the level of ICT adoption as illustrated in Figure 3.4 below, however the focus has been on the technology and not the relationship in the information systems literature and on the relationship and not the technology in the marketing literature. According to Barringer and Harrison (2000) there has been

little research in the area of collaborative relationships management in general. Most of the literature focuses on buyer-seller relationships but not specifically on the size differential. Factors such as the industry in which the firms operate and the economic environment in which it is located have also had little consideration.

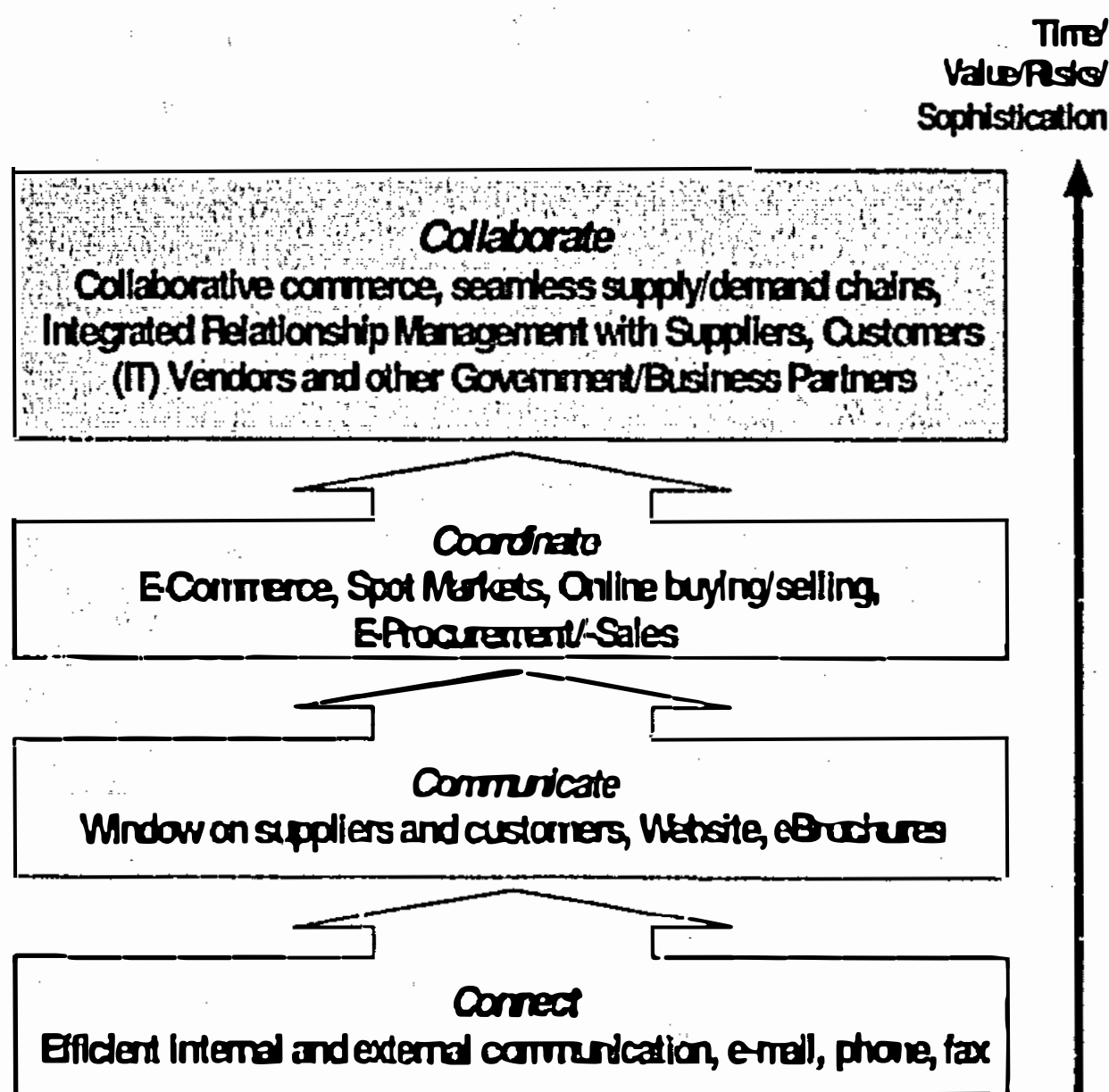


Figure 3. 4 Electronic Business Evolution Towards Collaborative Commerce

The research questions proposed in Chapter 1 have been designed to address the gaps in the literature and to provide the Industry Partners with the research on case specific data on collaborative business relationships relating to the context of the industry and region being studied.

Research Questions

1. What are the drivers and inhibitors for organisations to enter collaborative relationships?
2. What are the factors that impact on the creation and sustaining of collaborative relationships?
3. How does ICT facilitate and sustain collaborative relationships?
4. What are the benefits and drawbacks of collaborative relationships?
5. Models of best adoption of collaborative relationships?

3.9 Chapter Summary

This chapter has discussed collaborative business relationships and firm level factors that may impact on collaboration. The industry background to the study will be detailed in Chapter 4 which completes the study context and literature review. In Chapter 5 the research methodology that has been designed to address the research questions and in Chapter 6 the process for piloting the research will be detailed. This will be followed by the results of research undertaken in Chapter 7 and the summary and conclusions of the research in Chapter 8.

Chapter 4: The Industry Context

4 Introduction

The previous two chapters outlined the broad context of the study by discussing regional economic development strategies and the issues around collaborative business relationships and the use of ICT. The first half of this chapter will focus on the trends in the global and domestic defence industries in relation to the study. The dominant industry in the Henderson/Rockingham cluster in terms of turnover and labour force is the manufacture and maintenance of defence vessels. The defence industry at Henderson is made up of a mixture of private and public sector organisations which are directly impacted by government policy and international political events. The defence industry has a number of unique characteristics which will be outlined in the first part of this chapter.

The second part of the chapter will focus on previous research into marine and defence clusters in Australia and overseas to gain a greater insight into clusters and identify any common themes. The layout of the chapter is illustrated in the Figure 4.1.

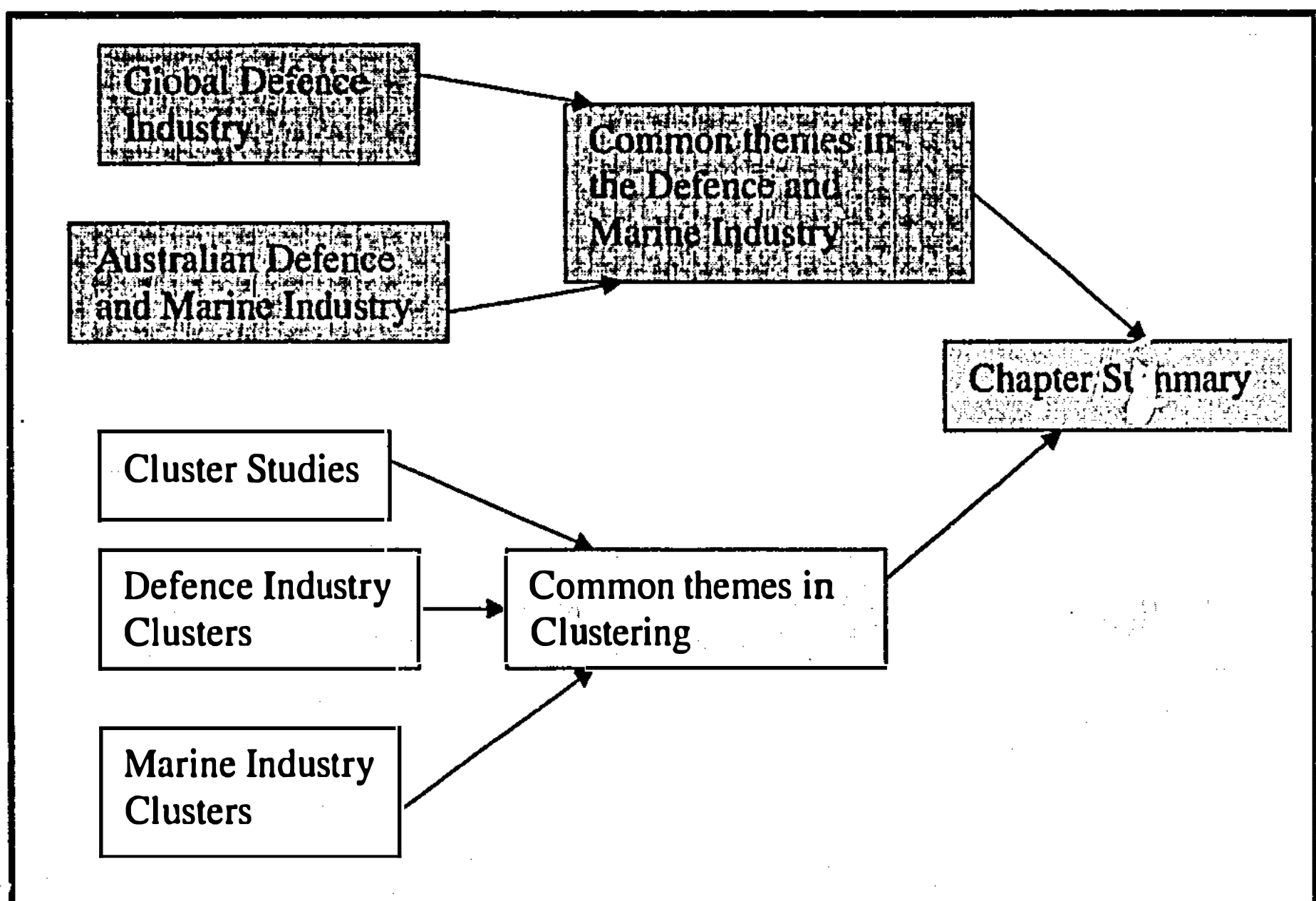


Figure 4. 1 Chapter 4 Layout

4.1 The Global Defence Industry

The defence industry particularly in Europe has changed since the end of the cold war with a one third drop in defence spending by 1996 (Hooke, 2005; Graham, et al., 2001). The reduction in defence spending and a shift away from supply by solely domestic contractors has changed the previously close relationships between government and their defence industry contractors (Humphries & Wilding, 2001). The global defence industry contracted significantly in the past 25 years through a series of acquisitions and mergers and an increase in collaborative ventures, particularly in Europe (Graham, et al., 2001; Hayward, 2005). The contraction of the defence industry created at the sub-contractor level globalized supply chains and multi national ownership which has lead to trans-national defence companies. In these national and international supply chains SMEs that were once protected now have to compete on a global scale to supply the prime contractors (Dowdall, 2004).

Increasing investment in technology has created new weapons systems with rapid deployment and extreme precision replacing large arsenals. The electronics,

software and communications technologies generated by the private sector have in most areas surpassed their defence industry counterparts (Hayward, 2005). In response to growing regional conflict and the threat of terrorism, current defence spending is focused on flexible and mobile deployment structures. This is balanced against the pressure to reduce the expenditure of public funds on defence which has led to increased focus on competitive costing, value for money and the wider use of commercial off the shelf technology (Humphries & Wilding, 2001; Hooke, 2005; Axelson & Eriksson, 2002). The defence industry is now under pressure to win work and to deliver on time and on budget, then ensure that products remain fit for their purpose for the rest of their service life (Hooke, 2005).

According to PricewaterhouseCoopers' (Hooke 2005, p.3) international review of the defence industry there are five elements that are the key to a defence contractor's business strategy. They include: "maximising the value of the domestic national market; investing in the right capabilities and partners; developing international markets – especially breaking into the US; securing scale and scope economies in an industry that discourages integration, and leveraging Industrial Participation and technology within the supply chain". Having to address all five of these elements poses a considerable challenge for defence contractors that wish to compete in the international market place.

The international defence market has now become a complex web of political and industry alliances where the activities of private multinationals are impacted by current foreign policy and the procurement protocols of each national government. At the same time the multinationals are focused on profits for their shareholders, not national defence (Hooke, 2005).

With increasing reliance on technology and the speed of technological change within the defence industry the threats faced by the corporate sector such as technological obsolescence, replacement systems compatibility and the maintenance of technological advantage are becoming very real (Hayward, 2005). The globalisation of the defence industry has led to technology being available to friend and foe alike, thus reducing a nation's level of technological superiority or differentiation. To maintain a level of superiority national defence forces need to integrate a range of

innovation and capabilities into a complex system while monitoring advances around the globe (Hayward, 2005). The defence market will never be completely global due to security of supply issues (Hayward, 2005). Nations also have to balance their need for superiority with the technological compatibility of those nations with which they enter into coalition agreement (Hayward, 2005).

In the following section the European defence industry is reviewed as it has high levels of collaboration between firms. The UK defence industry is discussed as government policy has sought to increase competition. The US defence industry is examined to provide an insight into a highly privatised defence industry. The discussion these respective defence industries will assist in providing a back drop to the Australian defence industry which is part of the study.

4.1.1 European Defence Industry

The EU Defence Industry is unique as it involves a high level of cooperation between nations which has seen increased levels of the integration of the European defence community through the establishment of the European Defence Agency (EDA) in 2005. The EDA has created a voluntary Code of Conduct on Defence Procurement designed to encourage competition within the defence industry (European Union Committee 2006). One of the major benefits perceived from this agreement is the "expansion of opportunities for small and medium sized companies from across Europe to sell into a continental-scale market...the customers for such companies may be a prime contractor rather than the end-user" (European Defence Agency 2005, p.4). It is proposed to adopt a code of best practice for the defence supply chain to create transparent and fair competition in the European industry.

EU defence procurement is divided along national lines and is bounded by public policy and a complex legal framework. To overcome these difficulties the EU is in the process of developing a European defence equipment market (EDEM) in an attempt to increase competition and economic efficiency in the defence industry and to support the European Security and Defence Policy (Commission of the European Communities, 2004). The move to integrate defence production will assist in

reducing the financial burden of carrying all defence capabilities within each national economy and the management of coalition warfare may become a driving force for the adoption of international standards for some defence systems (Axelson & Eriksson, 2002).

Within the European defence industry there is a growing trend of competition and collaboration with partners in one contract being competitors in another (Axelson & Eriksson, 2002). The relationship between prime contractors and suppliers is changing to be more of a network of relationships to access the required knowledge and expertise rather than hierarchical buyer and supplier relationships (Axelson & Eriksson, 2002). In 2004 the EU put together an expert group which produced a Green paper on the Reform and Harmonisation of the Defence Market to Reduce Duplication across the European defence community (Institute for Security Studies, 2005).

In a study of alliances in the European defence industry Butler, et al. (2000) found that firms were more likely to enter collaborative relationships rather than formal joint ventures or consortia as this allowed them to maintain control, influence decision making and protect core competencies. The nationality of the firms involved also seems to have a bearing on the type of business relationship formed with US firms being engaged predominately in collaboration and licensing agreements whereas those involved in joint venture partnerships were drawn from a wider variety of nationalities. US primes are the large firms which subcontract to smaller firms or licence their technology, with the software and IT sectors as the dominant area for cross border collaboration. Despite this level of collaboration adoption of commercial practices in the defence industry supply chains has been slow (Butler, et al., 2000).

According to the Institute for Security Studies (2005), competition within the defence industry is not desirable or even possible. Nations will always maintain certain distinct industry capabilities for strategic reasons even if they are not commercially viable and by the same token monopolies may be necessary where markets are too small. Competition however is seen as a means of "reducing costly

over capacities and unnecessary duplication” (Institute for Security Studies 2005, p.47).

The rise of technology in procurement, logistics and systems integration in the defence industry has seen the entrance of a number of firms not traditionally part of the industry. These new entrants may challenge the traditional contractors as the knowledge is no longer the exclusive domain of the defence contractors and defence lags behind other industries in ICT adoption. Axelson and Eriksson (2002) consider that the adoption of ICT would aid the development of collaboration across defence networks. However “established defence companies have few incentives to change their way of working unless their customers, governments, are willing to support and ultimately finance new endeavours” (Axelson & Eriksson 2002, p. 41).

4.1.2 UK Defence Industry

For the UK defence industry during the 1990s the reduced government spending on defence, loss of the close relationship with the government and increase domestic and international competition (Bishop 2003b) created a level of distrust which according to Humphries and Wilding (2001) still pervades the defence industry today. The government’s drive to increase the speed and efficiency of defence procurement in the UK has seen a push for partnerships to gain the benefits of competition and collaboration. This has been difficult to implement as there are so few competitors in the defence market that it is difficult to overcome the adversarial relationships that exist (Humphries & Wilding, 2001).

There are a number of factors that continue to constrain a fully competitive environment in the defence industry including the growing sophistication of technology, the process of contract renegotiation, government policy for regional development and government support of a domestic defence industry. Policy consideration can often be at odds with the drive for efficiency and competition (Bishop 2003b). The government’s desire to create value for money will continue to encourage technology transfer between the defence and civilian sector (Trim, 2001).

The UK defence industry has through subcontracting created complex supply chains or supply networks with interlocking and interdependent relationships (Dowdall, 2004). In a study of the supply of armoured vehicles in the UK a number of issues were found including “deficiencies in the use of information technology; the use of defence specifications limiting cost savings from potential civil and dual-use application; a failure to allow suppliers to identify other important cost savings; and the limited adoption and implementation of modern best practice management and manufacturing techniques among firms in the supply chain or network” (Dowdall 2004, p.541). Through the adoption of Network Enabled Capability policy the UK Government has attempted a shake up of procurement through the implementation of Smart Acquisition which was designed to support this policy (James, 2004).

Bishop (2003a) found that due to resource constraints small firms in the UK defence industry were less likely to collaborate on an international level than their larger counterparts, however firm size was not a constraint at the domestic level. It was also found that a firm’s ability to create successful innovation was linked to successful collaborations. The UK government has been focused on developing collaboration on a local and regional level around clusters however Bishop’s (2003b) study suggests that the major policy development should be around international collaboration (Bishop 2003b).

According to Graham, et al. (2001) technologically based defence companies created closer collaborative relationships with their customers involving them in a greater level of problem solving, cost reduction and quality assurance.

It was suggested by Graham, et al. (2001) that ICT could assist in the collaborative bidding for defence contracts and through the web provide a level of technological integration to assist with inter-organisational collaboration. ICT should lessen the resource constraints of smaller firms so opening up international collaboration, however the low level of ICT adoption by small firms is cause for concern (Bishop, 2003a).

In comparison the UK has a far more open defence market than the USA and even in relation to other European countries (Hayward, 2005).

4.1.3 US Defence Industry

The three main players in the US defence industry are the military, defence contractors and the USA Congress, all of whom have a vested interest in high levels of government spending on defence innovation (Reppy, 2000). With the end of the Cold War the defence landscape changed. No longer was there a single foe with whom to engage in technological 'one upmanship', now the threats are more amorphous and often coming from individuals and groups rather than nations. The traditional symbols of military superiority: tanks, battleships and bombers are being replaced with technologies that have arisen from the civilian sector (Reppy, 2000).

The US is the economy with the largest defence budget. It also has the largest defence industry and increasingly dominates global supply and the ownership of intellectual property but even it is looking outside its borders for defence supplies (Hooke, 2005; Hayward, 2005).

Despite attempts to foster cross border trade there are tight controls on the flow of technology and weaponry and of mergers or acquisition across international borders. On the other hand, increasing costs and shrinking markets have given rise to international alliances between defence firms (Reppy, 2000). The Department of Defense in the USA expects that the interaction between the prime contractors and smaller innovative companies that form joint ventures will meet the needs of the defence industry (Hayward, 2005).

The US Department of Defense is seeking to 'transform' the way it does business with the introduction of supply chain logistics for the private sector. It is believed that ultimately this change will improve the defence forces' warfighting capacity and allow for performance measurement of the procurement process (Frede, 2004).

According to Lundmark (2002) the drivers and inhibitors for US collaboration with European countries in the defence industry can be viewed from a government and corporate perspective as illustrated in Table 4.1.

Table 4. 1 Drivers and Inhibitors of Collaboration (Lundmark, 2002)

	Drivers	Inhibitors
Government	Interoperability with allies Cohesion of NATO Access to export markets for US companies Maintain peace and security R&D sharing Secure US leadership Technology transfer Coordination and control of technology Avoid fortresses/silos Sustain competition economies of scale Risk Sharing	Control of technology transfer Technology falling into wrong hands Protect US jobs Protect US technology base Non-proliferation Protectionism in general Rigidity of export control
Corporate	Access to markets Improve global position Access to programs Maintain prime position Economies of scale Get around protectionist barriers Create incentives for own rationalisation Access networks Portfolio shaping Access to technology and technology transfer Avoid fortresses/silos Risk sharing	Protect business secrets Difficult bureaucratic procedures/export controls Maintain prioritised domestic position Reduced congressional support Reduced support from armed services No synergies identified to build on Not financially rewarding Europe requires dealing with different entities and perceptions Hard to do Slow progress when dealing with governments Cumbersome government collaboration

In the following section on the Australian defence industry a number of the themes highlighted in this section under the global defence industry will reoccur.

4.2 Australian Defence Industry

Australia's geography has been fundamental to its psyche as the nation's isolation leads to a sense of vulnerability. To defend against an attack on home soil Australia

requires land and air capabilities. In comparison to Australia, the UK and France each spend four times as much on defence (Dibb, 2006). In the Australian defence industry there is a core of between 200 and 300 companies of prime contractors and first tier sub contractors which are medium sized firms contracted by the primes. There is also a lower level of sub contractors who engage in defence business on a regular basis but who are not involved solely in the defence industry. The Australian defence industry is mainly focused on shipbuilding and repair, land vehicles, munitions, electronics and IT and military aerospace (Wylie, et al., 2006).

The advent of information technology and its impact on warfare has become of increasing importance within the Australian military over the last decade. The Defence Budget in Australia makes up 2% of the Gross Domestic Product (Evans, 2006). In the White Paper, Defence 2000, Australia has committed to the development of advanced information technology infrastructure with major investments by the Australian Government and support from the United States (Evans, 2006). This focus on information technology is due to a long held belief that one of Australia's strengths is the possession of wide spread and high level skills in computer literacy (Evans, 2006).

Australia, like many countries in the last decade, is seeking to exploit a range of knowledge intensive technologies to create network enabled defence systems (Wylie, Markowski & Hall, 2006). These systems require large investments in intelligence, communications, command and control systems which are generally beyond small countries such as Australia. The United States is the leader in this technology and as many smaller countries fall behind they are tending to rely on their Allies to access these technologies (Wylie, et al., 2006). The only small industrialised country which can claim a general level of self reliance is Israel (Wylie, et al., 2006).

Despite its small population and GDP the Australian Government has supported defence related research and development (Wylie, et al., 2006). The philosophy behind this is to provide a level of military self sufficiency in peacetime and to enhance the defensibility of supply in wartime (Wylie, et al., 2006). Defence R & D is also considered to be a public good which may enhance the domestic economy. In

the global defence market these R & D activities focus on niche areas (Wylie, et al., 2006).

The US focus on network enabled military capability is pulling small countries in the same direction. For Australia this means accessing key technologies from the USA and developing niche technologies locally (Wylie, et al., 2006). In comparison, Europe has set up a multi member military alliance which allows the collaborative funding of military infrastructure to provide a rapid response (Wylie, et al., 2006). To adopt the network enabled defence systems will require collaboration, innovation and a culture where learning is welcomed (Evans, 2006).

Due to its alliance with the USA, Australia has access to intelligence and military capabilities which ensures it maintains a favourable technological position within the region (Dibb, 2006).

4.2.1 Defence Procurement

In their 2003 report on procurement in the Australian Defence Force the Defence Materiel Organisation (DMO) recommended that “change is needed at each stage of the cycle of acquisition and whole-of-life management of the equipment that comprises the core of defence capability management of major defence projects” and “that defence procurement become business-like and outcome driven” (DMO 2003, p.iii).

The current tendering system for defence projects has not always delivered best value for money, with tenderers over promising and under delivering and creating an adversarial relationship between industry and defence. The “through life” contracts (time the vessel is in service) under which vessels are maintained and upgraded are highly formalized in nature and provide little opportunity for innovation or flexibility on the part of the contractor. Although the current system is designed to give value for money it removes the flexibility which is essential to a modern defence capability (DMO, 2002).

In order to manage the future of the marine defence industry, DMO needs to ensure continued access to skills, knowledge and technology through the planning of future defence production. The DMO considers that there are three options facing the industry, firstly purchasing equipment off-shore, or secondly, partial construction off-shore with local fit-out and thirdly, construction wholly in Australia (DMO, 2002). One of the suggestions by Evans (2006) is that longer posting times for civilians and military personnel would greatly enhance the development of the Australian Defence Force.

4.2.2 Shipbuilding in Australia

In 2005 the Australian Commonwealth Government released the Marine Industry Action Agenda with a view to creating sustainability in the industry despite growing international competition (Department of Industry, Tourism and Resources, 2005). Within Australia the marine industry includes “manufacturing and repair of boats, ships and marine equipment and services such as the operation of marinas and retailing” (Department of Industry, Tourism and Resources 2005, p.6). The industry covers recreational, commercial and military activities and in 2003 turned over \$5.5 billion, employed approximately 29,000 people and exported product worth over \$750 million worth of products. The majority of firms are small and medium enterprises with only a few companies employing more than 1,000 people (Department of Industry, Tourism and Resources, 2005).

The defence shipbuilding industry is focused on Australian military demand while the commercial sector is more export focused. The growth in recreational boating in recent years has precipitated increasing demand in boatbuilding, retailing, equipment manufacturing and marinas and many of the boat builders have entered the export market (Department of Industry, Tourism and Resources, 2005). The marine infrastructure such as marinas and boat ramps have not kept up with the growth and this is constraining the domestic market. Marine companies have to deal with a range of regulatory organisations and the regulations themselves can vary from region to region. Due to the requirement for government control, the use of

waterfront land is often leasehold which can make investment in facilities and infrastructure uneconomical (Department of Industry, Tourism and Resources, 2005).

Although innovation is important to the continued growth of the marine industry there is "limited cooperation within the marine industry and with research organisations on innovation. The competitiveness of the marine industry could be improved by encouraging greater innovation and collaboration" (Department of Industry, Tourism and Resources 2005, p.7). According to the report another issue facing the marine industry is the shortage of skilled labour particularly in defence shipbuilding (Department of Industry, Tourism and Resources, 2005).

Finally, the diversity in the marine industry and its respective bodies makes it difficult for industry participants to exchange information, access new markets, gain government support and promote the industry's interest (Department of Industry, Tourism and Resources, 2005).

4.2.3 Defence Shipbuilding

The Australian Navy has chosen to develop internal capabilities in order to have a self reliant defence force. Naval shipbuilding within Australia has been intense over the recent past with the building of the frigates and submarines, however the outlook for the future is for half the equivalent spending on these projects (DMO, 2002). In 2002 it was predicted that the demand for shipbuilding over the next 15 years would be half that of the previous 15 (DMO, 2002). This will require significant contraction of the current industry with restructuring and consolidation inevitable (DMO, 2002). The concern of the Defence Materiel Organisation (DMO) with this restructuring is that there will be a loss of technical skills and manufacturing capabilities within the industry (DMO, 2002).

Local construction has been the preferred option for the Navy in recent times as it provides economic benefits and guaranteed access to upgrades and repair works should an external supplier become a foe rather than a friend (DMO, 2002).

The Naval Shipbuilding and repair industry by nature is a monopolistic market place with defence being its only customer and historically this has been primarily the Australian Navy. Difficulties have arisen in the marketplace due to the 'project by project' nature of defence work with little use of strategic demand to create sustainable industry capabilities (DMO, 2002).

The lack of rationalisation within the industry is exemplified by the fact that the six major Naval projects undertaken in the last 15 years have been awarded to five different companies based in five separate locations, which makes for an unsustainable industry. The lack of rationalisation within the industry and the erratic flow of work also make it difficult to retain the required skill sets. The sector of the industry most at threat is the Australian Submarine programme. The two skill sets that the defence industry needs to maintain are the high end activities such as systems engineering and platform integration and the manufacturing activities such as metal fabrication and equipment installation (DMO, 2002). In the DMO's report it is concluded that there is only sufficient demand to sustain one ship builder to meet the Navy's new construction capabilities requirements (DMO, 2002).

According to the DMO (2002, p.11) "there is a strong connection between the capabilities and skills required for Navy shipbuilding and for upgrade, repair and maintenance." It was suggested by the DMO that upgrade, repair and maintenance capabilities should be based in New South Wales or Western Australia in accordance with the location of the two fleets, one on the eastern and one on the western side of the continent. The proposal of having a single supplier will impact SMEs which are a source of innovation for the industry. The DMO suggests that the new industry structure would allow SMEs to form long term alliances with the single provider. It also is suggested by the DMO that the rationalisation of the defence industry may encourage greater defence exports which in turn would create a lower cost base for the Australian industry. It is proposed that there be a "smoothing" of defence contracts to allow for more continuous flow of work and that the Australian government adopt a role in the build programme for its major surface fleet.

4.2.4 Naval Shipbuilding in Western Australia

As part of a Senate Enquiry by the Federal Government into Naval shipbuilding in Australia, the West Australian Government has launched a campaign asserting that Western Australia is the logical choice for future shipbuilding projects. This is due to the co-location of major Naval and commercial ship builders around Henderson and adjacent to the nearby HMAS Stirling Naval Base (Department of Industry and Resources, 2006). The Western Australian Government has signed a Memorandum of Understanding with the South Australian Government to reduce the duplication of investment in the infrastructure between the major shipbuilding precincts located in the two neighbouring states (Department of Industry and Resources, 2006).

The opening of HMAS Stirling in 1987 signalled a move to a Two Ocean Policy which placed a naval presence on the western side of the continent to facilitate a greater focus on Australia's South East Asian interests (Department of Industry and Resources, 2006).

The Western Australian Marine industry boasts a diverse range of capabilities including light weight ferries, steel shipbuilding and repair, off shore platforms and modules, recreation and light commercial boats, marine biotechnology and chemicals (Department of Industry and Resources, 2006). The Western Australian Government has also constructed a Technology precinct as part of the marine cluster at Henderson in their bid to attract high technology companies to the region (Department of Industry and Resources, 2006).

Another initiative of the Western Australian Government is the establishment of a 'sub sea' cluster focused on the needs of the Oil and Gas industries with participants being based in the Henderson region. The Western Australian Government is also upgrading the Australian Marine Complex (AMC) working with the Australian Submarine Corporation to build a Submarine Repair and Maintenance facility at the AMC (Department of Industry and Resources, 2006).

4.2.5 Common Themes in the Defence Industry

From the review of the defence industry in Europe and the USA a number of themes have emerged including: the shift from machinery to technology focused warfare; the consolidation of the industry in the face of reduced defence spending and government's desire for "value for money" in defence supply; a move to e-procurement and supply chain facilitation; the introduction of competition from overseas firms and a desire to foster collaboration between firms.

In the Australian defence industry the themes included: cost reduction through the streamlining of procurement; the presence of multinationals in the supply chain and the increased use of subcontractors. The proliferation of technology in the Australian defence industry has led to a mixture of local and imported R&D and materials.

As the study takes place in the context of what could be termed a cluster the next section will present previous research on the marine and defence cluster.

4.3 Clustering Studies in the Defence Industry

Chapter 2 contained an overview of the previous research relating to clusters overseas and in Australia. The following case studies on defence and marine clusters are included to provide further insight into clustering in the context of the research.

4.3.1 South Australian Defence Cluster

Of the original clusters developed in South Australia as part of the South Australian Business Vision (SABV) Cluster initiative the Defence Teaming Centre (DTC) is the only one still in operation. The cluster was established in 1995 and received significant funding from the State Government with additional funding coming from the cluster members and overhead charges on successful DTC tenders. Of the 56 firms in the cluster, 50% have less than 10 employees and there are only a small proportion of firms employing over 50 persons (Lough, 2004).

The diverse range of firms within the DTC allows for bids to be put together with components coming from separate firms. Through the DTC they present as a single enterprise. Often the DTC attaches itself to a prime contractor in order to participate in large defence contracts. Although the cluster has been successful, according to Blandy (2004), the cluster would not have been as successful if it had not been for the collaborative and networking skills of the DTC Chair as the SMEs tended to be fragmented and lacking in trust. The process of putting together the tenders and the adoption of a Code of Ethics has improved the level of trust between the participants. "Once regarded as fragmented and lacking capacity, the defence capability of South Australian companies is now officially recognised by the Defence Department" (Blandy, 2004, p. 37). This highlighted the importance of interpersonal relationships and networks in the successful development of clusters.

4.3.2 Manawatu Defence Cluster

The Manawatu Defence Cluster was formed to service New Zealand's defence industry. The companies that the cluster encompasses provide a diverse range of products with very little duplication of products and services between firms. Membership is bounded by region and location is the only criteria for membership. The cluster is seen by a number of the members as a tool to assist their firm to win defence work. The cluster and the majority of defence contracts are awarded to core firms who are primarily focused on the defence industry. The supporting firms within the cluster either contract to the core firms or deal directly with defence if they have a specialised product not provided by the core firms (Lough, 2003).

The location of the cluster in proximity to a number of military installations has allowed for the development of relationships with the New Zealand Defence Force. The cluster also has links with the local University, Chambers of Commerce and Local Government. The Palmerston North City Council is supportive of the cluster as it is located within the Council's region (Lough, 2003).

Networking within defence is vital to the success of the cluster as its future depends on securing contracts and developing long term opportunities. Within the cluster there are opportunities for members to network and there is a Register of Interest which allows companies to participate in the tendering process for defence contracts. Generally, networking occurs within the cluster when the contract requires capabilities not possessed by a single company. Networking, however, is limited owing to the diverse range of skills and capabilities of the members within the cluster. They do not often rely on co-operation and collaboration in fulfilling their part of a larger contract. Networking among the companies is basically a form of business knowledge sharing, allowing participants to understand the capabilities held by other firms within the cluster and to identify opportunities for accessing contracts (Lough, 2003). The diversity of firms within the cluster has led to low competition among its members which it has been suggested removes a primary driving force for the growth and development of the cluster (Lough, 2003).

A review of the cluster in 2002 has resulted in a refocussing among the members on how best to serve the NZ Defence Force and to meet the higher level of demand due to the creation of specialist areas. The diversity of members within the cluster has allowed for the creation of a 'one-stop shop' attracting interest from defence and according to Lough (2003, P.169) "By pulling these complementary skills together, the power in numbers effect has created a mass competitor against national competitor threats in the New Zealand industry."

4.4 Marine Industry Studies of Clusters

The region being studied in the research project has a mixture of naval shipbuilding, commercial shipbuilding and yacht construction. The following case studies and expert interviews from Australia, New Zealand and Finland are presented to provide further understanding of the industries to be studied.

4.4.1 Tasmanian Light Shipbuilding Industry Cluster

The Tasmanian light shipbuilding cluster had its genesis with the development of aluminium welding technology and its application to fast ferries. The leading company, International Catamarans (later Incat), required the assistance of a number of the Managing Director's friends in the maritime industry to construct and fit out the product for the international market (Wickham & Hall, 2006).

The collaboration of the respective manufacturers allowed the cluster to create a dominant market position. A number of the collaborative firms that were originally formed to supply Incat had themselves forged significant export sales independent of Incat. For the firms that supplied Incat their involvement in the fit-out of each vessel gave them an opportunity to promote their own business (Wickham & Hall, 2006).

In 1977 the first high speed catamaran was constructed and a partnership to form Incat was established. The first all aluminium catamaran was produced in 1979 and a manufacturing facility was established in 1988 (Wickham, 2005). The Government funded a College of Aluminium Training with courses that linked to the University of Tasmania and these facilities provided the training needs of the Tasmanian shipbuilding industry at that time. The provision of Government subsidised training and development provided Incat with a locally based highly skilled workforce (Wickham, 2005).

In the early 1980's Incat granted licenses to a number of international shipyards which in turn stimulated the demand for specialised catamaran transport. During the 1980s and 1990s Incat differentiated itself through innovation and designs which met customers' needs (Wickham, 2005). By the mid 1990s Incat found itself in competition with other Australian based companies, including Austal located in Western Australia (Wickham, 2005). Austal had become a leading manufacturer of passenger catamarans and a dominant supplier in the Asian market (Wickham, 2005). Incat sought to fight its loss of market dominance through continuous innovation and penetration of international markets by joint venture agreements (Wickham, 2005).

Although Incat risked the loss of intellectual property through licensing and joint venture agreements the company was not overly concerned as they considered any technology being stolen was yesterday's technology (Wickham, 2005).

In the 2000s, Incat suffered cash flow problems and was put into receivership, however, they found an alternative source of income generation by licensing intellectual property for the building of high speed tactical vessels for the U.S. Government (Wickham, 2005). Now out of receivership, Incat continues to manufacture catamarans and sees their continued market presence as a result of their ability to identify problems and come up with new innovative designs to continually expand their markets (Wickham, 2005).

The creation of the cluster was in part due to global marketing pressure and the small domestic market. The consolidation of the industry into a cluster was driven by key individuals who saw the problems created by a fragmented industry and recognised the benefits that could come from a collaborative, uniform approach (Wickham & Hall, 2006). This consolidation was driven through communications among industry members persuading others of the benefits of collaboration (Wickham & Hall, 2006). The local marine industry also had a number of champions who collected and distributed information both formally and informally to assist the creation of the cluster (Wickham & Hall, 2006). The longstanding friendships between firms within the cluster was part of the basis of its success as was the realisation that sales by individual firms served to strengthen the industry as a whole (Wickham & Hall, 2006).

Another important factor in the cluster development was the participation of the Tasmanian Government, whose Economic Development Agency became a member of the cluster (Wickham & Hall, 2006). This Agency provided "important conceptual infrastructure that was beyond the individual competencies of the cluster firms to accomplish" (Wickham & Hall, 2006, p. 103).

The entry of the State Government into the Tasmanian Light Shipbuilding cluster provided support for this development. The success of the cluster by the majority of Tasmanian maritime firms is due to a high level of interpersonal relationships that

permeate through the industry and the power of personal persuasion (Wickham & Hall, 2006).

4.4.2 New Zealand Boat Building Cluster

According to Chetty (2003) New Zealand has developed a reputation for superior technology in boat building in the area of composite fibre yachts. A number of environmental factors have stimulated the growth of boat building in New Zealand including its geographical isolation, varied coast line, difficult weather conditions all of which boat builders have had to accommodate. In the 1980's a change in Government policy with the introduction of a Sales Tax and the removal of a subsidy on commercial craft caused a mass exodus of boat builders from the industry. As a result those who survived used product differentiation to penetrate the international market for custom built boats. The industry has also expanded into super yacht building which is now the fastest growing segment of the industry. Since the 1990's strong co-operation has developed among industry members, trade associations, and export promotion organisations around the cluster (Chetty, 2003).

The winning of two America's Cups, the most high profile international yacht race in the world, and a number of other international yachting races, by New Zealand built boats has created a strong reputation for the industry. The industry has established a reputation by linking excellence in sailing and excellence in boat manufacturing. The relatively small size of the international boat building industry means that reputation can be built through word of mouth recommendations (Chetty, 2003).

Chetty (2003) identified a number of supporting institutions that foster the boat building cluster, these include: trade associations which focus on training of skilled employees; government export organisations that work on marketing and exports; local economic agencies who work with industry members on marketing; city Councils who provide the infrastructure for the industry and Educational Institutions that provide training and academic courses related to the marine industry. The trade associations and export associations are the key drivers within the cluster (Chetty, 2003).

As members of the boat building industry became more involved in the cluster they realised that they were not in competition and could benefit from collaboration rather than working in isolation. The individual firms did not have sufficient resources to organise the cluster, so the external trade and export organisations played a facilitating role addressing issues across the industry. Current issues within the cluster include a shortage of skilled labour, project management skills, cash flow and issues of succession as many of its companies are managed by owner operators (Chetty, 2003).

Members of the cluster have worked together through the export organisation to access international markets and to create a united presence at international trade shows. The participation of cluster members at an international level allows for relationship development and expansion of export opportunities. The boat building cluster does not stand alone but links to other industries, such as electronics, due to the increasing technological sophistication of the boating industry (Chetty, 2003).

The majority of boat builders are located around Auckland which means that customers can have their repair needs met in one location. Head on competition within the cluster has been consciously avoided in order to strike a balance between competition and co-operation. A number of the cluster members have long term relationships due to their involvement in sailing and this has created a close knit group. Their passion for sailing also allows them to test their products at a professional level and their participation in international racing assists in building networks within the industry (Chetty, 2003).

According to Chetty (2003), the cluster has been shaped by the following forces: the members' passion for sailing; the entrepreneurial attitude of the companies which took the lead in shaping the cluster; the culture of collaboration which they fostered; the support for the industry leaders by facilitating organisations; the success in international yacht races and the reputation gained from this; a drive for internationalisation through collaboration; the bond cluster members develop through facing common problems such as labour shortages and ongoing learning has occurred within the cluster. The cluster's development has been a combination of

organic growth and structured intervention by supportive institutions. Without the industry leaders the cluster would not have been started. The participation of supporting institutions has ensured its continued growth (Chetty, 2003).

4.4.3 Finnish Marine Cluster

The large companies within the Finnish Maritime Cluster have developed a broad network and close relationships with their major contractors. These contractor and sub contractor networks are interrelated with companies being part of networks for shipyards, ports and shipping companies. This means the large companies are in fact connected to each other through their sub contractor networks (Viitanen, et al., 2003).

Although there are a diverse range of fields within the Finnish Maritime Cluster the inter-related nature of the firms gives it a cohesive identity. Characteristics of the cluster include a high level of technology and innovation, particularly among the large companies and an emphasis on the securing of a stable supply of labour. The level of innovation required by the shipyards has stimulated innovation among their sub contractors, many of whom have been able to grow into world market leaders (Viitanen, et al., 2003).

Unifying forces within the Maritime Cluster are common knowledge, education and research activities. The Finnish shipyards have managed to survive tough international competition through flexibility, innovation and a competitive network (Viitanen, et al., 2003).

The core of the Maritime Cluster is shipbuilding, shipping and port operations. The Maritime Cluster is a significant part of Finland's south-west regional economy. The maritime industry in Finland has strong historical traditions which are viewed as a strength for the companies. At present the demand for professional and skilled labour exceeds supply for many businesses in the south-west Maritime Cluster, this is particularly the case in the shipbuilding industry. A 2005 survey of the Finnish Maritime Cluster found two-thirds of respondents considered that competition had

increased over recent years and considered that the most important competitive advantages for the cluster were location, competence of its workforce, technical expertise and a function network of sub contractors. The Finnish shipyards specialise in producing cruise ships, passenger ferries and special purpose ships such as ice breakers. One of the factors for the strength of the Finnish Maritime Cluster is that 70% of Finland's imports and up to 90% of exports travel by sea (Karvonen, et al., 2006).

The survey highlighted the current and future intention to co-operate with others in the cluster. Co-operation is not limited to private sector companies but there are close links with public sector Agencies and particularly education institutions including secondary schools, Polytechnics and Universities. Within the south-west region there is also a strong emphasis on research and development activities (Karvonen, et al., 2006).

Although networking between companies is good it is suggested by the report's authors that further interaction between companies and training institutions would improve the competitiveness of the region. Although much of the focus tends to be on the large companies there is increasing focus on the smaller companies who make up the network as they bring innovation and flexibility to the network (Karvonen, et al., 2006).

4.5 Common Themes in Clustering

One of the main themes in clustering is the presence of a history or advantage for a region or industry such as the link between sailing performance and yacht manufacture in the case of the New Zealand Yachting cluster. The specialised expertise developed within the clusters is supported by strong links with education. Having a champion to lead the cluster development as well as government and industry support are also common themes. The creation of supply chains, the development of complementary providers and collaboration towards a common goal can also be seen in the cases presented. Finally, flexibility within the firms and the

industry to change with market conditions in order to ensure the continuing survival of the cluster.

4.6 Chapter Summary

This chapter has provided a background to the marine and defence industry and clustering from an international and Australian perspective. It was identified that there has been a shift in the defence industry towards electronic supply chain management, collaboration and increased competition between the private sector firms.

In Chapter 5 the research methodology for the project will be detailed followed by the process for the piloting of the research in Chapter 6. The results of research undertaken in relation to the research questions will be detailed in Chapter 7 followed by the summary and conclusions of the research in Chapter 8.

Chapter 5: Research Design and Methodology

5 Introduction

This chapter will describe the research methodology undertaken to gather data for the study. The framework for the chapter is illustrated in Figure 5.1, which shows the context of the research and the philosophical perspectives that were considered in determining the research method for the study. The choice of a case study approach impacted the format of the research instrument format, the sampling frame used and the data collection. The collection of qualitative data determined the type of data analysis used and the measurement employed to ensure the validity and reliability.

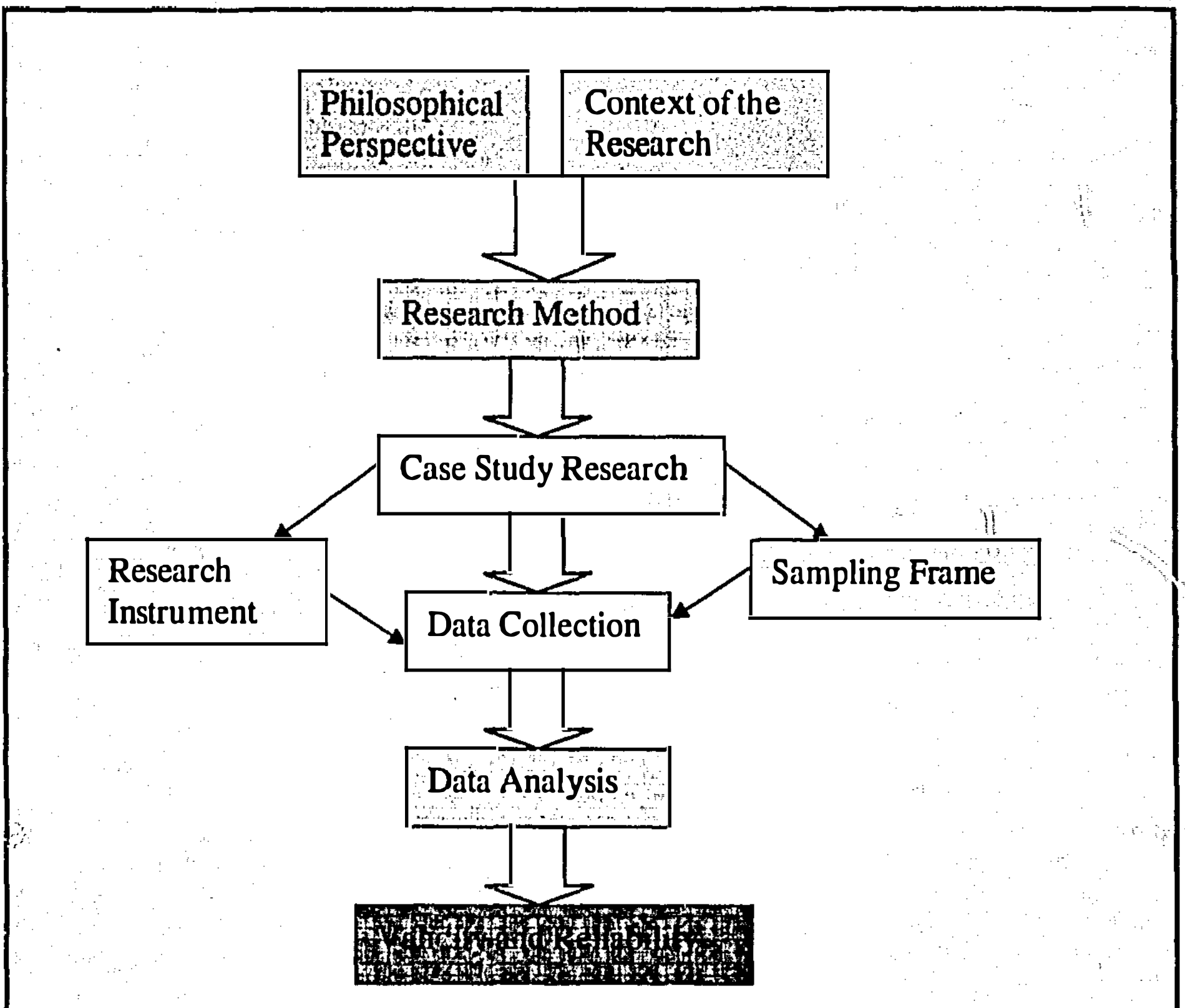


Figure 5. 1 Chapter 5 Framework

5.1 Context of the Research

As mentioned previously this research was undertaken as part of an Australian Research Council (ARC) grant in collaboration with a number of local industry partners. The funding of the research by external parties can pose a number of ethical issues, including possible conflict between the agendas of the funding bodies, the researcher and the participants. Control of the research can also be an issue as the researcher is no longer a free agent once funding is accepted for the research. Finally, it is possible that the funding may have an affect on the relationship between the researcher and the study participants as they may have concerns over the “agenda” of the funding body and this could affect the level of openness and trust between the researcher and the participants in the research process (Cheek, 2000).

In the case of this research there has been a level of accommodation between the research proposed in the ARC grant, the industry partner’s expectation and the limitations of the region being studied. The original research questions proposed in the grant application were:

- 1. What are the drivers for SMEs to adopt c-commerce? This will evaluate the influencing factors from a wide range of SMEs using the S-M-A-L-L framework and the general dynamic model of information systems adoption.*
- 2. How can ICT leverage the supply chain for clusters of SMEs and derive added value from knowledge networks? This will identify examples of best practice collaborative models locally and internationally.*
- 3. How are cluster models of SMEs realising the different types of added value benefits and assessing the significance of these benefits gained from their participation in global c-commerce?*
- 4. What strategies will be most effective for future entrepreneurship and innovation in c-commerce? This will explore issues such as local government policy, infrastructure growth, financing and marketing strategies, customer relationship management, managing alliances along the supply chain, developing virtual communities, people management, policies and the interaction of multiple players.*

The research that was to be conducted in conjunction with the South West Group focused on questions two and four. As outlined in Chapter 1 the South West Group was keen to focus on the multi-industry cluster within the Henderson/Rockingham region. Over repeated meetings with a representative of the industry partner it became clear that the research questions proposed in the ARC grant would require modification to meet the requirements of the industry partner and characteristics of the cluster which was to be the focus of the research. Based on the literature and conceptual framework, and accommodating the requirements of the participating parties, the specific research questions were formulated.

In the context of the Marine, Defence and Resources Cluster in the Henderson Rockingham region and the collaboration between large organisations and SMEs:

1. *What are the drivers and inhibitors for organisations to enter collaborative relationships?*
2. *What are the factors that impact on the creation and sustaining of collaborative relationships?*
3. *How does ICT facilitate and sustain collaborative relationships?*
4. *What are the benefits and drawbacks of collaborative relationships?*
5. *Are there models of best adoption of collaborative relationships?*

The representative of the industry partner, the South West Group, was to assist with the research process by providing contacts and introductions to possible interview participants within the industry cluster, particularly in the larger multinational companies who were at the centre of the cluster. At the point in time when the data collection was to commence the South West Group representative resigned from his position and was not replaced until after the data collection had been completed. The loss of this primary source of contacts and introductions into an industry in which the researcher had no previous association created some initial obstacles in the data collection.

5.2 Philosophical Perspective to the Research

In social research there are a number of approaches to research including positivist, interpretivist, critical research and grounded theory. Positivist, interpretivist, and critical research arose out of a re-evaluation of social science research in the 1960s the upshot of which was three “types or idealised, simplified models or more complex arguments” (Neuman 1997, p. 62). Although there is often a lack of agreement among scholars on all facets of each approach, the three provided fundamentally different ways of viewing the world and as such colour the research.

5.2.1 Positivist

Positivist research is based on the ideas of objectivity, distance and control and uses precise measurements to test the hypothesis. Researchers often choose to work with quantitative data generated from surveys, experiments and statistics (Greenwood & Levin, 2000; Neuman, 1997; Chen & Hirschheim, 2004). The positivist researcher starts with a cause and effect relationship and measures this within the social world while staying neutral and detached from what is being measured. According to Chen and Hirschheim, (2004, p. 201) the positivist researcher believes that “reality exists objectively and independently from human experiences”. The criticism of this approach is that the objectivity, detachment and statistical nature of positivism reduces peoples lives and experiences to numbers at the expense of the texture of peoples’ real lives (Neuman, 1997).

5.2.2 Interpretivist

Coming from a different perspective, interpretivist research focuses on the relationships and meaning imbedded within those relationships and the social setting in which they occur (Neuman, 1997; Chen & Hirschheim, 2004). To gain this level of detail the researcher is no longer abstracted from those he/she is studying.

Gummesson (2003, p.491) suggested that all research is interpretative as it “represents various interactions, such as between the researcher and the object of study and its actors; between our consciousness and qualities of our inner self; between substantive data and general concepts; between the parts and the whole; between words, numbers, body language and tacit language; and concurrent, non-linear and dynamic interaction between data generation, analysis, interpretation and conclusions”.

The contrast between the two approaches is summarised in the table below using the comparison formulated by Chen and Hirschheim (2004, p. 201) in their examination of research over the 10 years previous to 2001.

Table 5. 1 Comparison of Approaches

Approach	Ontologically	Epistemologically	Methodologically
Positivists	Reality exists objectively and independently from human experiences	Hypothetic-deductive testability of theories. Seeking the verification or falsification and generalizable results focused on causal relationships with a tight coupling is expected among explanation, prediction and control.	Use a value-free position and employing objective measurement to collect research evidence with a quantitative method such as the survey typically used.
Interpretivists	Emphasize the subjective meaning of the reality that is constructed and reconstructed through a human and social interaction process	Knowledge should be obtained not through the understanding of human and social interaction by which the subjective meaning of the reality is constructed	The researchers need to engage in the social setting investigated and learn how the interaction takes place from the participants' perspective. Field studies in real social setting are used to generate interpretive knowledge

5.3 Rationale for the Philosophical Approach to the Research

Early in the research project a positivist approach using Internet surveys was considered seeking to confirm a set of hypotheses around collaborative relationship drivers, factors impacting on sustainability and benefits derived from such relationships. The survey was not adopted for a number of reasons including the lack of emerging hypotheses or a concise model to test and consolidated research on the factors involved in collaborative business relationships and the use of ICT. The researcher was concerned that the survey was too prescriptive in nature so limiting the opportunity to identify other drivers and inhibitors to collaboration and the use of ICT. As the research project progressed it became clear that the dominant form of collaborative relationship in the region to be studied was between large and small firms, an aspect not covered in the survey but of interest to the industry partners and there were indications that there was little or no use of ICT in a collaborative setting.

The focus of the research was more investigative in nature rather than trying to “prove” any particular hypothesis. The research questions that had been formulated sought to ascertain what were the underpinning forces in collaborative relationships and if ICT played any role in these relationships within the context of the Henderson/Rockingham region.

Another difficulty with using the survey was related to the data collection process itself. At the outset of the research project it was anticipated that the research population would cover the whole of the south west region with over 3,000 SMEs in the region. The industry partner’s focus on the Henderson/Rockingham region limited the research population to approximately 150 companies. Within the Henderson/Rockingham region there are a number of distinct sub-populations with differing characteristics including industry and firm size. Investigating the impact of factors external to the cluster as part of the research project also required data collection from a number of key non-industry organisations. This too was a small population which would not have been suited to a survey. Figure 5.3 below illustrates the various sub populations in the research.

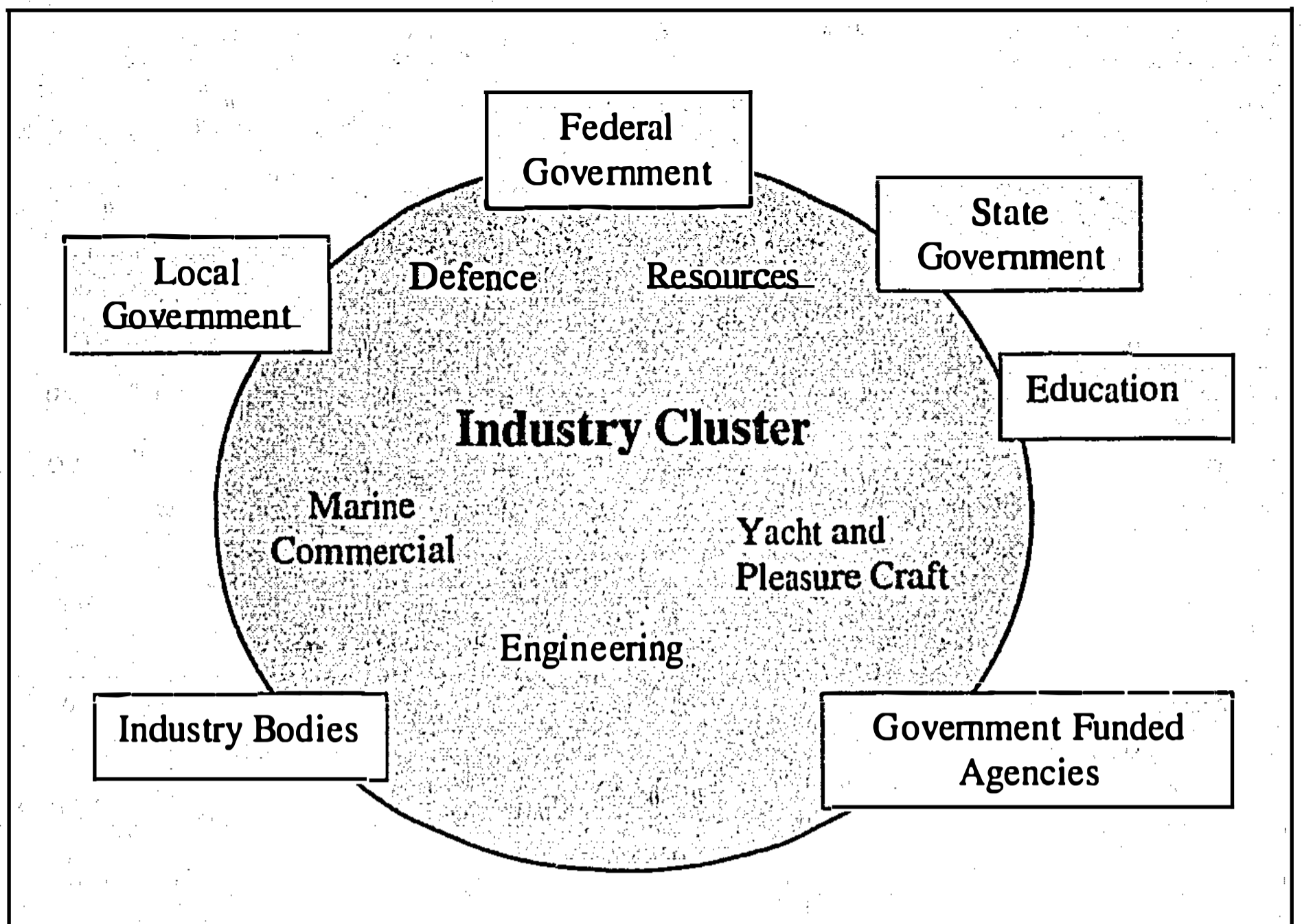


Figure 5. 2 Research Populations

Faced with a heterogeneous research population it was decided that a postal or electronic survey would not yield statistically significant research data. Previous research carried out in 2004 in the region used a mail-out survey to 1,500 SMEs in the maritime industry. The response rate for this study was less than 4% (Mazzarol, 2004). To target specific populations a telephone survey was considered however the results from the stratified sample would still be too small for statistical analysis at that level.

Another factor emerged from discussions with experts in the defence industry, government departments and the industry partner representative. These parties indicated that there was a high level of secrecy and security surrounding the defence industry and competitiveness in the commercial marine and yachting and pleasure craft industry. As the researcher was not known to the research population and the introduction through the industry partner was no longer available, it was considered that meeting with participants face-to-face would build a higher level of trust and would produce a richer data set than surveys or telephone interviews (Marshall & Rossman, 2006).

The investigative nature of the research, the possible interactions of factors such as firm size and level of collaboration, the importance of studying the social interactions in collaboration and the impact of the external environment as illustrated in Figure 5.4 below determined that the research take a predominantly interpretivist approach, seeking to identify any possible patterns that may exist (Fisher & Arnott, 1998; Patton, 1990). The interpretivist approach does not predefine dependant and independent variables but focuses on making sense of phenomena through the meaning people assign to them (Gummesson, 2003). The cluster being studied presented a complex system of networks where the variables and their relationship were yet to be established.

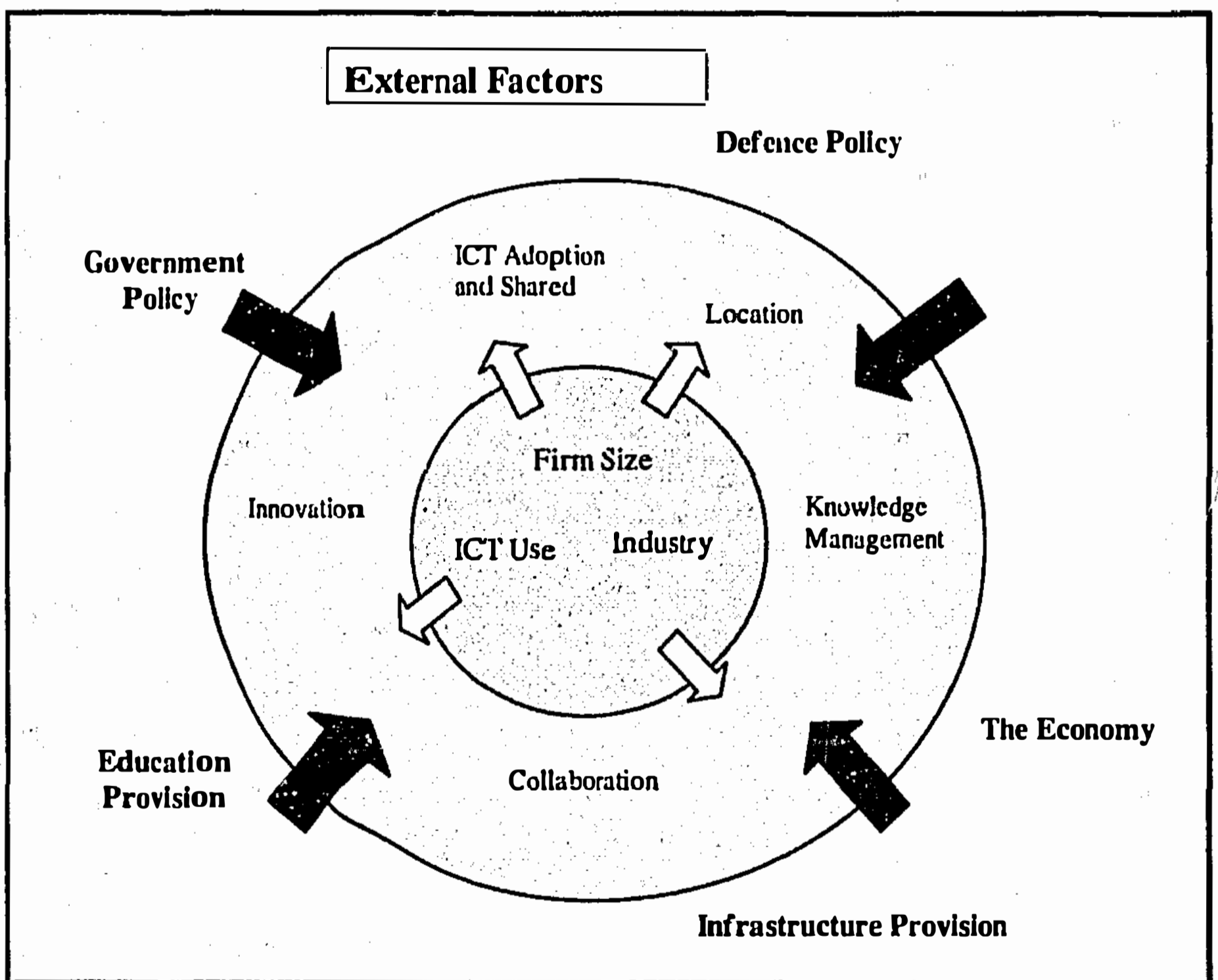


Figure 5. 3 Collaborative Factors Studied in the Cluster

5.4 Research Method Selection

The elimination of a positivist approach and the use of a survey lead to the assessment of a number of other data collection methods including focus groups, action research and case studies. Focus groups provide an opportunity for one shot

data collections and are useful when the window of opportunity for studying particular groups is limited (Berg, 2001). Despite the advantages of focus groups such as the data gained for the interactions between group members and range of opinions that are expressed, the researcher was concerned that the heterogeneity of the groups may lead to group norms and that valuable data would be lost. A number of the research participants were from the defence industry and there was a possibility that they would not be willing to discuss some issues in a public arena where their views could be identified with their organisation (Parahoo, 2007).

Action research was also considered as it provided opportunities for participation, reflection and empowerment of those involved in the research (Berg, 2001). Though action research could have brought about improved collaboration in the region being studied, the diversity of the research participants' interests would have made it difficult to address in a single research project.

5.5 Case Study Research

The final research method considered was case study research, which is suited to answering 'how', 'why' and 'what' questions (Yin, 2003). From the research questions stated earlier in this chapter it can be seen that the research is of an exploratory nature requiring the collection of data from various sources both inside and outside the cluster. Previous studies on collaborative relationships in clusters in Australia have generally only incorporated one dominant company or industry as with Incat in Tasmania. However the current cluster being studied has a group of dominant companies interacting with a wider group of small firms within the cluster and across Australia.

The number of factors being examined, the diverse groups within the population of the study and its exploratory nature lead to the adoption of a case study approach in an attempt to capture the multi faceted nature of the research. Collaborative business relationships are based on human interaction as well as the complexities of corporate interactions and require a research process that is capable of discovering

the behaviours and attitudes of those involved in the relationships and their interaction with the ICT employed by organisations. The research seeks to also discover the rationale between the behaviours and choices made by the respondents. A qualitative research methodology allows for the investigation of unquantifiable facts and allows the researcher to gain insight into the preconceptions of others (Berg, 2001).

Yin (2003) describes three types of research for which case studies are suitable: descriptive research, explanatory research and exploratory research. Descriptive case research is based on the presentation of a descriptive theory on which the study is based. Explanatory case research can be used when seeking to identify patterns or causes of phenomenon by pattern-matching data from cases to theoretical propositions. Exploratory case research can be undertaken before the formulation of the research question however there must be a study framework prior to research commencing. This form of research can be a precursor to a larger study (Berg, 2001).

Yin (2003, p.13) defines case studies as an empirical inquiry that “investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”. The use of a case study approach allows the investigation of the interrelationship of the various parties in the study and also the identification of specific relationships between organisations from both sides of the relationship.

According to Stake (2000, p.435) cases are “defined by the interests in individual cases, not by the method of inquiry used”. The definition of a “case” can prove difficult as some theorists believe that the case is already in existence and waiting to be studied or at the other end of the spectrum that cases are defined over the course of the field work (Miles & Huberman, 2002). A case is a bounded system with certain features in the system and those externally which provided context (Stake, 2000). In contrast Miles and Huberman (2002) consider the bounding of a case may prove to be quite difficult.

In this research project there are a number of possible ways of bounding the case. The whole of the cluster and the organisations external to it could be one case. As described in Chapter 1 the study focuses on a specific region and industry within that region, being the marine, defence and oil industries in Henderson. According to the literature cited in Chapter 2, organisations external to these relationships such as Government and Educational institutions may also impact on the formation and viability of collaborative relationships and the actions of the external organisations. The large firms may also influence the adoption and use of ICT. These external organisations could be considered in the context of the industry cluster and could also be seen as a case. At the other end of the spectrum each organisation interviewed as part of the research could be considered a pilot case.

Given the focus on a specific region and the unique nature of the cluster which incorporates at least three major industries it was decided to employ a single case study method for theory building. It is suggested by Yin (2003) that single case studies provide a 'critical case' for the development of theory and that they are useful when the case is of a unique nature or where the situation has the potential to be revelatory.

The Marine, Defence and Resources cluster at Henderson is unique in that it has a number of dominant organisations competing for power. The study of this case may reveal insights into collaboration where there is a significant power asymmetry between organisations and in a cluster where there are a number of dominant companies. The research will not only investigate relationships between companies within the Marine, Defence and Resources cluster but will also seek to understand interactions of Government and Education with the industry cluster.

A comparison of the research methods discussed and their application to the research project is outlined in Table 5.2.

Table 5. 2 Analysis of Research Methods

Research Approach	Application to Research	Application to the Study	Adopted
<i>Philosophical Approach</i>			
Positivist	Testing hypotheses, measuring cause and effect relationships without reference to the outside world	No clear hypothesis to emerge from the literature and the context is part of the study	No
Interpretivist	Investigates relationships and meaning imbedded within those relationships and the social setting in which they occur	Investigation of possible relationships in the context of the region in which the industry cluster is located	Yes
Critical Realism	Studies the evolution of society over time seeking to uncover the real structures and to help people change their conditions and build a better world for themselves	One of the outcomes of the study is to inform government policy in the region to improve economic growth in the region	No
<i>Research Method</i>			
Survey (mail/electronic telephone)	Test hypotheses. Response rate of over 25% and at least 100 surveys for statistical viability	Small population (150) with insufficient numbers for statistical viability particularly if the response rate is low.	No
Focus Group	Ability to study a particular group if time is limited.	Concern that not all views would be heard across the research population as interests were quite different	No
Action Research	Provides increased capacity for the participation and the empowerment of the research participants	Final results will be fed back to government and the participants.	No
Case Study Research	Allows the explorations of relationships and external environment	Investigate relationships between large and small firms inside the cluster and the impact of external organisations on the cluster	Yes

The field of collaborative business relationships has been discussed within a range of academic disciplines including marketing, organisational theory, social science, economic and information systems (Barringer & Harrison, 2000; Oliver, 1990; Orlikowski & Bradely, 2001; Holmlund, 2001). The impact of ICT on organisations and their business relationships has been discussed in a broad range of the Information Systems literature (Chatterjee & Ravichandran, 2004; Urbaczewski, et al., 2002; Leek, et al., 2001). This research seeks to combine these areas of thought as they are both focused on studying the social and technical aspects of organisations and the cross fertilisation of ideas from each area (Orlikowski & Bradely, 2001).

The researcher has yet to identify a specific validated model concerning the drivers for organisations to enter collaborative relationships: the factors that impact on the creation and sustaining of collaborative relationships; the role of ICT in facilitating and sustaining collaborative relationships and the benefits of collaborative relationships in asymmetrical business relationships. The research will, therefore, be exploratory in nature seeking to find if there are any patterns from which a model could be drawn rather than the validation of an existing model.

A number of researchers (Halinen & Tornroos; 2004, Carroll & Swatman 2000; Fisher & Amott 1998; Carroll, et al., 1998) consider that case study research is applicable to the business relationship and information systems research. Adopting a structured case study approach will allow the examination of business networks and relationships as a contemporary phenomenon within the dynamics of the setting in which they are involved.

There are difficulties with using case studies in the business relationship context. These include identifying and separating out specific relationships between organisations as these relationships can be interwoven in the network of organisations within a cluster or region. It can be difficult to isolate a single relationship when organisations are part of network. Another issue suggested by Halinen and Tornroos (2004) is the problem of time when dealing with dynamic networks that are subject to change and relationships can be formulated and dissolved over the time of the study.

5.6 Research Model

To examine a number of facets of the cluster and incorporate all the players in the cluster, both internal and external interviews were undertaken with organisations in the five industries identified in the cluster and external organisations identified as potentially involved in the cluster. The multiple organisational interviews provide:

- The ability to view the subject from many different angles and gain rich and in-depth data.
- The exploration of many more variables and data sources.
- The ability to compare the responses from the small, medium and large organisations and examine collaborative relationships in the context in which they operate.
- The ability to explore the context in which the organisations exist.
- The opportunity to gain an understanding of the interactions between people, process and technology within the organisations.
- The opportunity for theory building through multiple case studies (Yin, 2003; Carroll & Swatman, 2000; Halinen & Tomroos, 2004; Eisenhardt, 1991)

The case study research follows the framework in Figure 5.4 commencing with a literature review as contained in the preceding chapters. To gain greater understanding of the marine and defence industries and collaborative relationships a number of interviews were conducted with three experts and academics in the USA, UK and Scandinavia. The information from the literature and interviews was incorporated into the conceptual framework which was then used to formulate the interview schedule for testing in a pilot study process.

Pilot interviews were undertaken prior to the main data collection and to further refine the interview schedule a pilot case study was conducted of a marine industry cluster in north-eastern Australia. The participants in this case study were representatives of non-industry organisations which are involved in the development and sustaining of the cluster. Following the pilot process the fieldwork commenced with the identification and enlistment of organisations to take part in interviews for

the case study research. The interview data was collected and coded as an ongoing process during data collection to investigate any new areas for exploration (Carroll & Swatman, 2000). Secondary data concerning the organisations, the industry in which they participate and the regional economy was also collected over the course of the research.

Reflection on the data that was gathered and analysed signalled emergent themes and new interpretations and identification of conflicting findings. From this theory development was undertaken in light of the literature and the findings which are discussed in Chapter 8 Summary and Conclusions.

The research process can be either a step by step approach (Eisenhardt, 1989; Halinen & Tomroos, 2004) or it can be an iterative approach where the research feeds back into itself (Carroll & Swatman, 2000; Minichiello et al., 1995). The research followed a step by step approach in the data collection however, once the data was collected an iterative approach was taken with repeated reflection and analysis in light of the conceptual framework and the literature on which it is based.

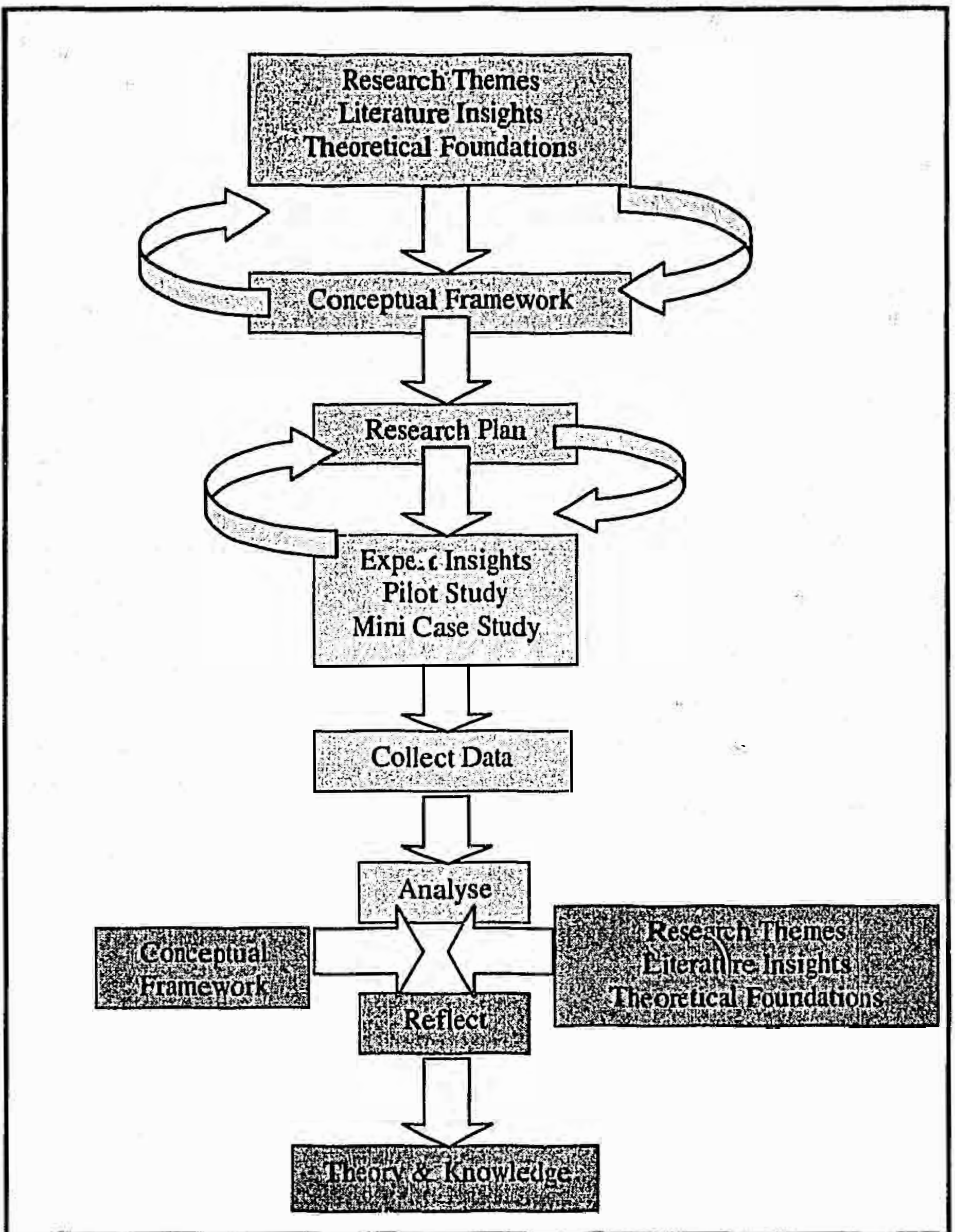


Figure 5. 4 Research Framework (Adapted from Carroll and Swatman 2000, p. 241)

5.7 Sampling Frame

The success of study is dependant on the cooperation of parties involved being willing to participate in an interview. A mailing list of firms in the region was obtained and was cross referenced with the AMC website and the industry partner to

assist in identifying key large firms in the region. Although these firms were the starting point for the research many of the further participants were identified by previous interviewees which formed a snowball or chain sampling framework for the study as suggested by Patton (1990).

Interviews with large, medium and small companies across the five industries were obtained between March and May, 2006. Interviewing continued until the data began to replicate itself. Data for the research was collected using interviews with individuals involved in the management of business relationships within organisations trading in the Henderson Rockingham region. Interviews were also conducted with representatives of non-industry organisations that were related to the cluster.

5.8 Research Instrument

The initial questions were more general in nature and were designed to get the interviewee to think in general terms about the subject before more in-depth questions were asked (Minichiello, et al., 1995). The following table shows the stages that the interview moved through starting with general questions about the company then moving to collaboration, ICT and concluding with the future intentions with collaborative relationships.

Table 5. 3 Research Instrument Layout

Stage 1	General questions about the company IT use, size, age and length of time in the region
Stage 2	Collaboration questions who they deal with in the region, drivers, benefits, measures, critical factors and external factors
Stage 3	Technology and collaboration introduction, implementation, benefits, drawbacks and knowledge management.
Stage 4	Innovation, future relationships and further comments

The development of this instrument from the conceptual framework and the pilot process is discussed further in the pilot chapter.

5.9 Data Collection

According to Yin (2003) there are three types of interviews, those that are open-ended where the interviewer asks for the facts of the matter as well as the interviewee's opinions and views about events. The second type of interviews are those that are focused in nature where the interviewee is following a specific set of questions while still being conversational in style. The final is along the lines of a formal survey with even more structured questions. From the proposed interview schedule it can be seen that this study will use focused interviews with structured questions. This approach was taken in order to cover the wide range of themes to be examined in the study and to assist with analysis of the data between cases.

While collecting the data Klein and Myer's (1999, p.72) seven Principles of Interpretive Field Research were applied as outlined in Table 5.4 below.

Table 5. 4 Principles of Data Collection (Klein & Myer 1999, p.72)

Principle	How this principle was addressed in this study
<p><i>The Fundamental Principle of the Hermeneutic Circle</i> All human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form.</p>	<p>Comparing the responses across industries; firms size and between the cluster and the external organisations. The cluster and the external environment can be viewed as a whole however it is also a sum of it parts. The iterative nature of the data analysis moved between the literature, the theoretical framework and the data itself.</p>
<p><i>The Principle of Contextualisation</i> Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the situation under investigation emerged.</p>	<p>The cluster in this research sits within the context of the region and its history, the various industries being studied, and government policy. To understand the data in light of this context the research has accessed expert insights and secondary documentation.</p>

Table 5.4 Principles of Data Collection (Klein & Myer 1999, p.72) cont.

<p><i>The Principle of Interaction Between the Researcher and the Subjects</i> Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researcher and participants.</p>	<p>The nature of interviews means that there were interactions between the subject and the researcher. The researcher questioned how she has influenced the data collected. She questioned her own assumption about the data being collected while holding the context in mind.</p>
<p><i>The Principle of Abstraction and Generalisation</i> Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action.</p>	<p>The research attempts to gain some general principles from the data following the conceptual framework developed prior to the study. Although it is a unique region a deeper understanding of collaboration may be gained through the data analysis.</p>
<p><i>The Principle of Dialogical Reasoning</i> Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision.</p>	<p>Where conflicts appeared between the findings of the research and theoretical concepts on which the research is based, the Principle of Dialogical Reasoning was used, revising and examining the theory in light of the data.</p>
<p><i>The Principle of Multiple Interpretations</i> Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it</p>	<p>As multiple interviews were undertaken in the same organisation the researcher is aware that the Principle of Multiple Interpretations will apply where each participant sees the situation from a different angle and this was taken into account in the data analysis.</p>
<p><i>The Principle of Suspicion</i> Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.</p>	<p>Finally, the researcher was mindful of any biases or distortions that appeared in the narratives provided in the interviews. When exercising the Principle of Suspicion the researcher examined the statements made by the participants in light of their possible political or economic motives.</p>

5.10 Data Analysis

The interview transcripts were coded and analysed using NVivo7. The coding in NVivo7 was based around the research questions and the themes that emerged during the data analysis. The data analysis for the pilot research assisted in identification of nodes of the coding of the interview text. The tree nodes used in the data analysis are displayed below in Appendix 1.

To provide another perspective on the data collected and check that there had been consistency in the analysis the interview transcripts were analysed using Leximancer which sought themes across the transcripts as a whole. Leximancer is a text-mining software tool for analysis of text-based documents such as interviews, reports, transcripts. Using an algorithm the program generates concept maps, by grouping words and character strings into suggested clusters of meaning. The results of the data analysis are presented in Chapter 7.

5.11 Validity and Reliability

As the research is qualitative with the majority of data being collected via interview the validity of the study depends on the “skill, competence and rigor” of the investigator (Patton 1990, p. 14). In order to maximise reliability and validity the following tactics in Figure 5.6 as suggested by Yin (2003, p.34) were used at the various stages of the research to address these issues.

Table 5.5 Research Tactics to Address Reliability and Validity

Stage of Research	Case Study Tactic	Test	Proposed Research
Research Design	Use replication logic in multiple case studies	External Validity	The case studies were divided into grouping by firm size, industry and external organisations. Interviewing continued until the responses began to replicate themselves.
Instrument Development	Have key informants review the draft case study report	Construct Validity	Academics and key industry representatives involved with the research reviewed the draft case study report. The instrument went through a number of iterations in light of the literature, expert opinions and the pilot study (see figure 5.6 below).
Data Collection	Use multiple sources of evidence	Construct Validity	Data has been collected from multiple sources including face-to-face interviews, organisational websites and secondary documents and reports.
	Establish a chain of evidence/audit trail		Documentation of evidence gathered at each phase of the research including initial research questions, research formulation and testing through experts and pilot studies, case study protocols, citations to all sources of data, the case study database and case study report. These formed an audit trail for the research.
	Use case study protocol	Reliability	An overview of the case study, field procedures that were used, the case study questions and a guide for the format of the case study report were produced.
	Develop a case study database		The data was gathered via interviews, notes, documents, quantitative data from the interviews and the narratives from the interviews
	Member Checks		All participants were offered a copy of their interview transcript, and interviewee transcripts sent to 8 participants who requested a copy to check that the statements made in the interview had been accurately recorded by the researcher.

Table 5.5 Research Tactics to Address Reliability and Validity cont.

Stage of Research	Case Study Tactic	Test	Proposed Research
Data Analysis	Pattern-matching Explanations Building Address Rival Explanations Use logic Models	Internal Validity	Compare patterns from the research to those found in the literature and those indicated by the survey and those identified during the interview. Compare patterns against a rival or conflicting theoretical position. Investigate if the patterns indicate any explanation for observed phenomena. Review data as it is collected. Compare observed patterns and explanations against theoretical framework for the literature.

These Principles were applied to create a framework to ensure each aspect was considered as part of the study and assist with the quality of data interpretation.

5.12 Chapter Summary

The previous four chapters have laid out the research themes, literature relevant to the study, expert insights obtained and the theoretical foundations to the study. This chapter has discussed the context of the research and research method employed for the study. Chapter 6 contains the results of the pilot study process and the revised research instrument that resulted from that process. The results from the research and the summary and conclusion are presented in chapters 7 and 8 respectively.

Chapter 6: Research Pilot and Instrument Development

6 Introduction

Following on from Chapter 5 in which the research methodology was presented this chapter details the process for the development and refining of the research instrument and gaining greater understanding of the context of the study. The research instrument was developed from the literature and expert interviews. It was further refined through a pilot study and a case study which were conducted prior to the main data collection. The insights from the expert interviews and the results of the pilot process and their implications for the research instrument are detailed in this chapter and are illustrated in Figure 6.1.

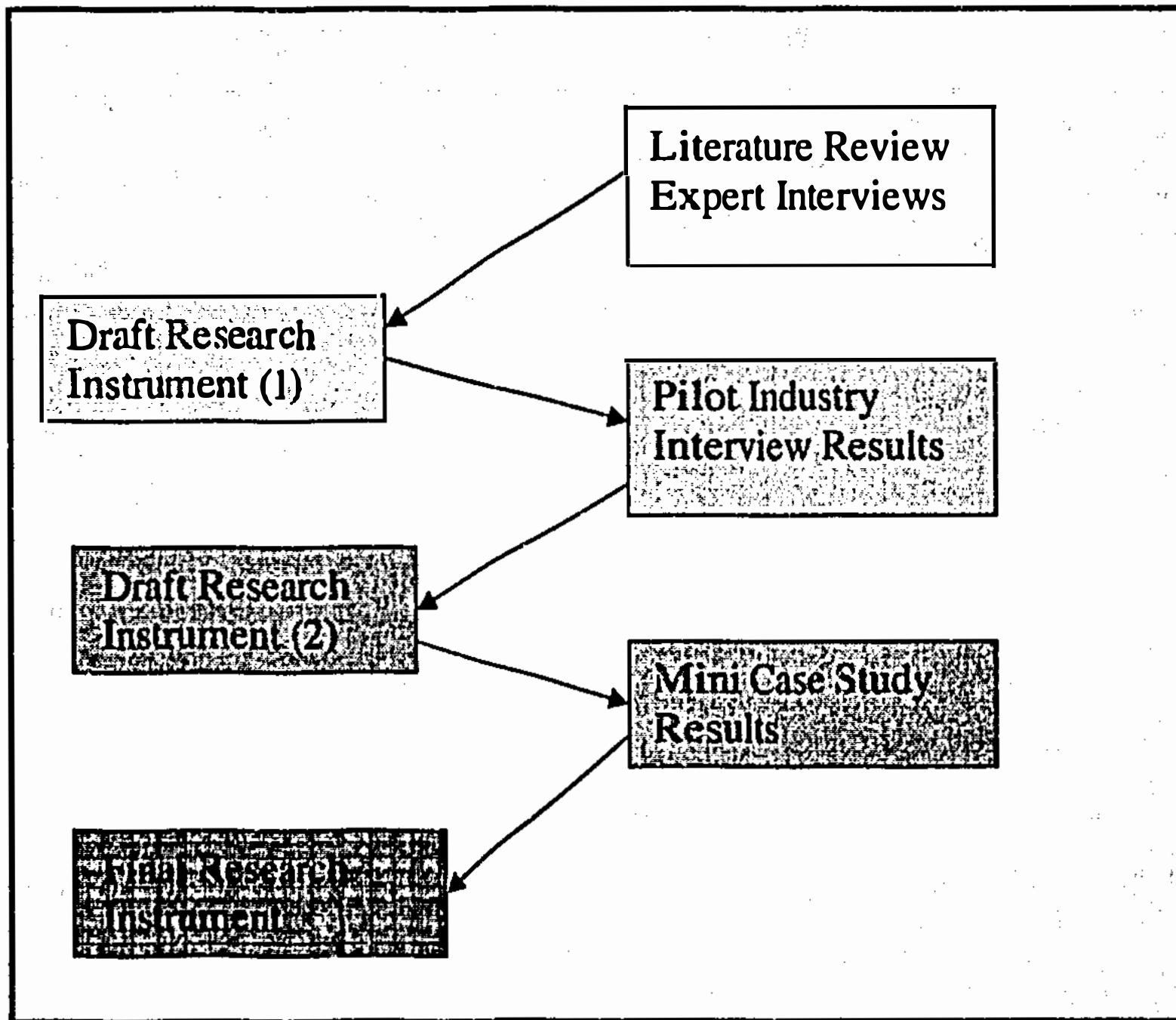


Figure 6. 1 Instrument Pilot Process

6.1 Expert Interviews

For the research to gain further insight into the marine and defence industries and the functioning of clusters based around these industries a number of unstructured interviews were undertaken as part of an international study tour in May and June of 2005, prior to the commencement of the main data collection. Locations and experts for interview were identified from the literature and provided a cross section of information on the defence and marine industries and case studies on industry and regional cluster development. The focus on Scandinavian countries was due to their small economies, sea faring traditions and their previous defence self sufficiency during the Cold War. Similarly, Australia has a small economy, a sea faring tradition and due to its geographic isolation has sought a level of defence self sufficiency. Finland in particular has experienced significant economic growth for a country that previously relied heavily on agriculture. The organisations and the information gained are outlined in Table 6.1 below.

Table 6. 1 Expert Interviews

Organisation/Expert Location	Purpose of the Interview
Cluster Research Org, Stockholm School of Economics Stockholm, Sweden	The Cluster Research Org had undertaken international research into cluster development and the role of government in the process. The interview provided further information on successful cluster programs.
Tekes Helsinki Finland	Tekes is the Government Ministry that deals with technology development in Finland and the creation of innovation clusters. Provided insight into government based economic development projects.
Oulu Business Development Agency Oulu Finland	Oulu Regional Business Development Agency was founded by a number of local governments around the Oulu region. It provided a model of integrated regional development by using the existing regional strength of telecommunications to facilitate economic development through a business incubator, the supporting of start companies and links with the local university.

Table 6.1 Expert Interviews cont.

San Diego Connect San Diego USA	A local government based organisation that seeks to provide linkages between SME's in the eastern counties region of San Diego. This interview provided background of the facilitation of a defence cluster by local government.
FOI, Swedish Defence Research Agency Sweden Stockholm, Sweden	Sweden is a small economy like Australia and up to 1990 had a protected defence industry. The interview provided information on government policy and initiatives to assist a local defence industry face international competition.
Centre for Marine Research, Turku Finland	Provided background on strategies used to strengthen the Finnish Shipbuilding industry during down tum in the 1980s. The industry has managed to survive the threat of cheaper vessels from Asia.

The information gained for these interviews has been incorporated into this chapter as part of the background to the study and assisted in the development of the interview schedule for the main data collection. Having gained experience and knowledge from overseas also assisted the researcher during the data collection to engage the interviewees with greater ease.

6.1.1 Cluster Development Research, Sweden

It can take three to five years for a cluster to start to bear fruit with visible increases in exports, innovations and employment (G. Lindqvist, Personal communication, June 10, 2005). With any cluster there must be a sustainable market for the product and industries such as defence which are driven by a single customer i.e.

Government, can prove to be unstable. Where an outside organisation is involved in the development of a cluster there can be a number of critical problems such as which organisation is dominant and questions of whose interests are being served by the cluster.

It was suggested by Linquist (2005) that targets be identified for the cluster. All organisations within the region should be surveyed to provide a map of the common and rare capabilities within the cluster and identify related industries. This mapping

is one of the ways to counter uncertainty in demand, providing firms with alternative markets for their competencies should the dominant market suffer a downturn. This information gained from the mapping process would form the basis of a database and any new companies entering the cluster would be entered on to the database.

According to the cluster research organisation ~~there are seven groups of activities, but~~ drivers for the establishment of clusters: joint production through purchasing, logistics and supply chain development; firm formation through incubation, spin off and business service; joint sales through joint product or regional branding and foreign market promotion; joint R&D; intelligence on the market or innovations; lobbying government policy, regulations and for the provision of infrastructure and human resource upgrading – technical, managerial training and education system interface (Lindqvist, 2005).

6.1.2 Finnish Clustering

Tekes is the Government Ministry that deals with technology development in Finland and the creation of innovation clusters. In Finland, the Government funds defence research as a means of procuring the best products and services for the military. The military tends to follow developments within the commercial sector then seeks to use them for military applications. (E Virtanen, Personal communication, June 13, 2005).

As Finland has such a small domestic market it has become export focused. Much of the cluster development in Finland has not been developed as a result of public sector policy but has been market driven. Big companies tend to attract smaller businesses which then become part of the value chain. Large firms tend to stay in a fairly narrow part of the value chain and seek partners to take on other functions within the value chain. There are some alliances between small companies, however it is usually just in the form of buyer/seller relationships. Within clusters it is suggested that there should be a combination of different companies and that no cluster is complete, there is always room for improvement.

An example of a cluster in Finland is that of the Biotech cluster which is based around the location of a large drug company in the city of Turku. There has been considerable public sector investment in Biotech with the focus being on innovation. In the 1990s there was a major economic downturn in Finland at which time the Finnish Government decided to invest in facilitating innovation in the technology and biotech sectors. The Government currently invests 400 million Euros annually, for a population of 5 million, into innovation, which is comparable with the amount invested by France with a significantly larger economy and population. The Government set up specialised offices focused on economic development of which Tekes works in the funding of innovation through selected start up companies and projects. Of the projects funded 50% lead to commercial success with 25% failing with no market outcome at all.

Recently there has been some backlash towards the funding by Tekes as the new start-ups supported by Tekes entering the market are considered to be taking market share from existing companies so the Government has reduced its funding of the private sector.

The basis of the projects funded by Tekes is collaboration between companies and the academic sector. Within Finland there is a culture of collaboration and participation with the country having one of the highest participation in Clubs, Unions and Societies. In the past there has also been external pressure both politically and economically for Firms to work together in order to achieve a common outcome (Virtanen, 2005).

6.1.3 Oulu Regional Cluster

The City of Oulu is located in the northern part of Finland and is thus not in competition with the cities of the south, where the majority of the population live. In the late 1990s the Finnish Government pushed local Councils to work more on a regional basis and this was the impetus for the development of the Oulu Regional Business Development Agency (H. Koivukangas, Personal communication, June 22, 2005).

At this time the city made a statement that it would become a technology city, yet apart from the location of a division of Nokia there was no basis for this statement. When Nokia did relocate in the 1980s to Oulu they focused their research on wireless applications. At the same time the National Research Centre for Electronics was also located at the University of Oulu.

The growth in mobile commerce saw Nokia become a major customer of a number of contractors in the region. At the same time Nokia itself developed a policy which did not allow the organisation to grow past 4,000 employees. This resulted in numerous spin-offs of divisions of Nokia into private companies which then subcontracted back to Nokia, but also did business elsewhere in the region.

Unfortunately most of these companies are still dependent on Nokia and are not ready to seek out international business.

The number of start-up businesses in Finland is increasing compared to a declining number of start-ups in Europe. The Oulu region also cooperates with adjacent regions in Sweden as Oulu is the same distance from Stockholm as it is from Helsinki the capital city of Finland. This cooperation with Sweden allows companies in the Oulu region to access larger markets and provides for mixed competencies between the firms in Finland and those in Sweden.

The Regional Development Authority has also sought to relocate existing companies into the area using the economic strength of the region but also other attractions such as the clean environment and access to housing and office space. There are also life style issues such as national sporting teams located in the region and access to pristine wilderness areas. The region is fast growing and has a young highly educated workforce. The Development Authority works with small companies with up to 10 employees and seeks to develop a long term relationship with these companies, tailoring their consultancy services to the companies' needs.

The Development Authority is located in the Oulu Technology Park which is centrally located in the city, has good public access and parking. It provides a facility for free face to face meetings for its customers which are both start-up firms

and existing firms. Services provided by the Development Authority include business mentoring, business incubators, market research and listings of suppliers and potential buyers. The companies which locate in the incubators are innovative companies which are either start-ups or businesses wishing to expand.

The Development Authority has also been successful in establishing collaboration between competitors. In one case builders of log homes collaborated on designs and purchasing and managed to increase their overall sales by 35%. Other areas of collaboration include building, metal work, handcrafts and tourism.

The Development Authority uses private consultants to assist when required. They provide IT development and training in software programmes. They work with 300 entrepreneurs per year. In the area of IT adoption they provide assistance in project architecture, IT solutions and wireless solutions. They may also locate individuals who specialise in certain areas of IT to assist companies in developing IT solutions and often act as brokers between organisations.

The Development Authority runs monthly free seminars on how to start a new company and at any one time they are working with up to 20 companies in a consultancy capacity. To assist companies in the region the Development Authority focuses on assisting companies to enter the European market and encourages companies' attendance at business to business trade fairs.

The Development Authority plays a linkage role between Oulu University and spin-off companies. One of the main areas of current development is biotechnology. Despite Oulu being the second largest University in Finland there is a shortage of IT skills within the region in specialist areas.

The model used by the Development Authority is capability, marketing and model integration. Ideas have been collected from around the world on business development and have been modified to work in the region. The Authority is always seeking new ideas from other countries and applying them within the Oulu context. One of the key indicators of the programme's success is job creation with a net gain of 400 jobs per year in the region (Koivukangas, 2005).

6.1.4 San Diego Defence Cluster

San Diego Connect is a local government based organisation that seeks to provide linkages between SMEs in the eastern counties region of San Diego. Their work has focused around the mapping industries in the region to identify linkages/supply chains between industries both direct and indirect (D. Weeks, Personal communication, May 16, 2005).

They have also been constructing a database of companies' capabilities in the region in order to identify capabilities that link to certain industries. This is so that companies can have flexibility to switch industries in the case of a downturn – such as the region experienced in defence industry during the 1990s. The work is seeking to develop flexibility within the firms in the region so as to enable them to ride out fluctuations in customer demand.

The database is for firms in the region to contract locally, as many firms did not know what their neighbours produced. The other use is to find potential buyers for a firm's products. Connect has been using the data base to develop consortiums to tender for government defence contracts as they can search by capability. The data gathered on the industries has an historical basis and may prove useful to identify areas of industry growth and the development of collaborative relationships between firms to innovate in the growing sectors.

There has not been a long history of technology transfer from the Universities in the San Diego region, and currently there is only one person employed at San Diego State University for technology transfer.

The Federal Government has often considered spending on defence to be a method of regional development. Another form of Government policy has been the use of Community Reinvestment Acts which provide a form of bank that invests in communities and provide opportunities for low income businesses (Weeks, 2005).

6.1.5 Swedish Defence Industry

During the Cold War Sweden was independent in its production of military requirements, but the Government's demand for defence related equipment has declined since the end of the Cold War leaving many well established firms in the defence industry with a significantly reduced demand. The Swedish Government has attempted to encourage diversification into new markets by existing defence firms. However, the sense of self sufficiency prior to 1990 has meant that government initiatives to encourage Swedish defence firms to collaborate with foreign companies have not been very successful (M. Lundmark, Personal communication, June 9, 2005).

Despite the lack of collaboration there have been increasing levels of foreign ownership within the defence sector in the past 15 years and this has precipitated the development of government policy on foreign ownership. Though once self sufficient the defence industry in Sweden now has a supply chain that includes international suppliers. The current trend within the Swedish defence industry is integration which takes the form of mergers, acquisitions and joint ventures that assist in rationalising the market place.

With the end of the Cold War and the development of the European Union there is increasing international integration in the defence industry across Europe. It would seem there are certain regions which specialise in particular areas of defence production. Whereas in the past, countries sought to be self-sufficient in producing all of their defence requirements, there now seems to be specific regions of expertise or clusters against which firms in Sweden find it difficult to compete. The defence market across Europe has now become regionalised with countries specialising in different facets of defence production. For a small country such as Sweden this may require focusing on particular niches of defence production and external purchasing in order to meet the needs of the defence force. By the same token Sweden in collaboration with its Scandinavian neighbours has developed joint production projects which have allowed specialisation in niche markets.

Areas that are currently being considered by the Swedish Defence Research Agency include: what are the niches of defence production which Sweden can exploit and what are the core competencies required to compete in these niches; the future of SMEs in the defence industry as Government is the main customer and tends to use the larger contractors; what core competencies within the defence industry that have external commercial applications; ways in which to overcome the culture of independence within the defence industry in Sweden and how to create better conditions for SMEs in the defence industry, both existing and new. Other issues identified included the long lead times required to get technological innovations into service due to the sensitive nature of the equipment. The secrecy surrounding the technological aspects of the defence industry also require ongoing service agreements. Different forms of defence industry models include State ownership of defence companies, a State monopoly or private companies. The level of foreign competition within individual countries' market places, for example the UK, is open to competition and the government still purchases from foreign suppliers.

To address some of the issues raised it has been proposed to develop a defence innovation centre in Sweden. This would combine stakeholders and procurement agencies to identify and communicate with future defence needs to SMEs so as to encourage them to be involved in the defence ventures, particularly in the area of defence.

The Swedish Defence Research Agency also investigated the impact of globalisation upon the defence industry and the ongoing tension between the USA and European defence industries which has had a history of conflict and a lack of trust (Lundmark, 2005).

6.1.6 Shipbuilding in Finland

Finland itself has been historically dominant in shipping, this is partly the result of Finnish industry being forced to make reparations to the Soviet Union after World War II. The shipyards are the major industry in Turku. However, in recent years the marine sector in Finland has contracted to the production of ferries and cruise liners.

One of the ways the shipyards have responded to a reduced number of ships being built is to focus on repair and upgrade of existing ships (T. Karvonen, Personal communication, June 16, 2005).

Within the marine industry in Finland there are three dominant companies. In Turku the dominant shipyard is Aker Finnyards which employs 136 sub contractors. There are some alliances between the SMEs. Besides luxury cruise ships and passenger ferries, Aker Finnyards is also involved in the production of military vessels and has recently been commissioned to build a small naval attack ship, which was a collaborative process between the Navy and the ship builder. The shipyard in Turku is becoming the dominant shipyard in Finland as the yard in Helsinki has limited space for its expansion and currently sits on extremely valuable oceanside land.

Trends within the shipping industry include passenger ships with more space for cargo and with higher icebreaking capability. In the cruise liner category there is a push for larger ships with the growth in cruise tourism in both Europe and USA. Finnish shipbuilding competes with Germany, France and Italy with the Italians being the strongest competitors.

Finland has worked to develop a niche in relation to Arctic vessels, such as icebreakers. There have been some links between technology and shipping, particularly through subcontractors. Although the Finnish shipping industry no longer builds tankers Finnish technology is used by the Chinese in their tankers. The workflow within the shipping industry varies and subcontractors tend to pick up the slack with there being some overlap with the building and fabrication industries which allow the subcontractors diversity of income. There is also another issue with shipbuilding in Finland. During winter there are some days when it is impossible to work outside due to the extreme cold.

The long tradition of shipbuilding in Finland has meant that in the past there was no shortage of skilled labour. However the contraction of the industry in the 1980s has lead to a current shortage and now an active programme of recruiting young people for the industry.

In comparison to Finland Sweden also had a large shipbuilding industry, however during the 1980s when competition from other countries entered the shipping market the Swedish industry went into decline. The only ships now being produced are those for the Swedish Navy. One of the reasons Finland avoided the same fate was government intervention at this time and a rationalisation of the economy. Also the acknowledgement that shipping is extremely important to the Finnish economy as 90% of exports are carried by sea (Karvonen, 2005).

From the expert interviews key points were identified in relation to clusters and collaborative relationships which were incorporated into the interview schedule developed as illustrated in Table 6.2.

Table 6. 2 Expert Insights and Related Interview Questions

Expert Insights	Research Questions
➤ Support of government and peak industry bodies in support.	Question 4 who the firms deal with in the region both government and private sector
➤ Linkages and collaboration between local firms assist cluster development.	
➤ Encourage existing companies to relocate into the area using economic, environmental and life style factors and incentives.	Question 2 concerning length of time in the region and reason for locating to the region and question 5 the proportion of business conducted in the region.
➤ Clusters are assisted by presence of drivers such as a history or dominant firm.	
➤ The role of an external facilitator such as the government and conflicts of interest.	Question 10 concerning external factors that have impacted on collaboration

6.2 Research Instrument

The primary focus of the research instrument is to answer the research questions posed in Chapter 1 and restated here below.

1. *What are the drivers and inhibitors for organisations to enter collaborative relationships?*
2. *What are the factors that impact on the creation and sustaining of collaborative relationships?*
3. *How does ICT facilitate and sustain collaborative relationships?*
4. *What are the benefits and drawbacks of collaborative relationships?*
5. *Are there models of best adoption of collaborative relationships?*

The original draft questions formulated are outlined below in Table 6.3 along with their relationship to the research questions and the literature.

Table 6. 3 Draft Interview Schedule

<i>General questions about the company IT use, size, age and length of time in the region</i>	
Question	Theory or Issue
Which of the following do you use in your company? (Types of ICT)	Research Question 3 - to establish the level of ICT usage within the organisation.
1. How many employees does your organisation have?	Determine the size of the organisation and enable comparisons between firms of a differing size.
2. How many years has the company been trading for?	Ascertain the length of time the company has been operating particularly within the region to see if there is any relationship between a company's history and level of collaboration.
3. What would you say is the main focus of your business?	To identify the industry to see if there was any industry patterns of collaboration and ICT use.
4. According to the definition can you think of any companies that your organisation has any collaborative relationship/projects with?	The kinds companies are they collaborating with, size and industry.

Table 6.3 Draft Interview Schedule cont.

<p>5. If so what proportion of your business relationships would be involved in collaborative relationship/projects in terms of percentage of income?</p>	<p>How focused on collaborative relationships are the companies.</p>
<p><i>Collaboration question: whom they deal with in the region, drivers, benefits, measures, critical factors and external factors</i></p>	
<p>Question</p>	<p>Research Question</p>
<p>6. What benefits does your company derive from these relationships?</p>	<p>Question 4 - Benefits of Collaboration research</p>
<p>7. How does your company measure the benefits of these relationships?</p>	<p>Question 4 - The level of information surrounding the benefits of collaborative relationships.</p>
<p>8. What do you think are the factors critical to sustaining these relationships?</p>	<p>Research Question 1 - seeking the drivers and inhibitors of collaboration that are central to the relationship.</p>
<p>9. What are the factors external to these relationships that you feel have impacted on the benefits derived?</p>	<p>Research Question 2 - examining the environment in which the relationships operate to ascertain if it impacts the relationship.</p>
<p><i>Technology and collaboration introduction, implementation, benefits, drawbacks and knowledge management.</i></p>	
<p>10. Does technology play a role in the relationship?</p>	<p>Research Questions 3 - is ICT used in collaborative relationships.</p>
<p>11. How has shared technology played a role in these relationships?</p>	<p>Research Questions 3 - the form of ICT used to collaborate.</p>
<p>12. What do you think are the benefits of the use of any forms of internet technology or inter-organisational systems used within the relationships?</p>	<p>Research Questions 3.</p>
<p>13. Have any new systems been introduced into these relationships and if so could you describe their introduction and implementation?</p>	<p>Research Questions 3 - Often where there is power asymmetry in a relationship the introduction of a collaborative system can be enforced by the larger company.</p>

Table 6.3 Draft Interview Schedule cont.

14. Have you identified any benefits or costs to using the shared technology?	Research Questions 3 - does ICT add value to collaborative relationships?
15. Is there any knowledge sharing between your organisations?	Research Questions 3 - level of progression in collaborative ICT.
16. Can you describe the systems you use for knowledge management within the relationship?	Research Questions 3 - addressing some of the issues around sharing of information.
Innovation, future relationships and further comments	
17. Have innovations come from the interaction in the relationship?	Testing to see if innovation does come from collaboration as suggested by the literature.
18. How do you see your future involvement in such relationship/projects?	Questions 4 – to see if they have been burnt or are they keen to get involved in further collaboration.
19. Do you have any questions or anything to add?	To enable further discussion and capture any information not provided by the previous questions.

6.3 Pilot Studies

According to Yin (2003, p 74) “the pilot case study helps investigators to refine their data collection plans with respect to both the content of the data and the procedures to be followed”. The research undertaken was of an exploratory nature so the pilot study provided an opportunity to test if the format and the wording of the questions asked prompted the disclosure of the information being sought in relation to the research questions.

6.4 Pilot Industry Interviews

The pilot study incorporated interviews with two large organisations and one SME all of which were located outside the region being studied in the research. The

organisations were selected due to their involvement in collaborative relationships or their alignment with the marine and defence industry. Organisation 1 was a very large organisation in the education industry with over 2,000 employees which has developed an online purchasing relationship with a stationery supply firm.

Organisation 2 was part of a multi-national company with over 300 employees involved in marine supply for the off-shore oil and gas industry. The final organisation was an SME whose core business was steel fabrication for communications and marine projects which had 25 employees. The interviews produced a number of themes around collaborative relationships and the use of ICT which are detailed below.

6.5 Refining the Interview Questions from the Industry Pilot

The piloting of the interview questions provided the researcher with an opportunity to test if the wording of the questions stimulated interviewees to provide information relevant to the study. The original pilot interview questions are in Figure 6.2 below.

Figure 6. 2 Industry Pilot – Interview Questions

Which of the following do you use in your company? (Types of ICT)

1. How many employees does your organisation have?
2. How many years has the company been trading for?
3. What would you say is the main focus of your business?
4. According to the definition can you think of any companies that your organisation has any collaborative relationship/projects with?
5. If so what proportion of your business relationships would be involved in collaborative relationship/projects in terms of percentage of income?
6. What benefits does your company derive from these relationships?
7. How does your company measure the benefits of these relationships?
8. What do you think are the factors critical to sustaining these relationships?
9. What are the factors external to these relationships that you feel have impacted on the benefits derived?
10. Does technology play a role in the relationship?
11. How has shared technology played a role in these relationships?
12. What do you think are the benefits of the use of any forms of internet technology or inter-organisational systems used within the relationships?
13. Have any new systems been introduced into these relationships and if so could you describe their introduction and implementation?
14. Have you identified any benefits or cost to using the shared technology?
15. Is there any knowledge sharing between your organisations?
16. Can you describe the systems you use for knowledge management within the relationship?
17. Have innovations come from the interaction in the relationship?
18. How do you see your future involvement in such relationship/projects?
19. Do you have any questions or anything to add?

Questions 10 and 11 proved to be almost identical so they were amalgamated into “What role does technology (shared) play in the relationships?”.

Similarly, questions 12 and 14 also proved similar and were combined into “What do you think are the benefits or costs of the use of technology within the relationships?”. Questions 15 and 16 became “What systems are used for knowledge sharing and management between your organisations?” These alterations reduced the number of questions to 16.

Also some of the wording of the questions was changed slightly for the interviews in the next refinement stage in the pilot case study, the questions for which are in Figure 6.3 below with the changes to the questions in italics.

Figure 6. 3 Pilot Case Study Pilot

- Which of the following do you use in your company?
1. How many employees does your organisation have?
 2. How many years has the company been trading for?
 3. What would you say is the main focus of your business?
 4. According to the definition can you think of any companies that you or your organisation has collaborative relationship/projects with?
 5. If so what proportion of your business relationships would be involved in collaborative relationship/projects in terms of percentage of income?
 6. What benefits does your company derive from these relationships?
 7. What ways does your company measure the benefits of these relationships?
 8. In your view what do you think are the factors critical to *making these relationships work*?
 9. What are the factors external to these relationships that you feel have impacted on the benefits derived?
 10. *What role does technology (shared) play in the relationships?*
 11. *What do you think are the benefits or costs of the use of technology within the relationships?*
 12. *Describe the process used to introduce new technology into these relationships?*
 13. *What systems are used for knowledge sharing and management between your organisations?*
 14. Have any innovations or new products and process business opportunities come from the interaction the relationship?
 15. How do you see your future involvement in such relationship/projects?
 16. Do you have any questions or anything to add?

These questions were then piloted using a pilot case study of a marine industry cluster in the eastern states of Australia. The results of this process are detailed in the next section.

6.6 Pilot Case Study Interviews

A second phase of the pilot research was to conduct a pilot case study in a commercial marine cluster in another Australian state conducted in January 2006. The results from this study were used to further refine the interview schedule and to provide the researcher with a greater understanding of industry clusters prior to the main data collection. As part of this pilot case study three interviews were undertaken with representatives of organisations involved in the development and support of industry clusters in the region.

The interviews carried out as part of the pilot case study comprised the CEO of a Regional Development Authority (RDA), a senior officer within an industry cluster representative body (ICR) and a representative from the higher education institution involved in studying clusters in the region. These interviews were chosen so as to provide the researcher with data on collaborative relationships in a regional setting and to investigate factors and parties external to industry which may impact upon the development of collaborative relationships. The results of the interviews are contained in Appendix 3.

6.7 Implications for the Study

The data gathered from the pilot case study assisted in extending the investigation of the marine, defence and oil industries at Henderson to include external organisations such as local government, state government and tertiary education institutions. The actions of this wider group could impact on the formation of collaborative relationships and the adoption of ICT in the industry to be studied.

The main study incorporated interviews across industry, government and education involved in the Marine, Defence and Resources cluster at Henderson. Secondary data sources such as websites and previous reports on the region were also consulted. Interviewing across the three areas enabled the researcher to gain a broad perspective of the relationships within and external to the cluster and assisted in the triangulation of data sources. Interviewees external to the industry may also observe factors in collaborative relationships that may not be voiced by the industry due to reputation or confidentiality concerns.

The interviews from the pilot case study highlighted the need to create two different sets of interview questions for the industry and non industry interviewees.

The pilot interview schedules for industry was altered to reflect the cases where the interviewees are not in collaborative relationships or using inter organisational ICT

systems within existing collaborative relationships. This allowed for a broader discussion with the interviewee around the drivers and inhibitors of collaboration and the use of ICT.

The proposed schedule of interview questions for industry interviews is in Figure 6.4 below with the changes highlighted. Question 4 provided a yes/no answer and did not provide any detail on the drivers of collaboration, therefore Question 6 “What factors/circumstances have/would encourage you to enter into collaborative relationships?” was added to capture more data concerning factors that might motivate organisations to enter into collaborative relationships as often times they were not directly involved in the collaborative relationships but providing observations and opinions.

Figure 6. 4 Questions for Industry Interviewees

Which of the following do you use in your company?

1. How many employees does your organisation have?
2. How many years has the company been trading for?
3. What would you say is the main focus of your business?
4. According to the definition can you think of any companies with which you or your organisation has collaborative relationship/projects *in the Marine, Defence and Oil industries in the Henderson Region?*

Can you identify in what area they are?

<i>State Government</i>	<i>Marine</i>
<i>Local Government</i>	<i>Defence</i>
<i>Educational</i>	<i>Oil industries</i>

5. If so what proportion of your business would be involved in collaborative relationship/projects relating to the *Marine, Defence and Oil industries in the Henderson Region?*
6. What factors or circumstances *have/would* encourage your company to enter into collaborative relationships?
7. What kind of benefits *does/would* your company derive from these relationships?
8. What kind of factors *does/would* your organisation use to measure the benefits of these relationships?
9. In your view what do you think *are/would be* the factors critical to making these relationships work?
10. What *are/would be* the factors external to these relationships that you feel have impacted *on the success of these relationships?*
11. What role *does/would* technology (shared) play in the relationships?
12. What do you think *are/would be* the benefits or *drawbacks* of the use of technology within these relationships?
13. *What was/would be* the process used to introduce new technology into these relationships?
14. What systems are used for knowledge sharing and management between your organisations?
15. *What innovations or new products or process or business opportunities* come from the interaction in these relationships?
16. How do you see your organisation's future involvement in such relationships?
17. Do you have any questions or anything to add?

The second interview scheduled for non industry interviewees required alteration to reflect the non-commercial drivers for collaborative relationships. The focus for the first seven questions changed to be more focused on the individual/team that works with the clusters rather than the organisation as a whole. Question 7 was added to

reflect the non financial aspects of these relationships for non industry interviewees.
 “What are the goals of these relationships?”.

Figure 6. 5 Proposed Questions for Non Industry Representatives

<p>1. How many people work in your team?</p> <p>2. How many years have you been working in this area?</p> <p>3. What would you say is the main focus of your role?</p> <p>4. According to the definition can you think of any companies with which you or your organisation has collaborative relationship/projects in the Marine, Defence and Oil industries in the Henderson Region?</p> <p>Can you identify what area they are?</p>	
State Government	Marine
Local Government	Defence
Educational	Oil industries
<p>5. If so what proportion of your time would be involved in collaborative relationship/projects relating to the Marine, Defence and Oil industries in the Henderson Region?</p> <p>6. What factors/circumstances have/would encourage you to enter into collaborative relationships?</p> <p>7. What are/would be the goals of these relationships?</p> <p>8. What kind of benefits do/would you see coming from these relationships?</p> <p>9. What kind of factors does/would your organisation use to measure the benefits of these relationships?</p> <p>10. In your view what do you think are/would be the factors critical to making these relationships work?</p> <p>11. What are/would be the factors external to these relationships that you feel have impacted on the success of these relationships?</p> <p>12. What role does/would technology (shared) play in the relationships?</p> <p>13. What do you think are/would be the benefits or draw backs of the use of technology within these relationships?</p> <p>14. What was/would be the process used to introduce new technology into these relationships?</p> <p>15. What systems are used for knowledge sharing and management between your organisations?</p> <p>16. What innovations or new products or process or business opportunities come from the interaction in these relationships?</p> <p>17. How do you see your organisation’s future involvement in such relationships?</p> <p>18. Do you have any questions or anything to add?</p>	

A summary of the research findings are contained in Appendix 3.

6.8 Chapter Summary

The findings of the pilot study described in this chapter have been used to refine the research instruments for the main study. The pilot study incorporated interviews with two large organisations and one SME and three interviews as part of a pilot case study. The results, conclusions and modifications to the research instrument were detailed in this chapter. In Chapter 7 the results of the main research and analysis of the data will be presented followed by the summary and conclusions of the research in Chapter 8.

Chapter 7: Research Results

7 Introduction

The previous chapters have dealt with defining the research problem and the methodology used to investigate the research questions. In this chapter the results of the main data collection including the 35 interviews conducted as part of the research project will be analysed and presented. The layout of the chapter will be based around the results of the research questions as illustrated in Figure 7.1.

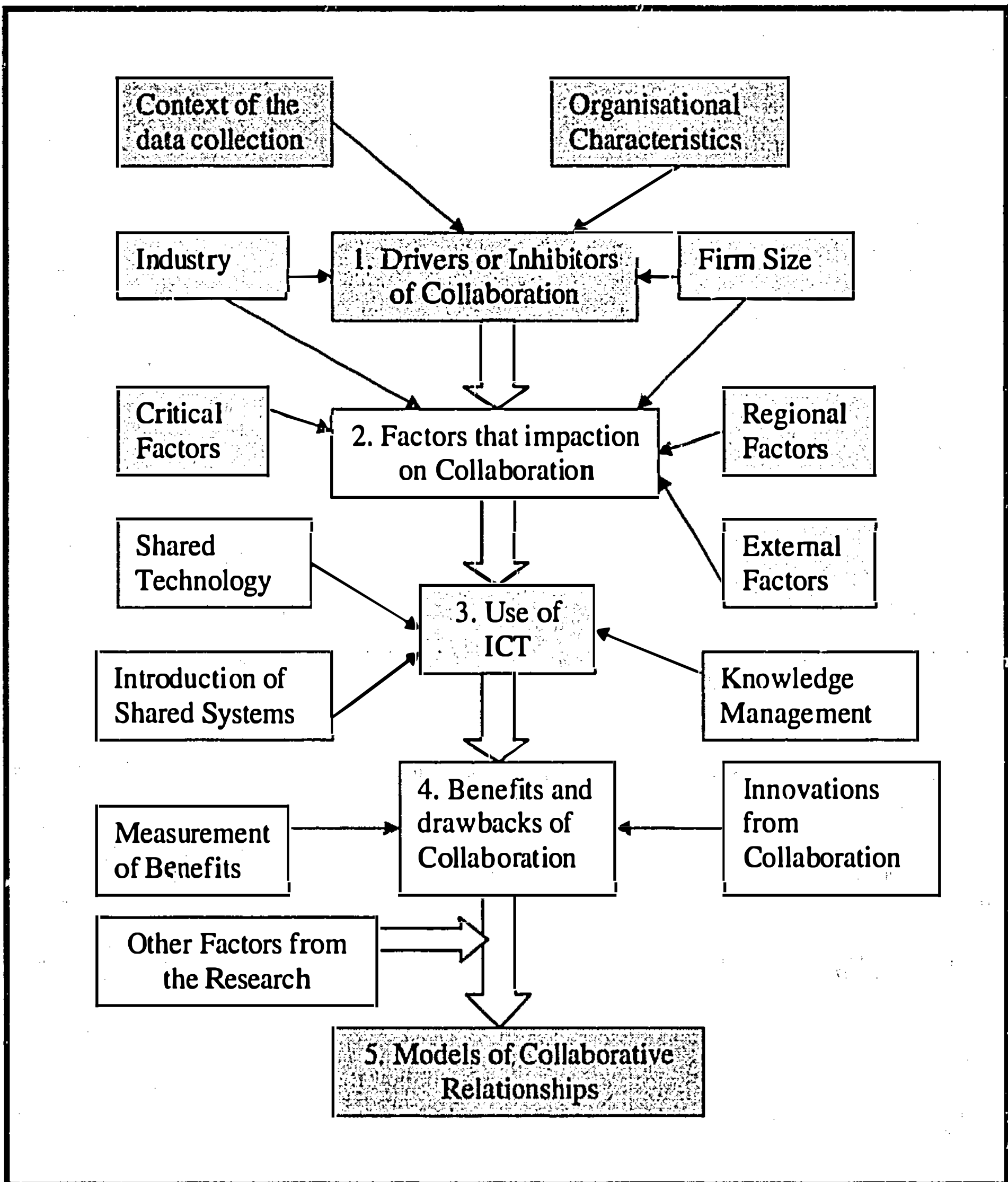


Figure 7. 1 Diagram for Chapter 7

7.1 Research Context

The research was constructed using a multi phase research process which as a single case study focused on the marine, defence and resources industries clustered around the Henderson and Rockingham regions in Western Australia. The interviews were conducted with the senior managers, directors and senior executives within each

organisation between March and May 2006. The following is an outline of the characteristics of the firms in the study.

The researcher contacted a total of 40 organisations either in the region or linked with the development of the region and obtained 35 semi structured interviews. To build an understanding of the region and industries being studied the majority of the initial interviews were with public sector and educational organisations and large industry firms. This provided a picture of the dynamics in the region and assisted with the identification of further interviewees. During the data collection a pattern of referral and interviewee identification developed where the larger organisations would identify smaller counterparts for interview and the small firms identified other small organisations as depicted in Figure 7.2.

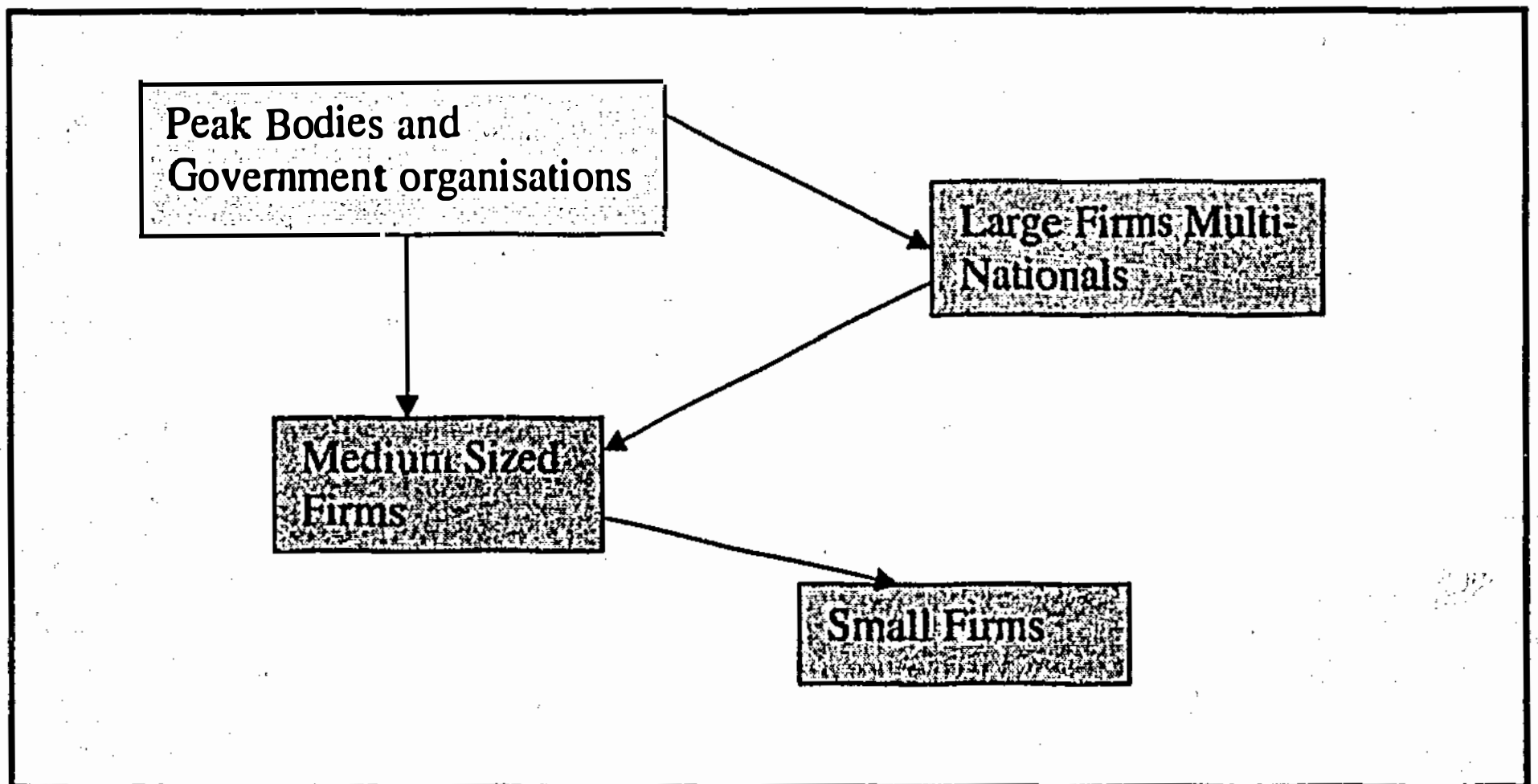


Figure 7. 2 Pattern of Interview Referrals

7.2 Organisations Participating in the Research

As discussed previously the research was designed to incorporate both industry organisations in the Henderson/Rockingham region and non-industry organisations that potentially impacted the region. The industry organisations interviewed can be divided by size into large, medium and small organisations. The large organisations were often termed “Primes” due to the primary role they played in attracting work to

the region such as multi million dollar Navy contracts. Generally these organisations employed over 101 staff or were part of national or multi national organisations with their head offices in the eastern states of Australia or overseas. Medium sized firms are those that employ between 21 and 100, with small organisations employing 1 to 20 staff.

Two representatives from Navy alliances were interviewed. These alliances comprised a mix of industry organisations and Navy representatives. The collaborative groups of organisations had been formed to improve service to the Navy in the areas of vessel building and maintenance.

The organisations interviewed in the non-industry category comprised two educational institutions with campuses in the region, one University and a Technical College, which supplies certification in trades such as aluminium fabrication. Other external organisations interviewed included an industry association, a government funded small business incubator, a representative of a regional local government organisation, representatives of two State Government authorities, and a State Government funded facility in the region. The number, industry focus and the code used for each organisation interviewed are summarized in Table 7.1.

Table 7. 1 Types of Companies Interviewed

Industry Interviews		Code
Large Firms		
	Oil and Gas	P1
	Defence & Oil/Gas	P2
	Defence Shipbuilding	P3
	Defence Submarines	P4
	Commercial Shipbuilding and Defence	P5
	Defence Systems	P6
	Defence Systems	P7
	Defence Systems	P8
	Defence Systems	P9
	Navy Alliance Shipbuilding	N1
	Navy Alliance Ship repair	N2
Medium Firms		
	Engineering for Defence	M1
	Underwater Systems Oil and Gas/ Defence	M2
	Engineering and Construction Oil and Gas	M3
	Commercial Shipbuilding	M4
	Steel Fabrication	M5
	Super Yacht Interiors & Yacht building	M6
	Commercial Shipping Fittings and Fixtures	M7
Small Firms		
	Commercial Boat Builders	S1
	Commercial Boat Builders	S2
	Marine Engineering	S3
	Commercial Boat Builders	S4
	Marine Design Naval Architects	S5
	Marine Engineering	S6
	Marine Coatings and Engineering	S7
	Yacht and Pleasure Craft Building	S8
	Yacht and Pleasure Craft Building	S9
Non Industry Interviews		
	Local Government Regional Coordinator	G1
	State Government Department	G2
	State Government Agency	G3
	State Government Agency	G4
	Education	E1
	Education	E2
	Peak Industry Body	O1
	Economic Development Agency	O2

7.2.1 Company or Team Size

Of the multi nationals interviewed some had a relatively small number of staff based in Western Australia yet were part of organisations which employed over 1,000 staff and as such were coded according to the total size of the organisation. An example of this was P7 which only had 40 employees in Western Australia however it was part of a large eastern states company.

At the other end of the spectrum a number of the smaller firms mentioned in their interviews that they did not wish to employ more than 30 members of staff as it would increase overheads and the administrative burden such as payroll tax and superannuation. Comments from these firms included:

“Originally we had six employees but now we have expanded to 25. We may go up to 30 but do not wish to grow any larger.” (S3)

“We have 28 to 30 employees and like to stay around that number as there are economies of scale and people do not have to be specialized in their jobs”(S7).

Often these small firms manage their workflows by using contractors to supplement core staff in peak periods of activity.

Table 7. 2 Firm Size

Number of Employees	Number	Firm Size	Total
1 – 5	3	Small	9
6 – 10	2		
11 – 15	3		
16 – 20	1		
21 – 30	3	Medium	12
31 – 40	0		
41 – 50	3		
51 – 75	4		
76 – 100	2		
101 – 500	9	Large	14
501 – 1,000	1		
1,001 Plus	4		
Total	35		

7.2.2 Years Trading in Region

Of the organisations interviewed, 24 have been trading for five or more years. Of those that had been trading less than five years the majority were non industry based public sector organisations. One of the defence firms had been trading for less than five years in the region and had operated previously in the eastern states, but recently moved into the Western Australian market to take advantage of expanded opportunities in the defence industry.

A number of firms have only been operating for a few years however their managers and directors have had 20 to 30 years experience in the industry and have worked in the region the majority of their working life. An example of this is one of the small super yacht builders whose directors originated from a larger firm that was taken over by another large firm in the region. After a moratorium on trading in the industry of three years the directors of the original large firm set up a new smaller firm. Another small firm S6 has only been operating for 12 months and was established by a proprietor who left another large company in the industry to work for himself. The oldest company in the research has been trading for 51 years and was originally located in Fremantle then moved to Henderson about 20 years ago.

Table 7.3 Years Trading in the Region

Years	Number of Companies
1-5	11
6-10	7
11-15	5
16-20	5
21-30	7
31-40	0
Total	35

7.2.3 Industry of Participants

Marine defence and commercial marine were the two main industries in the region in which the interviewees were involved. A number of the firms operated in more than one industry sector and five of the engineering firms provided services across three of the industries including commercial marine, yachting and pleasure craft, defence and resources industries. This multi-industry approach is reflected in the Table 7.4. where 17 out of the 35 firms had some involvement in the defence industry.

Table 7.4 Industry of Business Focus

Main Focus of Business or Role	Number
Defence	17
Marine commercial	15
Yachting & Pleasure craft	10
Resources Industry	7
Engineering	6
Other	4

As can be seen from the Table 7.5, the organisations operating in the defence industry are predominantly large industry firms and also government institutions. Conversely the majority of firms in the yachting and pleasure craft are small firms and this is consistent with the size of the contracts in each industry. The medium sized firms were spread across the industry sectors.

Table 7.5 Firm Size by Industry

Firm Size	Defence	Engineering	Marine Commercial	Resources Industry	Yachts & Pleasure Craft	Other
Small	0	1	4	0	4	1
Medium	5	4	6	5	4	1
Large	12	1	5	2	2	2

In summary, the organisations which were involved in the study comprised public sector organisations which were involved in the development of the region and private sector firms which were predominately involved in the defence industry.

Although there has been a history of shipbuilding in the region just under one third of the firms have moved into the area in the past 5 years. The large firms were involved in defence and the resources sector and the small firms tended to be in the marine and yachting industries.

In the next section the drivers and inhibitors of collaboration cited by the research participants will be discussed.

7.3 Research Question 1 - Drivers and Inhibitors of Collaboration

To examine the research questions "What are the drivers and inhibitors for organisations to enter collaborative relationships" the respondents were asked to identify the factors which encouraged them to form collaborative relationships. As illustrated in the Table 7.6 access to new business or markets was most often cited by the interviewees.

Table 7. 6 Drivers and Inhibitors of Collaboration

Factors in Collaborative Relationships	Number of Citations
Access new business or markets	27
Access skills and expertise	20
Access to resources	11
Access labour	10
Pre existing relationship	9
Customer service expectations	6
Reduce costs	6
Product development	4
Raise profile of business	3
Share the risk	3
Access work without having to go to market	2
Return favours work with friends	1
Goals of relationships	8*

(*External government and not for profit organisations were asked the goals of the collaborative relationships the results are later in this section.)

Collaboration to win contracts was a major theme for medium sized and large firms who would often band together with firms of a similar size in order to win large contracts which were beyond the resources of a single organisation. In the oil and gas industry P1 made the following comment illustrating this point *“the growth in the size of projects in the oil and gas industry has created collaboration among firms...to show that there is capacity for W.A. to take on these large projects as opposed to them being out sourced to Asia”*.

Another reason for large firms collaborating is the complex nature of defence contracts. No one company provides the platform (ship or submarine hull) and the onboard systems (communications, sonar and war fighting capacity). Therefore, collaboration among the large firms is necessary for both the building and maintenance of ships and submarines. There is also a preference by the Defence Force for collaboration among the primary contractors and according to M2 this was facilitated by the use of an *“integrated product team, a system where everybody works together so they are on the same page. This is controlled by Defence, Science and Technology Office whereby contractors input information about the project and in some cases in an electronic format”*. Collaboration for the smaller firms was

often about accessing new markets through collaborating with larger firms thus creating a profile at a higher level of the industry.

Access to skills and expertise was the second most frequently mentioned factor, which is closely linked to access to additional resources. Specialisation within the defence industry has led to the large firms choosing to outsource much of their technical work to smaller firms rather than employ the expertise within the company itself. The large firms can pick and choose who they use for a particular job, giving them more flexibility and greater organizational capabilities. It was commented by one of the large firms that arrangements with smaller firms meant that it accessed specific expertise from the smaller company while the large company supplied “size”, resources and financial backing for the project. According to one of the large firms in the defence sector *“the specialized nature of the systems side of a defence vessel requires expertise from a diverse range of organisations, therefore collaboration provides access to skills not contained within the company”* (P7).

In contrast smaller firms tend to subcontract out to other small firms or owner operators due to the specialized nature of their work. A number of the small firms were involved in yachting and pleasure craft and as one of these firms commented *“we only build one to two boats a year so we do not require a large pool of labour with specialized expertise, therefore we bring in electrical engineers at specific points during the boat build”*(S4).

One of the unexpected findings of the research was the impact on the region of the skilled labour shortage. This may explain why the desire to access labour was also cited as a driving force for collaboration. Through collaboration, firms were able to access additional labour to keep contracts and manage the peaks and troughs in their workflows. The uncertain and erratic nature of contracts was an issue for all size firms and subcontracting provided flexibility and cost reduction. Some of the larger firms commented they still could not access all the highly skilled labour required, particularly for defence industry contracts.

Pre-existing relationships between the firms were also a significant driver of collaboration. For large firms pre-existing relationships were important, particularly

in the defence industry as this provided a “track record” of the company’s performance on previous collaborations on large contracts. There was a major focus by the large firms on meeting deadlines, quality work and reliability of those with whom they collaborated. By the same token, meeting contractual requirements set by the Navy by delivering on time and within budget provided the large firm with a “track record” with their major customer, the Navy. For small firms, pre-existing relationships were important as it gave them the measure of those with whom they were working.

As part of the research process the external government and not for profit organisations interviewed were asked what were the goals of the collaborative relationships as profit making and market share may not have been a driver for them to collaborate. The goals of their collaborative relationships included:

- Building on synergies that create a win-win situation.
- Increasing the capability scope of work being undertaken in Western Australia to enable the winning of larger contracts, thus stimulating employment, investment and economic growth.
- To work collaboratively with the private sector to enable them to access facilities and services to create the best possible outcome.
- Fostering successful projects that result in economic benefit to the state.
- Meeting key performance indicators.
- To either bring expertise to the organisation or increase output.
- The delivery of services that fill the gap in the market place and stimulate enterprise in the community.

Overall these organisations are seeking to foster collaborative relationships that benefit themselves and industry. Although profit for the organisation itself is not a goal, increased capabilities, contracts and output from the industry sector were drivers.

7.3.1 Drivers of Collaboration by Industry

A comparison of the drivers of collaboration by industry showed that access to new business or markets was significant for most firms. For defence organisations the most significant driver for collaboration was accessing new business or markets, with the second most important being access to skills and expertise and thirdly meeting customer service expectations. Selected comments made by the interviewees are shown in the Table 7.7. For firms in the defence industry, collaboration was seen as a way to compete and grow in this high cost and low volume industry where the contracts are in the millions or even billions of dollars. The complexity of the products and contractual obligation required by the Navy means that collaboration is a way to meet these without expanding the company outside of its core capabilities.

Table 7. 7 Drivers of Collaboration in the Defence Industry

Factors	Defence Industry
Access new business or markets	<p>P2> - <i>Scale of project is too big for one company. Commercial arrangement with smaller company with specific expertise as we supply the size or resources required, financial backing.</i></p> <p>P4> - <i>Supporting a panel of qualified providers that meet criteria-strength, financial resources, quality systems, level of compatibility, financial structure, reliability.</i></p> <p>P6> - <i>In the Alliance P3 provides the platform and P6 provides the systems, this has given the Navy a one stop shop for the maintenance and upgrade of the ANZAC class ships.</i></p> <p>P7> - <i>With their expertise in reporting and compliance the firm takes on the lead role in meeting the requirements of the Navy contracts relieving the subcontractors of this obligation.</i></p> <p>P8> - <i>Working in a specialist area of sonar and communications means that P8 has to collaborate to access contracts they could not do on their own. The Navy supports collaboration.</i></p> <p>P9> - <i>Market positioning of the company, to create direct relationship with the Commonwealth</i></p> <p>M2> - <i>Looking for complimentary relationship as they are too small to meet all the contract requirements alone. Used as a local company as a platform for overseas firms wanting to enter the market.</i></p>

Table 7.7 Drivers of Collaboration in the Defence Industry cont.

<p>Access Skills and Expertise</p>	<p>N1> - <i>Direct access to resources from industry experts.</i> N2> - <i>The transient nature of defence personnel means that alliance would allow for knowledge to be retained within the corporate personnel giving greater stability. Alliance provides efficiency of resourcing and access to manpower as combat system expertise is in short supply in W.A., it will reduce double handling of financial tasks.</i> P2> - <i>Capabilities teaming in areas of strength.</i> P4> - <i>Provision of service, skills and attention to detail come up to meet submarine safe standards.</i> P7> - <i>The specialised nature of the systems side of defence vessels requires expertise from a diverse range of organisations therefore collaboration provides access to skills not contained within the company.</i> P9> - <i>Accessing capability as P9 does not build the actual individual systems but integrates them into the submarine.</i></p>
<p>Customer Expectations and Service</p>	<p>N1> - <i>Best project outcome for the Navy.</i> N2> - <i>The SPO is entering into an alliance with its commercial contractors as the current contracts are about to expire. The alliance for the building of the ships has been successful for a number of years so they are following that model.</i> P3> - <i>Timing, overflow of work to meet timing on contracts.</i> P6> - <i>This alternative package has made it easy for the Commonwealth, halving the time it takes to turn around upgrades and providing open communication, responsiveness, flexibility and reduced risk.</i></p>

*Participant's comments in Italics

Although the marine commercial interviewees considered accessing new business, skills and expertise as important, their primary driver was the accessing of labour. From the comments below it can be seen that all of these firms are either medium sized or small firms. Their focus on accessing labour may be due to the fact that they are often the subcontractors to the large firms that supply the skilled labour.

Table 7. 8 Drivers of Collaboration in the Marine Commercial

	Marine Commercial
Access Labour	<p>O1> - The current shortage of labour means collaboration is an option to save turning down work.</p> <p>M4> - If they were to enter into a collaborative relationship it would be to offset work load by accessing extra capacity due to a shortage of labour.</p> <p>M5> - <i>Tend to go it alone as they have the capacity to fill the lead role but use other firms such as painters for fit out.</i></p> <p>S2> - Lack of labour at P5 means they subcontract to others.</p> <p>S9> - To take the extra load subcontractors come onto the premises and work.</p>
Access new business or markets	<p>M4> - Government tenders not large enough so the firm goes alone. They do subcontract to P5 and Babcock.</p> <p>The move to Saigon promoted by economics, cheaper production costs make the firm more competitive in a global market and location is in an international region.</p> <p>M7> - The information fed into the network leads to opportunities in markets and clients may also look for information about the market. This network forms a referral and cross promotional network where members are introduced to one another and gain opportunities to access new markets.</p> <p>S2> - Enter into subcontracting relationships when the price often allows interviewee to make money from the contract.</p> <p>S7> - Collaboration is a requirement of working in the defence industry as the firm only provides one part of the package required by defence therefore they often work as Project Managers where they go in as the lead company and work with subcontractors with other expertise to complete the work. By collaborating they have been able to expand the market in which they operate and create new opportunities.</p>
Access Skills and Expertise	<p>M5> - <i>When we can't do it ourselves due to a lack of expertise or equipment.</i></p> <p>S7> - They have gone into tenders that require mechanical and electrical expertise therefore to create new opportunities.</p> <p>S9> - Areas such as electrical and carpentry. The reason they don't send work outside the factory is because they do not like others knowing what they are doing.</p>

Participant's comments in Italics

For the yachting and pleasure craft interviewees their focus on accessing expertise was due to their desire not to carry expertise that is not required on an ongoing basis. According to M6 *"we do not want to carry the expertise and some times the work provided (by external firms) is of such high quality that it is better to use their skilled tradesmen"*.

This was a significant driver for the resources industry, however there was some comment about the importance of pre-existing relationships. P1 classified all those businesses outside of its present alliance as associates to the group and were subcontracted. They had a pool of providers whose history with firms within the alliance was important to their future role.

S8 was a yachting firm that had diversified into the resources industry and sought those who were *“Like minded on construction but not in direct competition with the company, a pre-existing relationship between the firms was a plus”*.

The Engineering firms indicated that their drivers for collaboration were around accessing resources and new business and markets. For M1 collaboration was to *“gain technical expertise, to access cash flow through projects. They are offering something that we do not have”*. M3 pointed out that they collaborated to *“win business for the State, even though we may have all the expertise a multi discipline approach is required as part of the tender therefore other firms are involved”*. For S6 it is *“to provide flexibility of resources and scheduling”*.

To access new business M3 collaborates to *“win a tender where we do not have 100% of the capacity or expertise required and we would collaborate in the overseas market should the opportunity arise”*. S3 collaborates to gain new contracts which provide *“stability and continuity of work with fixed pricing through the life of the quote which can be between 3 and 24 months”*. For the organisations outside of the industry the accessing of resources from the State and Federal governments was a driver for collaboration.

7.3.2 Drivers of Collaboration by Firm Size

There were some variations in the drivers of collaboration between the different sized firms. The common driver across all firm sizes was accessing skills and expertise which may be due to the skilled labour shortage in the region. For the medium and large firms access to new business or markets was the primary driver for

collaboration as they seemed to be more focused on expansion than the small firms, many of whom, as mentioned previously, did not want to grow past their current size. A summary of the results is presented in Table 7.9.

Table 7.9 Drivers of Collaboration by Firm Size

Drivers	Small	Medium	Large
1	Access skills and expertise	Access new business or markets	Access new business or markets
2	Access labour	Access skills and expertise	Access skills and expertise
3	Access to resources	Access to resources	Pre existing relationship

Other variations in drivers according to firm size included collaboration for product development, which was a driver for the large firms alone. Meeting the customer service expectations was a driver for the medium and large firms but not the small firms. In comparison only the small firms considered accessing work without having to go to market and return work favours for friends as drivers for collaboration.

In summary, the key drivers for collaboration for firms' were access to new business, markets, skills, expertise, resources and labour. Drivers of collaboration were found to vary by firms' size and by industry. The industry characteristics of high competition, complex multi million dollar contracts and the skilled labour shortage may have provided impetus for the collaborations. For the public sector firms, their goals of collaboration with other organisations could be summarised as creating growth in the region through the coordination of resources.

The study was designed to investigate if there were any factors outside of the relationships between the firms that impacted on collaboration. The factors investigated will be discussed in the next section.

7.4 Research Question 2 - Factors that Impact on Collaborative Relationships

To explore possible factors that impact on collaboration a series of questions relating to external networks, level of business transacted in the region, reasons for locating in the region, the impact of external factors and the critical factors for collaboration were asked.

7.4.1 Networks within the Region

The interviewees were asked which organisations they dealt with in or around the region, the results of which are summarised in the Table 7.10.

Table 7. 10 Level of Contact with Other Industries

Who do you deal with Region	Number
Defence	28
Educational	27
Marine	23
State Government	19
Resources Industries	18
Local Government	16
Other	11

Defence is the dominant industry in the region with 28 of the 35 organisations interviewed having some form of relationship with a defence organisation, 23 interviewees dealt with the marine industry and 18 the resources industry.

It emerged that the high level of interaction with educational organisations is due to the importance of the local TAFE (Technical and Further Education College) in providing apprentices and tradesmen across the various industry sectors in the cluster. Three of the large defence firms and one of the medium sized firms mentioned contact with Universities in relation to obtaining graduates.

Though the defence industry requires skilled labour for the fabrication of vessels they also employ a wide range of staff with graduate and post graduate education, specifically within the computing and engineering fields, hence their relationships with the universities. In comparison the marine, yachting and pleasure craft and resources firms were focused on TAFE and high schools as a means of encouraging the development of further skilled labour in the region.

The main contact that firms had with State Government and Local Government was related to regulatory requirements, accessing land and infrastructure.

As stated previously, the majority of the large organisations were in the defence industry and they tend to have the highest proportion of contact with external organisations. The defence and marine commercial firms had the highest proportion of contact with other organisations in their industry. The engineering firms had similar levels of contact across defence, marine commercial and the resources Industries. The four firms that worked solely in engineering all worked in the three industries and saw this as a means of creating sustainable business.

Although most of the firms stayed within their traditional industries P9, a defence organisation, was seeking to expand into the oil industry. P2, which originated in the construction and engineering industry is moving into infrastructure for defence projects across all sections of the defence force and the firm is developing relationships with other firms in these industries.

Throughout the research the following pattern of interaction between industries emerged, as illustrated in Figure 7.3. The engineering firms worked across the industries in the cluster. The resources industry had the least interaction with the other industries within the cluster.

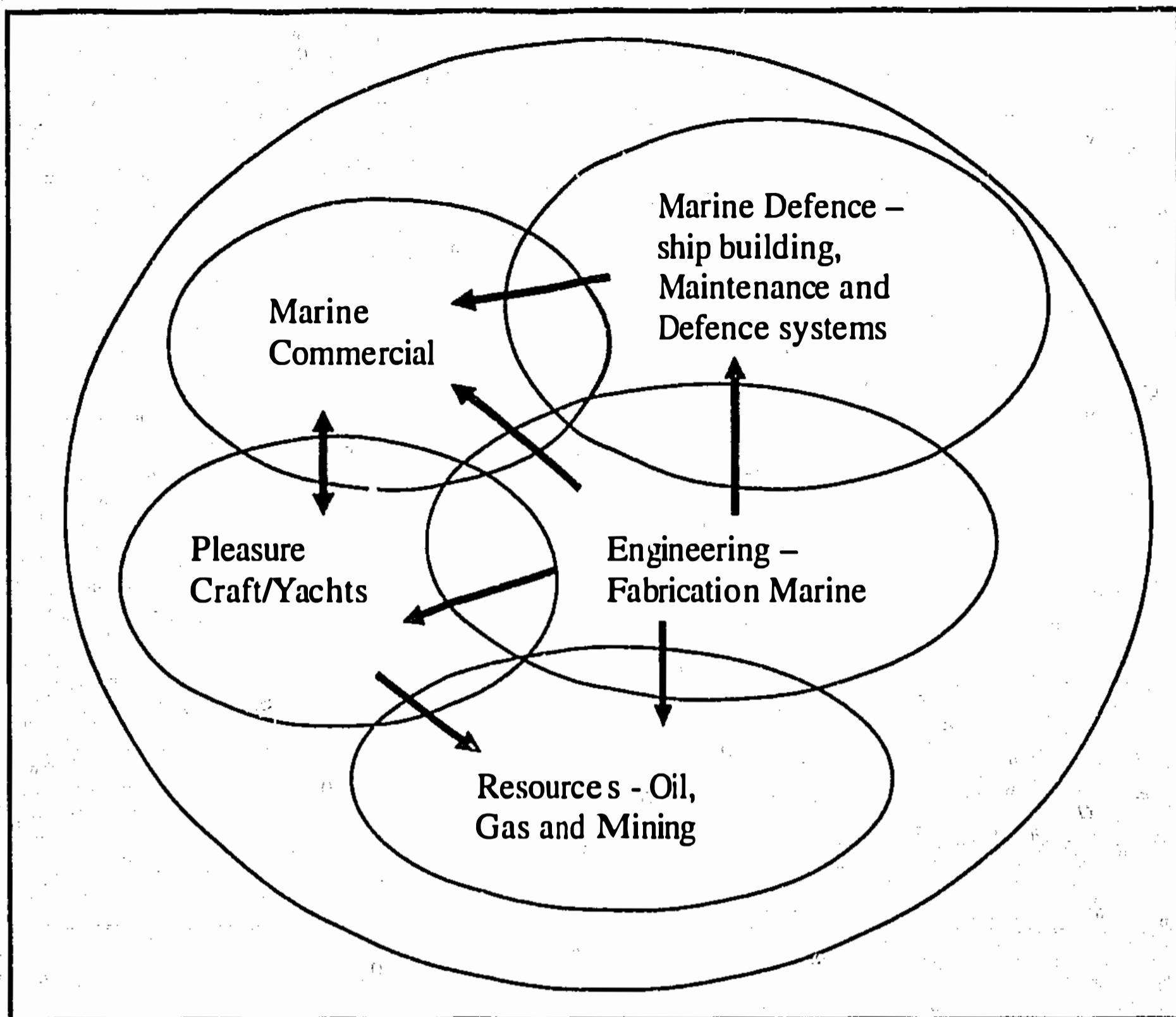


Figure 7.3 Workflows within the Cluster

7.4.2 Proportion of Business in the Region

The interviewees were asked what proportion of their business they undertook in the Henderson/Rockingham region. One of the 35 firms, a small business resource organization, did not have any business within the Henderson/Rockingham region. As you can see from the Table 7.11 the number of firms transacting business in the region is evenly spread and the results are split evenly with half of the interviewees transacting less than 50% of their business in the region and the other half of the respondents transacting more than 50% of their business in the region.

Table 7. 11 Percentage of Business Firms Transacted in the Region

Number of Firms	% of Business
7	0-10 %
2	11-20 %
5	21-30 %
1	31-40 %
2	41-50 %
3	51-60 %
2	61-70 %
5	71-80 %
4	81-90 %
3	91-100 %

Of the firms involved in defence, the dominant industry in the region, their focus varied between the local region and their eastern states operations as illustrated in Table 7.12.

Table 7. 12 Level of Local Focus for Defence Firms

Percentage	Comments
90-100	P8 - As the submarines are their only contract 100% of their work is focused in the region. P9 - 95% of the work is focused in Henderson/Rockingham as that is where the submarines are located.
80-90	P7 - According to the interviewee 80% of all their work is based around the Henderson, Rockingham region focussing on repair and maintenance.
50 - 60	P6 - 50% of its time is spent dealing with eastern states and 50% with W.A. through servicing the ANZAC SPO.
40 - 30	P2 - 40%. Manages defence nation wide.
10 - 20	P3 - Minimal as most of the focus is on the Eastern States and overseas suppliers. P4 - 5% depending on contractors and subcontractors brought in to work on the submarines.

In contrast the marine commercial and the yachting and pleasure craft industries did not show a strong regional focus, however this may be due to the small sample size. There was a national and international focus for a number of the medium sized firms in the marine commercial market. According to M4 "80% of our business is focused on the international market and 20% local" and for M5 "only 5% of the firm's work is based around Henderson and that is mainly purchasing supplies". M7 had

become vertically integrated so their interaction within the region was only "10% as we tend to manufacture most of the components....we have become vertically integrated, buying out a number of our subcontractors as the products they were providing were not up to the standard required by us".

Two of the yachting and pleasure craft firms were predominately export orientated. S1 commented that they had an "export orientation such as Jordan and Singapore. We do obtain supplies from local regions such as windows...(we) do not use subcontracting but rely on a small supply base, lack of locally supplied products". S5 was focused outside of the region with only 30% of his dealings with local aluminium firms but less than 5% of his revenue comes from the region.

7.4.3 Reasons for Locating in the Region

As part of the interview process the respondents were asked to comment on their reasons for locating in the Henderson/Rockingham region. As displayed in Table 7.13 firms located primarily due to proximity to other firms, their suppliers or competitors with whom they were collaborating. The other major reason was proximity to customers as many of the firms supplied others in the region. A number of respondents indicated that their location was due to historical factors with some firms or their owners having been located in the region for over 20 years. Six of the industry firms had relocated into Henderson from other regions around Perth.

Table 7. 13 Location by Size

Reason for Locating in the Region	Number Citations	Small	Medium	Large
Proximity to suppliers and other firms	13	5	2	6
Proximity to customers	11	2	5	4
History	8	2	3	2
Other	3	0	3	0

For small and large firms proximity to other firms and customers were of major importance. Their proximity to those firms often relates to their ability to collaborate

with or supply to others. Many of these small firms are part of the subcontracting system which operates in the marine and defence industry.

Location in relation to industry had a strong relationship for defence firms as their primary customer the Navy is located at Garden Island off Rockingham where the majority of the shipbuilding, upgrading and the maintenance is carried out. Other reasons for locating in the region included proximity to suppliers, skilled labour and collaborations with other large firms. There was little direct reference to history being a factor for location.

Table 7. 14 Reasons for Defence Firms Locating in the Region

Factor	Comments from Interviewees
Proximity to Suppliers (labour) and other firms	<p>P3 – Location near suppliers - The market opportunities were not in this region and most of the firms dealt with are agents for international suppliers.</p> <p>P6 – Location near skilled labour – they contract out all their “black trades”.</p> <p>P6 – Locations near collaborators, P6 has a collaborative relationship with CSC as they are the software designer and developer for simulations.</p> <p>P7 - According to the interviewee 80% of all their work is based around the Henderson, Rockingham region focussing on repair and maintenance.</p> <p>P8 - They like to maintain a skill base in the region as they use only a few subcontractors due to the high level of technical expertise required in their work on submarines and it takes a long time to train someone in submarine safety.</p> <p>P9 - Location near other Large Firms. There is competition but also collaboration where the roles of the primes switch according to the contract.</p>

Table 7.14 Reasons for Defence Firms Locating into the Region cont.

<p>Customers</p>	<p>N2 - Location of Navy personnel at Rockingham - There will be an amalgamation of Navy and commercial personnel which will reduce the level of red tape.</p> <p>N2 - Location near vessels. The upgrading of the ships is an iterative process, there is a major upgrade to systems every two to three years and every five to six years systems are replaced with new systems. "By the time we have got it into service parts of it are obsolete."</p> <p>M2 - 50/50 between Oil and Gas and defence work, although they have no direct work in the Henderson region they are involved in supplying firms such as P5 and P2 and M6.</p> <p>P6 - is located in Western Australia (Rockingham/Henderson) as their customer is located here.</p> <p>P8 - They are currently located in Rockingham however they plan to move to Henderson as the submarines will be located there in the future.</p> <p>P9 - Located near their customers, P9 is currently servicing the Navy.</p>
<p>History</p>	<p>N2 - They already have an existing relationship over the past 4 years however their alliance will require a shift to a new structure which may be a little more challenging.</p>

For the marine commercial, proximity to customers and industry history were factors for locating to the region. Previously there was a cray fishing boat manufacturing industry in the region and this is one of the reasons there is a concentration of aluminium boat builders. According to P3 most of their suppliers worked out of the eastern seaboard. For them Henderson was not well located for the global market, however there was a growing Australian market which compensated. It was also commented that Henderson was located in the southern hemisphere a long way from where the majority of super yacht owners lived. Therefore, it was difficult for boat builders to manage the relationship with their clients due to distance.

Table 7. 15 Reasons for Marine Commercial Firms Locating in the Region

Factor	Summary of Comments from Interviewees
Proximity to suppliers and other firms	<p>S7 - By chance their current location is in between two of their major paint suppliers, one of which is located next door to their factory.</p> <p>S9 - The reason they located to Henderson was that everybody seemed to be there, it was close to the ocean and they could build brand new premises. 80% of their suppliers are in the region.</p>
Customers	<p>P5 - Currently contracted to the Navy through the Defence Material Office to provide maintenance.</p> <p>M4 - The impetus of this was the winning of a contract to provide Patrol boats to Singapore. They also work on selling boats to international clients as a supply channel. They do some work for the Navy and quote for engineering work.</p> <p>M7 - The company chose to locate in Henderson due to marine clients being in the area. Its main Australian customers are INCAT and P5.</p> <p>S7 - They located into the Henderson region to follow Wavemaster and Oceanfast, who are aluminium boat builders. They actually have a facility located on the land of one of the primes to which they subcontract. They have competitors in each branch of their business, however as far as they are aware they are the only company that competes across the three areas. Commercial marine, defence and marine architecture.</p> <p>S9 - Their customers come mainly from Western Australia but do sell interstate. 65% of their work is based in the Henderson region</p>
History	<p>M5 - Used to work for the Navy at Garden Island but the tradesmen within the company did not like the red tape involved so the company no longer services this market. M5 started as a shipbuilding and labour hire company for Kailis, providing steel trawlers. Then they bought premises for labour to work on supplying the W.A. market. Then the steel shipbuilding industry collapsed and the company moved to steel fabrication in the mining industry.</p> <p>P5 - Focus on aluminium arose out of the cray fishing industry's requirement for speed. This lead P5 away from steel shipbuilding as aluminium provided more flexibility.</p> <p>S2 - The interviewee worked for P5 then started his own business. He currently subcontracts to P5 although the company is not dependant upon them.</p>

7.4.4 Critical Factors to Successful Collaboration

The respondents were asked what they considered to be the make or break factors in collaborative relationships, the most frequent response revolved around the relationship itself and the personalities involved in the relationship. For the non industry organisations the creation of good working relationships and the ongoing agreement between collaborative partners was a major focus.

When reviewing the critical factors for collaboration by industry issues such as relationship, history and experience and work performance were again prevalent. The top three critical factors for each industry are illustrated in Table 7.16.

Table 7. 16 Critical Factors for Collaboration by Industry

Rank	Defence	Marine Commercial	Yachting & Pleasure Craft	Resources Industry	Engineering
1	Relationship	Relationship	Work performance standard	Relationship	History or experience
2	Financial benefits	History or experience	History or experience	History or experience	Relationship
3	Trust	Work performance standard	Financial benefits	Mutual benefit	Trust

When the critical factors for collaboration in the defence industry were examined it was found that relationship, financial benefits, trust and work performance/standards were the top four factors. In the tables below the interviewees' comments in relation to the four factors are summarised by industry to illuminate their thinking on these matters.

Table 7. 17 Defence Industry Interview Comments on Critical Factors

Factor	Summary of Defence Industry Comments
Relationship	<p>E1> - The right orientation of the partners involved with persons who are willing to champion the project.</p> <p>G3> - Ensuring that each person understands the other and respects their perspective.</p> <p>G4> - In a market survey the two things that industry were looking for was low cost structure and good working relationships on site.</p> <p>N2> - The right culture of organisations working in the alliance.</p> <p>P3> - Working well together despite different cultures and ways of doing things, honesty and trust.</p> <p>P4> - P9 provides the combat systems that are coordinated by P4 and P8 provides the war fighting systems that are produced by private organisations. This contracting arrangement creates a strong link between Government and private organisations.</p> <p>P6> - Competition can impact on relationships as the project should come first</p> <p>P9> - There has also been up skilling among the tradesmen as P9 has created a model of doing business through collaborative information exchange that has made them attractive to the Navy.</p>
Financial benefits	<p>E1> - A dollar value of the project return on investment, the delivery of "bums on seats" i.e. students into courses.</p> <p>G2> - real dollars to be gained,</p> <p>G4> - In a market survey the two things that industry were looking for was low cost structure and good working relationships on site.</p> <p>N2> - Integrated processes and information systems.</p> <p>P2> - Balance sheet of partners, standard credit checks.</p> <p>P3> - Profit derived from the partnership.</p> <p>P6> - You also have to monitor the performance of others to ensure that they are travelling well and are not hurting as it is best that everyone benefits from the project. What is best for the project is best for all parties.</p>
Trust	<p>G3> - Clarity and trust. A high level of honesty is required and the information provided must be accurate.</p> <p>N2> - Trust.</p> <p>M2a> - No relationship is completely open.</p> <p>P3> - Working well together despite different cultures and ways of doing things, honesty and trust.</p> <p>P6> - It is much harder to walk the collaborative line and be a company focused on high levels of trust within the organisation that allow staff to balance competing demands of the company and the alliance.</p> <p>P8> - Commonsense in keeping classified information to yourself.</p>

Table 7.17 Defence Industry Interview Comments on Critical Factors cont.

Work Performance Standards	<p>G4> - Meeting their needs, providing a competitive price, continually working hard to provide customer satisfaction and attract new contracts.</p> <p>N1> - Adherence to tight reporting criteria on a weekly and monthly basis.</p> <p>P2> - Safety performance important for the resource Industry. Standard compliance.</p> <p>P4> - Meet Submarine safe criteria and the requirements of the work, security clearance.</p> <p>P7> - Ability to meet milestones of the work schedule. Proficiency of work in meeting the work specifications and standards. Do not meet the standards required by the Navy and by the company. Flexibility in tasking and responsiveness to urgent requests including the ability to move to another location or work outside standard hours. Ability to meet deadlines, responsive and multi skilled.</p> <p>P8> - People that are good at communicating with "can do" attitudes, flexibility and that are on call. Good working processes, record keeping for evidence of quality.</p>
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Comments made by the interviewees in the marine commercial industry are shown in Table 7.18.

Table 7. 18 Marine Commercial Industry Interview Comments on Critical Factors

Factor	Marine Commercial Industry
Relationship	<p>O1> - Inter industry networking of people.</p> <p>M5> - When you have a good relationship with a staff member within another company you have to re-establish that relationship when they leave. There tends to be a higher turnover of staff in the smaller firms.</p> <p>M7> - The succession of new people inside the networks is managed and information is exchanged to ensure a smooth transition, provide access to others in the network and supply quality information.</p> <p>S7> - "You have to have confidence in the guys you bring in that they can do the work. A deal breaker is financial impropriety".</p> <p>S9> - We have worked with these people in the past and in the industry everyone knows everyone else.</p>
History or experience	<p>O1> - Previous bad experiences have stopped collaboration.</p> <p>M7> - The succession of new people inside the networks is managed and information is exchanged to ensure a smooth transition. Provide access to others in the network and supply quality information</p> <p>P5> - Credibility of collaborators. Track record.</p> <p>S9> - We use people we know who have a reputation and as everybody knows everyone else you can usually find out about someone before you contract them. We try to keep the good ones as good people are hard to find.</p>
Work performance standard	<p>M4> - Level of service provided by the subcontractor. Level of service provided by the firm, the interviewee indicated that the firm prides itself on giving more than is expected.</p> <p>M5> - Knowledge, information, so timely delivery of goods, good relationship with the subcontractor. "When a company lets me down and lies to me which puts me in a difficult position with a client it would be better if the subcontractor was honest about the progress of the work as then interviewee could negotiate with the client". The interviewee noted that the clients are now far more demanding.</p> <p>S7> - Reliability, quality of work, meeting the schedule of work. If subcontractors fail to meet dead lines it can cost the company significantly through penalties.</p>

For the yachting and pleasure craft industry the main comments were on critical factors of work performance/standards and their history and experience with their collaborators, this is discussed in Table 7.19.

Table 7.19 Yachting and Pleasure Craft Industry Interview Comments on Critical Factors

Factor	Yachting and Pleasure Craft Industry
Work performance standard	<p>M6> delivery, quality, working within the company's schedule, reliability and flexibility</p> <p>S4> - Quality of work.</p> <p>S5> - "Cheaper for the company to subcontract out the aluminium cutting for the boats. The subcontractors fail to follow specifications in writing or leave material out of the order. Poor customer service as they don't seem to care about the job they do due to the lack of competition". The interviewee's firm is a small player compared to one of the primes so it has less leverage which equals poor service. The business model of the interviewee is that of a high quality design and precisely manufactured kits, however the service that he gets from his subcontractors is not congruent with his business model and when there is a problem the buyers see it as his fault not that of the subcontractor.</p>
History or experience	<p>S4> The people that we deal with many of whom are old (Alpha firm*) employees therefore you know with whom you are dealing. This is an incestuous industry everybody knows each other.</p> <p>S8> Having a pre existing relationship with the company, having a history with the company, a common labour force.</p> <p>S9> We use people we know who have a reputation and as everybody knows everyone else you can usually find out about someone before you contract them. We try to keep the good ones as good people are hard to find.</p>

(* "Alpha" was a commercial boat building firm which was bought out by one of the large firms in the region).

7.4.5 Critical Factors by Firm Size

The level and quality of the relationships was most often commented on by the interviewees and it seems to be more important to the large firms participating in the research. The interviewees' history with or experience of those they are collaborating with was significant to all size firms as was the level of work performance and meeting of standards. Notable differences between the various sized firms included the low level of emphasis on trust and the gaining of financial benefit by the small firms. Conversely, the medium sized and large firms had a stronger focus on creating mutual benefits between partners.

Table 7. 20 Critical Factors for Collaboration by Firm Size

Critical Factors	Small	Medium	Large	Total
Relationship	4	7	10	21
History or experience	6	6	6	18
Work performance standard	3	7	4	14
Trust	1	5	5	11
Mutual benefit	0	3	7	10
Financial benefits	0	4	6	10
Communication	1	3	4	8
Workflow	2	1	3	6
Other	2	2	2	6
Security and IP	0	2	3	5
Business growth	1	1	3	5
Negative factors	0	1	3	4

The responses from the large organisations highlighted the tension between loyalty to the company and the demands of working with firms who have a different way of doing things. Even though firms are collaborating they can also be in competition and this, according to one large company, can impact on relationships as the project should come first. According to P1 *“the pull of the project means that personalities and differences are put to one side so that they can get on with the project”*. For P3 *“working well together despite different cultures and ways of doing things”* was also a critical factor. The large organisation P9 had created a model of doing business through collaborative information exchange with their subcontractors, however this was predicated on a good working relationship with those subcontractors.

The medium sized firms’ knowledge of or relationship with a particular individual in another company was a critical factor in collaborative relationships. M3 considered that *“knowledge of a particular individual within a company that you have been dealing with over time”* was important. The other two medium sized firms pointed out that the high staff turnover within the small firms meant that relationships had to be re-established after the key collaborator left the company.

For the smaller firms relationships varied depending on the size of the company with which they were dealing. One owner of a small firm commented that in his relationship with a large company in the region there was no loyalty as the market was big enough so the large company could change subcontractors at any time.

Among the small firms themselves there tended to be long-term relationships as many of the owners and managers had worked in the region for extended periods of time, often leaving a large company to start up their own business. It was commented by an interviewee from one such company in that it was *"hard to underestimate the power of a slab of beer"* (S6). The proprietor of this company often had people around for drinks on a Friday afternoon which built social relationships outside of work that led to increased work opportunities. This firm was relatively new to the region and this could explain the proprietors desire to create social networks in the region. The history that some small firms have is reflected in the comment *"we have worked with these people in the past and in the industry everybody knows everybody else"* (S9).

This focus on pre-existing relationships was borne out in the comments coded under History or Experience. For the large firms, prior experience with collaborators and subcontractors was important as this often gave evidence of credibility, track record and reputation. Particularly in the organisations involved in the defence industry there was a network of people who had prior history of working with each other as they were formerly enlisted in the Navy. A number of the interviewees from the large defence organisations had previously served in the Navy and upon the completion of their 20 years of service had left to take up positions within the private sector of the defence industry.

The medium sized firms considered that the past history or reputation of the other firm was of importance when collaborating with another firm. Similarly small firms were looking for firms with whom they had experience and those that had built a good reputation in the industry as this was a form of security against being taken advantage of or mistreated. In one case the manager of a small firm commented *"the people that we deal with, many of whom are old Alpha* employees therefore you know with whom you are dealing. This is an incestuous industry, everybody knows each other"* (S4).

The researcher found that many of the small yacht and pleasure craft builders knew each other and what was happening within each others firms, even if they were not dealing directly with these firms. It was commented by one interviewee that the

major source of this "industry gossip" was the suppliers who moved from firm to firm. There was also a network of pre-existing relationships as many of the small firm owners previously worked together in some of the larger firms in the region. There were two informal networks operating in the region, one of ex defence personnel mainly based in the large firms and the other of ex employees of large boat building firms who were now small and medium firm proprietors.

Of the 35 interviews conducted 34 were with males and all of the industry respondents were male, usually between 40 and 60 years of age. On numerous occasions the interviewer would be told stories of what was happening in other firms in the region, this informal flow of information in a male dominated industry was unexpected, however it played a significant role in the creation of collaborative relationships and the identification of new opportunities for the firms in the region.

The measurement of work performance/standards was the third most cited critical factor in collaborative relationships. For the large firms who were involved in the defence industry and the resources industry the meeting of standards required by the Navy and the off shore oil and gas industry was a critical factor for the maintenance of these collaborative relationships. Similar concerns were expressed by a number of the medium size organisations who sought delivery of promised outcomes, reliability, timeliness and technical expertise. One of the medium sized firms interviewed was a supplier to a larger firm however used subcontractors as part of its production process. The interviewee commented "*when a company lets me down and lies to me about the progress of a job this puts me in a difficult position with a client, it would be better if the subcontractor was honest about the progress of the work*" (M5). This typifies the position of a number of the large firms who often find themselves caught between the demands of the Navy and the performance of their collaborators and subcontractors.

Among small firms work performance/standards were not often cited, however S5 subcontracted aluminium cutting work out and often found that the work returned was sub standard or slow. As a small company competing with the large firms, S5 found that they had far less leverage in comparison to large firms and this equated to poor service from the aluminium cutting firms.

Linked to relationship and history was the critical factor of trust. The need for trust and trustworthiness within collaborative relationships was most often cited by the medium size organisations. It was commented by M2 that no relationship is completely open, yet M1 considered honesty and openness to be important. For the primes trust was important, however this was balanced with the need for commercial confidentiality as their collaborators could become their competitors in the future. The interviewee from P6 said that it was much harder to walk the collaborative line and that firms needed to show a high level of trust in their staff, enabling them to balance the competing demands of the company against those of the alliance.

The need for each party to benefit from the relationship was expressed as mutual benefit as firms spoke of the desire to see a win-win situation in collaborative relationships and according to P6 *"trade offs have to be made within an alliance to create a win-win situation for all partners"*. It was suggested by the interviewee that *"you also have to monitor the performance of others to ensure that they are travelling well and are not hurting as it is best that everyone benefits from the project. What is best for the project is best for all parties."* P1 worked on the principle of *"treat others well and they will return the favour, delivering on time and up to standard."* P5 needed its collaborating company to access an overseas market and its collaborator required P5 for intellectual property. The concept of mutual benefit was mostly spoken about by the large organisations. This may be due to their significant bargaining power which allowed them to create a win-win situation in a project.

Interestingly the financial benefits and workflows came well down the list of critical factors for collaborative relationships, however for two firms price and profit were over-riding factors. A continuous flow of work for small firms provided regular income and allowed the maintenance of a stable labour force which was extremely important in the tight labour market. For the large firms, having a regular flow of work meant that they could maintain their subcontracted pool of skilled labour which reduced overheads associated with seeking and training new staff.

Communication was important in collaborative relationships as it allowed organisations to track the progress of a project or contract. According to M4 *"communication is central as when it fails projects can go pear shaped."* This is similar to the response of N2 *"lack of feedback and communication from subcontractors who promise to deliver but don't, this can be critical."* Similar to workflow, business growth involved collaboration that allowed firms to access new contracts or expand the business.

The negative factors cited in relation to collaborative relationships relate to failure to deliver or to perform according to contractual agreements. For S7 financial misconduct was a deal breaker and the interviewee from this firm spoke of contractual non performance which cost the firm significant amounts of income and lost reputation due to non performance by a collaborative partner.

The critical factor of security and intellectual property was pertinent to a number of the primes in the defence industry who required confidentiality agreements and the adherence to defence security protocols by personnel from external organisations.

M4 used collaborative relationships to identify innovations and new technologies and had worked collaboratively with a subcontractor to develop and commercialize technology identified within this company.

7.4.6 External Factors that Impact Collaboration

The three major factors that impact on collaborative relationships external to the industry cluster were government policy, defence policy and the economy.

7.4.7 Government Policy

The issues cited under government policy include tax regulation such as Goods and Services Tax, superannuation regulations and payroll tax. For medium and small firms the government regulations surrounding employment caused concern in

relation to skilled migration, the hourly pay rate system and overheads when employing staff.

According to S2, the hourly pay system meant that it was hard to penalize poor performing workers and the owner would prefer to pay according to the job done in order to give greater benefit to the harder working employees. The interviewee had found that the less diligent workers tended to slow the better quality workers down. The tight labour market meant that it was very difficult for the interviewees to sack under performing workers, in fact he himself worked on the shop floor in order to meet production targets.

There were general comments relating to the need for government policy to support local industry to compete outside of the domestic market. Linked to Government policy were comments concerning the inadequate or inappropriate provision of infrastructure within the region, such as placing overhead powerlines in Henderson, making it extremely difficult and costly to transport boats and yachts by road to slipways on the coast.

According to M6 there is a lack of services supplied by State Government for the power and pleasure boat industry. Facilities such as mooring for boats, public slipway or boat lift needed to be supplied in order to assist the growth of this industry. The interviewee commented "*that the State Government seemed to be primarily focused on the defence industry*". Other infrastructure cited included launching facilities, the provision of underground power and "fairer" access to the AMC which was predominantly used by the large firms to the exclusion of other firms.

In a brief history of the composite fibre yachting industry interviewee S8 pointed out that with the America's Cup win of 1983 the then State Government had the opportunity to grow the shipbuilding industry located along the south-west coast of Western Australia. The opportunity was never seized as with the introduction of a luxury tax in the 1980s the "*number of yachts builders decreased from 87 down to 5 in the space of a year*" (S9). This also resulted in the reduction of the workforce available in that industry. According to S9, "*there has been a lack of assistance*

from the government to get firms to grow to the next level, however the industry is not big enough to attract support and government policies are not focused on the leisure industry. This is unusual as Western Australia has the highest proportion of boat ownership in any state" [in Australia]. According to interviewee M6, compared to the Queensland Government which he considered was very proactive in building facilities for the super yacht industry, the Western Australian State Government has provided no support and seems to be primarily focused on the defence industry.

7.4.8 Defence Policy

The significant defence policy which impacted the region of Henderson and Rockingham was the development of the Two Oceans policy which saw the deployment of the ANZAC class frigates and the Collins class submarines to Garden Island in Western Australia. The Two Oceans policy has precipitated the location of international and national firms to Perth to participate in the defence industry. These large firms require the skills, expertise and technology provided by local firms to meet the requirements of the Navy. The Navy usually seeks to deal with a single contractor however no one contractor, as mentioned before, can meet all the requirements of a contract.

One of the noted changes in defence policy has been the decision by the Department of Defence to move the provision of maintenance services away from enlisted personnel to industry providers. The Department has also embarked upon a programme of local provision of Navy vessels. According to P4, the Government's decision was based on the fact that they *"did not want to send their ships back to the country of origin so they needed to build in-country expertise and skills"*. An example of this has been the building of the Collins Class submarines in Australia and these are now home ported on Garden Island and maintained by a large firm and a raft of subcontractors.

Defence policy in relation to the building of both surface and submarine vessels was discussed by a number of interviewees. The main difficulty facing the large firms who were the large firm contractors was the discontinuity in shipbuilding contracts.

Although these defence contracts are of extremely high value they are infrequent in nature and were generally shared around a small pool of Primes. The difficulty faced by the large firms was primarily in the development and maintenance of skilled labour over both the building and the maintenance life cycle of the vessels. For P7 the scheduling of requirements of the defence industry meant that work was irregular in nature and cash flow erratic for the smaller subcontracting firms. The interviewee believed that *"the culture of the defence industry is that of a silo mentality with a lack of information exchange due to security concerns."*

One of the large firms interviewed had sought to expand its defence market by adapting existing commercial vessel designs for naval use. With the increased threat of terrorism and increased coast guard operations the interviewee suggested that Navies are seeking smaller high speed vessels and this company has won contracts with smaller overseas Navies as well as with the U.S. Navy.

7.4.9 The Economy

For the majority of the medium and small firms the state of uncertainty surrounding the Australian economy, fluctuations in the dollar, cost of raw materials and labour shortages were cited as factors that impacted on their formation of collaborative relationships. With the booming minerals sector much of the skilled labour which would normally be employed in the region has been attracted to the north-west of Western Australia, exacerbating the skills shortage in the region. Changes in the international market place and political climate have impacted those firms trading internationally. When selling to overseas defence industry, firms have to be mindful of current foreign policy as sometimes our allies become our enemies. Changing material prices particularly impacted the smaller firms that produced one or two boats a year and the time lag between price quoted and completion of the project, which was often 6 to 12 months, could see significant changes in the price of the finished product.

It was noted by S9 that the booming Western Australian economy meant increased sales of yachts, however imports of yachts from overseas manufacturers such as

China were seen as a threat to the local product. The respondent commented that at present they could compete through a high quality product, however he saw a time when overseas manufacturers would be competitive both on price and quality.

In summary the larger firms that were more likely to have contact with other firms and the local skills shortage meant that TAFE was one of the key points of contact in the region for the majority of firms. While there was interaction between firms in the various industries, engineering firms were unique in that they dealt with all the firms within the cluster. The location of suppliers, other firms in the same industry and customers in the region were important in the firms' choice to locate in the region.

When investigating the critical factors for collaboration for the defence, marine commercial and resources industries the relationship they had with the collaborator was the most critical factor. For the Engineering firms it was their history or experience with the collaborator and for the yachting and pleasure craft firms it was the standard of the work performed. The firms interviewed seemed to be interacting with others in the region and placed a high level of importance on relationships, both past and present, for collaboration.

Although not directly impacting on collaborative relationships it was found that government can impact and inhibit the way that the firms do business. Government policy on employment, taxation and the provision of infrastructure was considered to be inhibiting business growth. The lack of support for the expansion of the boat and yacht building industry has contributed to a very competitive local market which is not conducive to collaboration. According to interviewees, the Federal government's defence policy has created a highly competitive industry with little room for collaboration. The labour shortage created by the booming mineral's industry and the threat of overseas manufacturers entering the local market may provide impetus for collaboration.

7.5 Research Questions 3 - The Use of ICT in Collaborative Relationships

Generally, as the size of the firms increased so too did the level of sophistication of the ICT being utilized by the firms. All 35 organisations represented in the study had access to a desk top PC, however one of the small industry firms did not actually have access to the Internet at the work place and instead accessed it at home. Two of the third tier firms had no webpage.

The majority of online ordering was limited to the purchase of office materials. Of the online ordering undertaken the majority was done through email rather than through direct interface or web enabled systems. There was no evidence of the use of electronic data interchange (EDI) between the organisations interviewed. It is possible that the large firms used EDI in other parts of the company but the interviewee was unaware of this. G1, the Local Government organisation, did have a capacity for online purchasing and payments and E2 and G2 conducted online communities for their stakeholders and customers. One medium sized organisation was found to use customer relationship management software.

There were no clear examples of c-commerce though the two Navy alliances and the spreadsheet system used by P9 were the closest to any form of c-commerce. The IT usage for the organisations that took part in the study is illustrated in Table 7.21.

Table 7. 21 IT Usage within Organisations

IT Usage	Number Firms
IT stand alone desk top PCs	35
Internet access	34
Webpage	33
Online purchasing	19
Online Ordering	5
E-commerce	4
C-commerce	0

7.5.1 Role of Shared Technology in Collaboration

One of the main focuses of the research was to investigate the use of shared technology within collaborative relationships. Unfortunately the level of shared technology used was well below the researcher's expectations, considering the number of large national and multi national firms within the region. Three of the large firms stated directly that shared technology did not play a part in their collaborative relationships. The two large firms that did use collaborative technology were both involved in the communications and war fighting systems side of the defence industry. Two of the medium sized firms and six of the small firms used no collaborative systems in their business relationships. For many of the firms the only form of shared technology was information exchange through email, this seemed to be the dominant computer based form of technology organisations used to exchange information and work together. According to M6, face to face communication was the best form of collaboration and they had created an international network of interpersonal relationships built through activities such as going to international yacht shows to promote themselves.

A summary of the inhibitors to the use of shared technology identified by the respondents included:

- The lack of collaborative purchasing and supply systems used by other firms in the region.
- The high cost, low volume nature of supply in the shipbuilding industry reduced the requirement and cost effectiveness of shared systems.
- Security fears including the loss of intellectual property and industrial espionage.
- The technology has not been adopted across the industry.
- The cost of implementing new systems and the lack of knowledge about the systems hindered small firms.
- Finally, according to one respondent "*only technology used is phone and fax, nothing more complex is required*" (S4).

P3 commented that they had previously tried to get the shipbuilding yards to work together through the Australian Shipbuilding Forum in order to sell collectively to the export market. This was thwarted according to the interviewee by a lack of opportunities, half hearted commitment from firms and competition between the collaborators.

The two alliances that serviced Navy vessels both had some form of integrated system, however the variation in technology used between the collaborating organisations and the Navy's increased need for security meant very little progress towards the creation of collaborative systems had been made. One of the medium sized firms and three of the large firms had their own internal networking system to allow them to communicate across the continent and internationally, but these systems had not been extended to their collaborative partners. The Navy itself had two different information systems for the management of information and knowledge within their organisation and external contractors are allowed only limited access according to their security clearance. No unified data management system was used across the Navy's surface and submarine fleets. Instead one system had been developed for submarines whereas another one had been developed for surface ships.

Some form of a collaborative system had been implemented by the Defence, Science and Technology Office seeking to encourage contractors to work collaboratively on projects and in some cases using an electronic format for the tendering process. The two collaborative alliances around the maintenance of vessels have been a driver of the development of further collaborative systems. This has been an extremely slow process as it required cultural change within the Navy itself to work collaboratively with others in an electronic environment.

A notable example of the use of collaboration around technology was between P9 in the warfare systems industry and its subcontractors. The contract manager for the large firm set up a system of spreadsheet based communications with the subcontractor to manage the peaks and troughs of the workflows on vessels.

Through that the firm was able to position itself as a single point of contact for the Navy instead of the Navy having to interact with multiple subcontractors. The large firm became the intermediary man between the Navy and the subcontractors who

were predominately from a trade background. The large firm sent a consolidated maintenance report to the Navy who no longer had to deal with fifteen different subcontractors and reporting formats.

The interviewee reported that there was significant initial resistance among the subcontractors, however the subcontractors found that the system allowed them to better schedule their workload and increase their profitability. The collaboration around ICT in this case proved to be successful for the three parties involved: the subcontractors were able to regulate their workflows; the workload for the Navy in meeting its reporting requirements was reduced and the large firm was able to build up a substantial pool of subcontractors and deliver beyond the Navy's expectations which it is hoped will assist the large firm in winning future Navy contracts. The types of shared technology identified in the study are contained in Table 7.23.

Table 7. 22 Use of Shared Technology in Collaborative Relationships

Role of Shared Technology	Citations
Not used in collaboration	14
Email collaboration	12
Collaboration through external party	9
Inhibitors	9
Role of shared technology – general	6
Internal networking	5
Face to face collaboration	2
Use CRM	2

7.5.2 Benefits or drawbacks of Shared Technology

As most of the interviewees did not use collaborative technology the responses to the question seeking to identify benefits or drawbacks to the use of technology in collaborative relationships solicited answers which involved the use of technology in general format rather than specifically collaborative relationships.

The benefits identified of using ICTs included:

- Convenience in the transfer of information and collation of data on the progress of projects.
- Improved communication and the reduction of confusion.
- Overcoming distances, particularly working in export markets.
- Allowing the dissemination of information across organisations to obtain a uniform understanding on a collaborative project.
- Increased efficiency and reduced costs.
- Greater access to classified material which assists with scheduling of projects.
- Provision of long term data on workflows which allows better scheduling.

The organisations which predominantly cited benefits in the use of technology in business relationships were the large organisations and the two Navy alliances. The drawbacks to the potential use of collaborative technology included:

- The leaking of intellectual property.
- The need for cultural change within the collaborating organisations.
- Technical problems such as network failure.
- The double handling of information and the lack of co-ordination between collaborating firms and their IT systems.
- The general lack of technology literacy among firms in the industry.
- Lack of compatibility between systems in the large firms and their collaborators.

According to P6 there were advantages to working collaboratively, however, it needed *“to be a long term relationship to make IT investment worthwhile”*. The interviewee found that when a collaborative system was instituted conflict arose between the partners as to which or “whose” system would be used for which particular function of the alliance. The implementation of a new system required significant cultural change on the part of the collaborating firms as they came from very divergent cultures. It was pointed out by one of the small firms that even though technology improved communication with their collaborative partner it still did not provide any earlier warning of changes in the firm’s work schedule.

The three organisations who spoke about their preference for face to face relationships were from the Government and educational sectors. The interviewee from E2 commented that while technology facilitated relationships it lacked a personal tone and the interviewee commented that "*face to face allows me to use my 'trust radar'*".

7.5.3 Introduction of New Technology into Relationships

For the firms involved in the defence industry, new information systems were often introduced through the Department of Defence and the Navy. For the Primes in the defence industry this has meant dealing with two different supply chain/logistical software systems which are SIMS (submarines) and AMPS (surface vessels) which were both developed in house by the Navy. As yet no new system has been developed by the Navy in collaboration with the private sector and all changes in information systems are driven by the Navy. According to one of the small firms the Navy's Department of Materiel Services (DMS) did not have an online system for maintenance and used a fax to communicate.

One of the overriding themes from the interviews concerning technology and the defence industry was the slow rate of change. Interviewees, both in medium sized and large firms, cited the archaic nature of the technology used by the Navy. It was suggested that the reason for the use of outdated technology was the need for it to be tried and proven before adoption by the Navy as failure could put lives at risk.

The only instance of a large company implementing collaborative technology with smaller firms was the case of P9. It was commented by the interviewee from P9 it takes between six to eight months for the subcontractors to see the benefit of the collaborative system. However, he felt that "*it is a living thing (the system) that helps them improve their business*". The interviewee found that instead of coming to him for help the subcontractors tended to collaborate with each other to gain skills in the use of their collaborative technology. Once the subcontractors gained

proficiency with the shared system they would then have the confidence to feed back to the interviewee suggestions for system improvements.

7.5.4 Knowledge Sharing and Management between Organisations

There was little inter-organisational knowledge sharing apart from the two Navy alliances. N2 used a configuration management tool to share information on the vessels and the progress of maintenance and support. The private organisations in the alliance had some access to the record management system of the defence organisation. Apart from this example, organisations only had internal knowledge management systems. Some organisations used off the shelf records management products, such as DOC Whiz, My Documents and Primavera, or simply stored files electronically on their desk top computers.

It was suggested that part of the reason for the lack of any collaborative knowledge management systems may have been due to the relatively high security within the defence industry and the for the protection of boat designs and technology in the marine commercial and yachting industries. This was epitomized by P5 who commented that they work *“extremely hard to protect their intellectual property and rarely work collaboratively on design”*. If external access is granted to the systems of large firms it is on a one off and very restricted basis. The unwillingness to share information with others was also evidenced among the smaller firms as many of them sought to differentiate themselves in a highly competitive market.

In summary, a low level of ICT use for collaboration was found in the study and the sophistication of ICT use increased with the size of the firm which is consistent with previous research. The inhibitors to the use of ICT were cited, including a lack of an industry standard, the high cost low volume nature of the industries in the region, the cost benefit of implementation of a new system and security fears.

Although some collaborative use of ICT was evidenced in two major naval contracts, there was generally a low level of adoption of ICT for collaboration across the

defence industry interviewees. Concerns with using ICT to communicate between firms included leaking of intellectual property, organisational culture, technical problems, lack of compatibility between systems and low level of ICT skills. The reticence of the defence industry to adopt new technology and its high level of security combined with the absence of any firm or organisation to drive the adoption of ICT meant that collaborative use of ICT was a low priority. The low level of collaboration using ICT corresponded to a low level of IT based knowledge management.

7.6 Research Question 4 - Benefits and Drawbacks of Collaborative Relationships

The benefits of collaborative relationships are similar to the drivers with access to skills, expertise and intellectual property and access to markets, contracts and networks being cited as the main benefits. A number of firms commented that collaboration gave them access to capabilities and resources which allowed them to compete in new markets or develop unique products. For the defence industry the performance of maintenance and the shipbuilding process itself placed a premium on time and production schedules. Being able to get a ship or submarine built or back into the water within a certain time period after scheduled maintenance was often part of the contractual obligations for the large organisations.

The inter-related nature of the defence industry meant recognition from competitors, customers and collaborative partners could create commercial value for firms of all sizes.

For the large firms the drawbacks of collaborative relationships included the leaking of intellectual property, losing contracts due to choosing the wrong collaborative partner and where a smaller company increased its expertise sufficiently to start to bid against the large company with which it originally collaborated. For small firms the drawbacks included rigid contracts, lower profit margins and a loss of staff to larger firms.

The skilled labour shortage in the region meant collaboration was a benefit to firms as subcontracting allowed firms of all sizes to manage peaks and troughs of their workflows. The concept of flexibility of sourcing labour was considered important for the larger firms. For the smaller firms the long-term sustainability of the individual firm's workflows through contracting to large firms was significant.

Table 7. 23 Benefits of Collaborative Relationships

Benefits/Drawbacks	Citations
Access to skills, expertise and intellectual property	20
Access to markets, contracts and networks	18
Better product and production time	13
Building track record and reputation	11
Better relationships with others	10
Improved workflows	10
Increased income and reduced costs	9
Drawbacks	7
Other	7
Sustaining local industry	6
Improved customer service	5

7.6.1 Measurement of the Benefits of Collaboration

As evidenced from Table 7.24 the most common form of measurement of the success or benefits gained from collaborative relationships was financial performance. Large, medium sized and small firms were equally represented as considering financial performance as their central measure of collaboration. Linked to this was the measurement of the criteria of "ongoing work and contracts".

Table 7. 24 Measurement of Benefits of Collaboration

Measurement of Benefits of Collaboration	Citations
Financial performance	21
Ongoing work and contracts	12
Contractual requirements	11
Open up new markets, relationships and products	10
Improved safety, quality, reliability, timekeeping	10
Creation and sustaining of good working relationships	9
Customer and staff feedback	7
Improved service provided	4
Measurement – general comments	3

Comments from respondents included identification of the partner that would give the best opportunity to win the work, the number of new projects that “come through the gate” and accessing bigger markets or contracts. Related to this was the opening up of new markets, relationships and access to new products. For one large firm this equated to the ability to win work that it would not have otherwise won. For one small firm the development of long-term relationships with other firms provided leads to expanding opportunities in areas not previously tapped by the firm.

Firms involved in the defence and the resources industries were exposed to extremely rigorous contractual requirements and compliance. For the large firms to maintain their contracts with the Navy they had to ensure that the work carried out by the smaller firms, to which they subcontracted work, met with those requirements. The meeting of contractual requirements impacted on firms of all sizes. The importance of compliance was explained as being due to the life and death nature of defence projects where the safety of enlisted personnel depended on the quality of work carried out by commercial subcontractors. This focus on contractual requirements was particularly evident with the firms that worked on Collins Class submarines. Related to contractual requirements was citing of factors such as safety, quality, reliability and delivery of contracts on time as being measurements of collaborative relationships.

Of the firms interviewed four indicated that they had no formal measurements of the benefit of collaborative relationships. One was a medium size firm, two were small firms and one was a Government organisation. Many of the forms of measurement

cited were informal and were assessed by the respondents on the basis of observation rather than any formal measurement process.

The creation and sustaining of good working relationships had a number of facets including the building of a working history with another organisation in which all parties involved were treated fairly. As collaborative relationships are based around individuals in firms there was comment on the ability of individuals to work together. In an interview with one of the defence primes it was commented that a measurement of the health of the relationship is *"if they are throwing stuff at each other"* (N2). If this is happening then it is deemed that the relationship between the staff of the respective firms is not running too well.

Four of the nine large primes interviewed commented on creating and sustaining good working relationships. The respondent in one of the large organisations saw an important measure of the relationship as *"being able to get all parties to work together despite their differing expectations and completing the project"* (P1).

7.6.2 Innovations from Collaborative Relationships

The low level of collaboration may in part explain the low level of innovation found across the marine, defence and resources industries investigated in the research. The majority of innovations cited by the respondents were incremental, that is minor improvements on existing technology. One of the themes which emerged during interviews was the source of the innovations either coming from external sources to the company or those developed within the company.

For P1 and P2, joint ventures and collaborations have provided access to new capacity, technology and skills. For P8, innovations came from the parent company in the eastern states of Australia. S1 sourced new technologies from overseas partners that are integrated into innovative designs by the company.

For other small and medium sized firms innovation came through 'on the job' learning, working with other subcontractors and through the information exchanges

as part of the floating labour market in the region. Collaboration and knowledge sharing among the subcontractors particularly in the defence industry, although not producing technological innovation, produced up-skilling of labour, transfer of tacit knowledge and industry know how. Often this improved know how or a “better way of doing things” was fed back through the large organisations to the Navy. Generally the innovations were related to the administrative processes used or manufacturing techniques. Efficiency in production, reduced labour costs, faster turn around time for maintenance and improved quality assurance were cited as innovations across industries and firm sizes.

The one major innovation that is historical to the region is the high level of expertise in aluminium boat building in the Henderson region. This has seen the development of large high speed aluminium boats for both commercial and naval purposes. According to M2, radical innovations are not common in the defence and resources industry as they both tend to be high risk with a possible loss of life. The level of innovation is sometimes restricted by contractual requirements as both these industries want to use proven technology to reduce risk. The interviewee from M2 commented that firms did not share a lot of information as they did not want to ‘show all their cards’ when collaborating with other firms.

According to P6 “the alliance itself is an innovation. Much of the innovation is in the form of intangible IP from the collaboration. The open relationship allows for the observation and adoption of cultural behaviours allowing you to try and use the best bits of each organisation to produce change”.

7.7 Future Involvement in Collaborative Relationships

When asked what they saw as the future of collaborative relationships all but one of the large firms indicated that they were seeking additional collaborative relationships with the focus being on new projects or new markets. For the large firms involved in the defence industry future major defence contracts such as the air warfare destroyers and the amphibious craft contracts could mean the reshuffling of current alliances

and repositioning in order to get part of the contracts. The Navy alliances have proved to be successful and the level of collaboration according to N2 will increase. This will be *“a big change in the culture for the existing personnel, there will need to be more trust between contractors and Navy personnel, however defence will still have control”*.

For the two large firms involved in the resources industry, success in collaboration has encouraged them to expand into the marine and defence industry as they believe the skills they have obtained in joint venturing are transferable to another industry. Similarly P5, has moved from commercial vessels into Navy contracts by forming alliances in the USA with defence industry firms. P6, a Scandinavian based company, sees relationships as central to the company's culture and way of doing business. A number of the large firms with small bases of operation in Western Australia are seeking further collaborative relationships to extend their market in this region.

For the medium sized firms further collaborative relationships were a means of accessing new markets and projects. For small firms expansion of collaborative relationships is a way of building workflow and long-term sustainability.

Companies also spoke of consolidation of existing relationships, by improving their ability to service their customers. For some of the small and medium sized firms expansion into new relationships required resources beyond the firm's current reserves.

In summary, the benefits of collaboration for the participants in this study included access to skills, expertise, intellectual property, markets and contracts. The regulated nature of the defence industry and the erratic nature of contracts meant that better products, faster production and regulating of workflows were also priorities. The citing of reputation, relationship and building a track record as benefits may be linked to the strong emphasis on relationships evidenced in the study.

Most of the measurement of the benefits of collaboration were of a quantifiable nature based on financial measurements and meeting contractual obligations. Other

measures included access to new opportunities and developing good working relationships. There was a lack of formal measures of collaboration particularly among the smaller firms.

There was little evidence of innovation arising from the collaborations however, innovation was not seen as a driver or benefit of collaboration by the participants in the study. The firms in the study were seeking to expand their collaborative relationships. The larger firms seemed to have a greater capacity for collaboration and were seeking to extend or consolidate their relationships. Some of the smaller firms lacked the resources to enter into any further collaboration.

7.8 Other Comments

At the end of the interview the respondents were asked if they had any further comments they would like to make and allowed the interviewer to follow themes raised previously. Details on the history and issues facing the yacht and boat building industry were prevalent. According to O1 the Henderson region was originally set aside for shipbuilding during the 1980s with only shipbuilding firms allowed to locate into the region. The original industry around Henderson was family based with firms such as the Kailis and Lombardo Yards and Australian Shipbuilding Industries. The majority of the shipbuilding was around prawn trawlers, these yards were union controlled as the firms that located on the waterfront are required to have unionised labour forces. To avoid unionisation new yards began to spring up away from the waterfront which meant some of the bigger builders did not have ocean front access, and the larger boats were harder to move.

A number of infrastructure issues relating to the Henderson region were raised by the interviewees including:

- The presence of overhead powerlines which made it difficult to move large vessels to the waterfront for launching.
- The lack of a launching facility smaller than that of P3.

- The control of ports by autonomous bodies which makes it difficult for the berthing and servicing of the Super Yacht industry.
- State Government's unwillingness to sell them land near the water and the size of shed required does not make leasing an economic proposition.
- There is no access for a portable boat lifter.
- No public marina in the area where people can moor their boats, particularly larger vessels.
- Lack of a public accessible ship lifter, slipway and dry dock facility for larger boats to be taken out of the water for maintenance.

According to S8 there could be a sizable industry in the building and maintenance of super yachts however the lack of these facilities has stopped the industry from developing. The interviewee indicated the region has been significantly underdeveloped and consideration should be given for a marina development and yacht club.

Finally, the yachting and pleasure craft industry was dominated by small firms where the majority of the owner operators were over 45 years old. It was commented that apprentices did not traditionally leave to set up their own companies as they do not have sufficient skills to build a boat from start to finish. S1 commented that when he and his brother wanted to retire that they would simply close the business as there was no one to take over. In relation to the size of these boat builders the debt required for small boat builders to move up to the next level, along with the administrative burdens were disincentives to growth.

7.9 Labour Shortage

One of the recurring comments in the interviews related to the skilled labour shortage in the region. The majority of interviewees who spoke about the labour shortage were from smaller firms. The contributing factors to the shortage identified by the interviewees were the mining boom in Western Australia, disinterest among young people in the trades, and the desalination plant project which was drawing trades

people away from the region. According to S9 *“15 years ago no one put on apprentices and now we are paying the penalty”*. To address the labour shortage M5 has brought labour in from South East Asia however they had found the imported labour did *“not have the same skill level as the local labour force but are being paid the equivalent wages”*.

The labour shortage has resulted in a lower and unreliable standard of work, poor work ethic, higher wage costs and a restriction of growth opportunities. According to S3 *“if an employee chooses to leave to go to another company if his work is not up to standard it is a small industry so people talk and future employers are made aware of that person’s reputation as a worker”*.

7.10 Research Question 5: Models of Best Adoption of Collaborative Relationships

No single definitive model of best adoption of collaborative relationships at the regional level and the firm level was found in the literature or the study. Some common themes from the literature reviewed were identified from the expert interviews undertaken and the pilot and main data collection for the study which are elaborated on in the next section.

7.10.1 Regional Settings for Collaborative Relationships

From the research there is some indication that the environment in which the collaboration takes place has some impact on the relationships. The literature reviewed showed collaboration was a common theme across the strategies of regional economic development. Of the strategies of regional economic development reviewed, including entrepreneurship, networking, innovation systems, Triple Helix and cluster, it seemed that a clustering strategy covers the widest range of facilitating activities. These activities included: knowledge creation and sharing; generation of intellectual property and technology transfer; technological innovation;

business growth and the development of export markets; collaboration between organisations; the development of education and training to support industry; the use of ICT; the provision of infrastructure and a focus on the development of SMEs.

The comprehensiveness of clustering as a means for regional economic development could lead to the assumption that it is the “best” model for facilitating collaborative relationships at a regional level, however, as cautioned in Chapter 2 by the Department of Industry, Tourism and Resources (2004) any clustering initiative must take into account the geographic conditions, culture and history of the region. In comparison with European countries Australia has some unique characteristics which make the application of economic development strategies difficult, specifically the lack of coordination by government and the size of Australia’s economy (Roberts & Enright, 2004; Maude, 2004). Caution must, therefore, be applied to the transplanting of successful strategies from other countries to Australia.

From the expert interviews conducted a number of insights concerning clusters were gathered. The research of the Cluster Org. based at the Stockholm School of Economics provides an overview and direction for developing clusters. The experiences of Tekes, Oulu and San Diego Connect interviewees show that the implantation of cluster development varies greatly.

Table 7. 25 Expert Observations on Clusters

Source	Observations
Cluster Org Sweden	<ul style="list-style-type: none"> ● Presence of a sustainable market for the product and industries such as defence which are driven by a single customer i.e. Government, can prove to be unstable. ● Problems linked to cluster facilitation by an external organisation including leadership and conflict of interests. ● Targets need to be identified for the cluster. ● Identify and map the common and rare capabilities within the cluster and identify related industries to counter the instability in the market by providing firms with alternative markets for their competencies should the dominant market suffer a downturn. ● Drivers for the establishment of clusters are: <ul style="list-style-type: none"> ○ joint production through purchasing, ○ logistics and supply chain development, ○ firm formation through incubation, ○ spin off and business service, ○ joint sales through joint product or regional branding and foreign market promotion; ○ joint R&D, ○ intelligence about the market or innovations, ○ lobbying government policy, regulations and for the provision of infrastructure and human resource upgrading – technical, managerial training and education system interface.
Tekes, Finland	<ul style="list-style-type: none"> ● A small domestic market has lead to an export focus. ● Cluster development in Finland has been market driven. ● Large companies integrate smaller businesses into their value chain. ● There are some alliances between small companies, however it is usually just in the form of buyer/seller relationships. ● Clusters need a combination of different companies ● No cluster is complete, there is always room for improvement. ● There has been a backlash towards government intervention through supporting start-ups as they are considered to be taking market share from existing companies. ● The basis of the projects funded by Tekes is collaboration between companies and the academic sector. ● Finland has a culture of collaboration and participation.

7.25 Expert Observations on Clusters cont.

<p>Oulu Development Authority</p>	<ul style="list-style-type: none"> • The dominant firm, Nokia, has a policy of limiting its employees to 4,000 which has created numerous spin-offs companies. • The Oulu region also cooperates with adjacent regions in Sweden which allows companies in Oulu region to access larger markets and provides for mixed competencies between the firms in Finland and those in Sweden. • The Regional Development Authority has also sought to relocate existing companies into the area using economic, environmental and life style factors and incentives. • The Development Authority's services include business mentoring, business incubators, market research and listings of suppliers and potential buyers. • Establishment of collaboration between competitors. • The model used by the Development Authority is based on ideas that have been collected from around the world on business development and have been modified to work in the region.
<p>San Diego Connect</p>	<ul style="list-style-type: none"> • Mapping industries in the region to identify linkages/supply chains between industries both direct and indirect. • Creating a database of companies' capabilities in the region in order to identify capabilities that link to certain industries so that companies can have flexibility to switch industries in the case of a down turn. • Develop flexibility within the firms in the region so as to enable them to ride out fluctuations in customer demand. • The database aids local contracting by firms and is used to develop consortiums to tender for government defence contracts as they can search by capability. • A history of technology transfer from the Universities in the San Diego region. • The Federal Government has often considered spending on defence, a method of regional development. • Another form of Government policy has been the use of Community Reinvestment Acts which provide a form of bank that invests in communities and provides opportunities for low income businesses.

In the Australian context the pilot case study of the super yacht cluster in another Australian state also provide insights into cluster development. In this case the primary driving forces for collaborative relationships were a common benefit or risk of loss to be avoided by working together and opportunities to be exploited were increased competitiveness, a change of business model in response to changing

market needs and the differentiation of identity in the market place. Facilitators to collaboration were pre-existing relationships prior to cluster formation, the engagement of decision makers with power to effect change, a willingness to embrace change, a co-operative, open, entrepreneurial attitude, demonstrated commitment to the relationship and a united identity in the market. The inhibitor identified was inconsistent policies at the different levels of government

The use of shared ICT enabled quick and cheap information exchange and access to new markets. For the super yacht cluster ICT facilitated their presence in the international market. Despite the introduction of ICT it was stressed that face to face meetings, both formal and informal, were the basis of relationship development and information exchange. The success of the cluster program was evident in the growth in the number of industry clusters in the region and the move towards the creation of integrated or "super clusters".

There are similarities between the super yacht cluster and the Henderson/Rockingham region, yet no one case or model can provide a "blue print" for the development of the Henderson/Rockingham cluster. Even though it was termed a cluster, there were no examples of formal or organised clusters at the time of the study. Subsequent to the study the researcher has been informed by a representative from the State Government that a yachting cluster and a sub-sea technology cluster are in the process of being established in the region.

7.10.2 Collaborative Relationships

For collaborative relationships to be established there needs to be a driver. Through the literature the drivers to the formation of collaborative relationships were identified in Chapter 3 and are listed in Table 7.26.

Table 7. 26 Drivers of Collaboration

Drivers	Factors
Economic	<ul style="list-style-type: none"> • Obtaining and accessing resources • Create competitive advantage through control of scarce resources • Increase competitiveness or market position and so to profit and grow • Access to new markets • New opportunities • Efficiency by improving the internal input output ratio • Reduce the production and transaction costs • Creation of superior product • Reduce risks associated with possible market failure • Reducing competition • Enable greater geographical coverage • Creation of higher profits • Increase trade volumes • Facility for selling over capacity
Knowledge & Skills	<ul style="list-style-type: none"> • Need to access knowledge • Need to access and develop new skills • Increase organisational competency and value through knowledge • Access complementary skills • Capacity to develop new products and innovations • Access information on customers' future intentions
Relationship	<ul style="list-style-type: none"> • Similar dependencies • Reciprocity - Pursuing mutual benefit or goals • To exercise power or control over an organisation or its resources • To justify organisational activities and appear to hold to prevailing norms • Access to important third parties
Environmental	<ul style="list-style-type: none"> • Reduce environmental uncertainty • To meet legal or regulatory requirements • To align itself with others to reduce environmental uncertainty • To gain legitimacy within a particular environment • Environmental threats <ul style="list-style-type: none"> ▪ Opening national markets ▪ Deregulation ▪ Globalisation ▪ Privatisation ▪ Non hierarchical structures ▪ Race for the future ▪ Organisational networks ▪ Information age
Other	<ul style="list-style-type: none"> • For survival • Crises • Needs

It is not clear if a firm requires just one or numerous drivers to enter a collaborative relationship. There is also no “rating scale” as to how strong a drive or drivers need to be before a firm can enter a relationship. Similarly with the facilitators of collaborative relationships there is no clear model for the application of these factors to a relationship, although factors such as trust have received considerable attention in the literature. The facilitators drawn from the literature review in Chapter 3 are listed in Table 7.27. These could be seen as a guide to desirable factors in a collaborative relationship however it is not a prescriptive list.

Table 7. 27 Facilitators of Collaboration

Facilitators	Factors
Structural/ Infrastructure	Information technology Institutional bonds Infrastructure
Economic/ Financial	Investment in the relationship Accepting initial costs for future benefit Perception of benefit Creation of ongoing value Reduce ambiguity
Organisational	Compatibility Flexibility Intellectual capital Organisational interactions Communication Organisational interconnectedness Relationship management Mechanism of coordination –formal and informal Standard values Top management support Shared goals Collaborative environment Putting collaborative interest first Participant’s contribution to the solution Initiating and maintaining the collaborative relationship Competence Commitment Develop a common frame of reference
Social	Positive expectations Share with others Commitment to the relationship Trust Organisational culture Individual interaction

These lists of drivers and facilitators may vary due to factors such as firm size as illustrated by Blomqvist (1999) in Table 7.28. There was also some variation in the drivers of collaboration according to firm size in this study with small firms primarily driven by the desire to access skills and expertise whereas the medium and large firms were interested in accessing new business opportunities and markets.

Table 7. 28 Collaboration Comparison by Firm Size (Blomqvist, 1999)

SMEs	Large Firms
<ul style="list-style-type: none"> • Market-based competitiveness, marketing channels • Time-based competitiveness • Credibility and legitimatisation • Access to finances and higher profitability • Risk reduction • Technology and standard-based competition • Competitive R&D • Competition 	<ul style="list-style-type: none"> • Competitive R&D • Technology-based competitiveness • Time-based competitiveness • Cost-savings and higher profitability • Human-resource-based competitiveness • Market-based competition • Competition • Credibility and legitimatisation

From the research conducted in Henderson the industry in which the firms were involved may also affect the drivers and facilitators of collaborative relationships. Two of the drivers, access to labour and a pre-existing relationship, were not identified in the literature as illustrated by Table 7.29.

Table 7. 29 Primary Driver of Collaboration by Industry

Industry	Primary Driver of Collaboration (Research)	Classification from Literature
Defence	Access new business or markets	Access to new markets (Economic)
Marine Commercial	Access to labour	*Not identified in the literature
Yachting & Pleasure Craft	Access skills and expertise	Need to access and develop new skills (Knowledge and Skills)
Resources Industry	Pre existing relationship	*Not identified in the literature
Engineering	Access new business or markets / Access to labour	Access to new markets (Economic)
External Organisations	Access to labour	*Not identified in the literature

In the expert interviews relating to the marine and defence industries a low level of collaboration was found in the Swedish Defence industry. A sense of self sufficiency has meant a low level of collaboration with foreign defence companies. The industry is consolidating mergers, acquisitions and joint ventures that assist in rationalising the market place (M. Lundmark, Personal communication, June 9, 2005).

For the Finnish shipbuilding industry there were some alliances between SMEs, but most collaboration was in the form of subcontracting to access labour and expertise (T Karvonen, Personal communication, June 16, 2005).

From the main data collection the notable collaborative relationships were the alliance around the building and upgrade of the ANZAC frigates which involved N1, P3 and P6, the relationship between P9 and its subcontractors and informal collaboration between M6 and S8 which allowed for the sharing of skilled labour.

Finally in relation to the use of ICT in collaborative relationships the following facilitators were identified specifically in relation to ICT. As the research indicated the use of ICT in collaborative relationships was low so drivers for ICT use in collaboration were not identified, however, perceived benefits of ICT in collaborative relationships were identified. These are compared to the facilitators from the literature in Table 7.30 below where it can be seen that there were some similarities.

Table 7. 30 The Use of ICT in Collaborative Relationships

Facilitators from the Literature	Research Findings
<ul style="list-style-type: none"> • Cost reductions 	<ul style="list-style-type: none"> • Increased efficiency and reduced costs.
<ul style="list-style-type: none"> • Productivity improvements • Efficiency and cost effectiveness 	<ul style="list-style-type: none"> • Provision of long term data on workflows which allows better scheduling.
<ul style="list-style-type: none"> • Access to information 	<ul style="list-style-type: none"> • Allowing the dissemination of information across organisations to obtain a uniform understanding on a collaborative project. • Greater access to classified material which assists with scheduling of projects.
<ul style="list-style-type: none"> • Routine and simple exchange process 	<ul style="list-style-type: none"> • Convenience in the transfer of information and the collation of data on the progress of projects. • Improved communication and the reduction of confusion.
<ul style="list-style-type: none"> • Product market strategies 	<ul style="list-style-type: none"> • Overcoming distances, particularly working in export markets.
<ul style="list-style-type: none"> • Competitive position • IT resources and skills • Technical trust and bonds • Level of integration of the organisation's existing internal systems i.e. level of IT investments • Level of implementing security systems to protect information exchanged between the organisations • Finding or creating value and ongoing return for all partners in the project • Common history between the organisations • Power balance between organisations • Trust and commitment • Social bonds • High level of integrity, availability and accessibility, efficiency, flexibility, standardization, compatibility, performance, reliability and security of IT • Dependence • The agreement on a common goal and value created 	

7.11 Concept Relationships

As part of the triangulation of the data the researcher used an alternative data analysis tool called Leximancer. The coding for the NVivo analysis was based around the interview questions and themes drawn from the literature, expert interviews and the pilot case study and the pilot interviews. The program was used to scan the text of the interview documents to identify key themes, concepts and ideas that may not have been disclosed from the NVivo data analysis.

Two analyses of the data were undertaken and two maps were generated from the data, the first contained all the interviews and the second contained only the interviews from industry. There was a high level of correlation between the two data sets as illustrated by the ranking of concepts and the concept maps. This was done to ascertain if the non-industry interviews skewed the data in any way. The concepts identified in the text by Leximancer have been ranked by importance and are illustrated in Table 7.31. From Table 7.31 there is little difference between all interviewees and the only industry responses.

Table 7. 31 Ranking of Concepts from Leximancer

Concept	Relative Count	All organisations	Concept	Relative Count	Industry only
<u>work</u>	100%		<u>company</u>	100%	
<u>company</u>	96.6%		<u>work</u>	67.2%	
<u>industry</u>	62.2%		<u>industry</u>	36.4%	
<u>systems</u>	44.9%		<u>systems</u>	27.8%	
<u>contract</u>	44.9%		<u>Navy</u>	24.8%	
<u>Navy</u>	41%		<u>market</u>	24%	
<u>project</u>	41%		<u>boats</u>	23.3%	
<u>relationship</u>	40.2%		<u>interviewee</u>	22.1%	
<u>market</u>	38.2%		<u>project</u>	21.4%	
<u>boats</u>	36%		<u>labour</u>	19.1%	
<u>business</u>	34.6%		<u>contractors</u>	18.7%	
<u>access</u>	32.4%		<u>access</u>	18.4%	
<u>labour</u>	28.4%		<u>contract</u>	16.9%	
<u>information</u>	25.4%		<u>information</u>	14.6%	
<u>time</u>	24.3%		<u>time</u>	14.2%	
<u>region</u>	23.1%		<u>expertise</u>	13.9%	
<u>Defence</u>	22.9%		<u>relationship</u>	13.5%	
<u>Henderson</u>	21.7%		<u>Henderson</u>	13.5%	
<u>people</u>	20.6%		<u>quality</u>	12.4%	
<u>building</u>	20.3%		<u>Defence</u>	12%	
<u>level</u>	20.3%		<u>building</u>	11.6%	
<u>Government</u>	17.3%		<u>level</u>	11.2%	
<u>process</u>	14.8%		<u>located</u>	10.9%	

While the top four concepts were the same for both data sets the notable difference for all organisations was with the higher ranking for relationships, contracts and the inclusion of the concepts of people and government. For the industry only data set, as expected, the greater focus on financial outcomes with market having a higher ranking and the concepts of expertise, relationship and quality being included in the industry data.

The major focus for firms was around obtaining contracts and staffing for the workload. This may be due to the erratic nature of the workflows in all the industries due to the irregularity of high value of the contracts.

Though the study was concerned with relationships this was not a dominant factor in the interview text when analysed with Leximancer. The larger the dots and the darkest the text the stronger the concepts were in the interview text. The concept maps for all interviewees and industry only interviewees look relatively similar with

the two main terms of work and company closely linked. The other two significant concepts were systems and industry. These were located away from the main concept group which indicates only a weak relationship between the terms. The concepts across Figures 7.5 and 7.6 seem to be evenly spread with no strongly defined concept clusters.

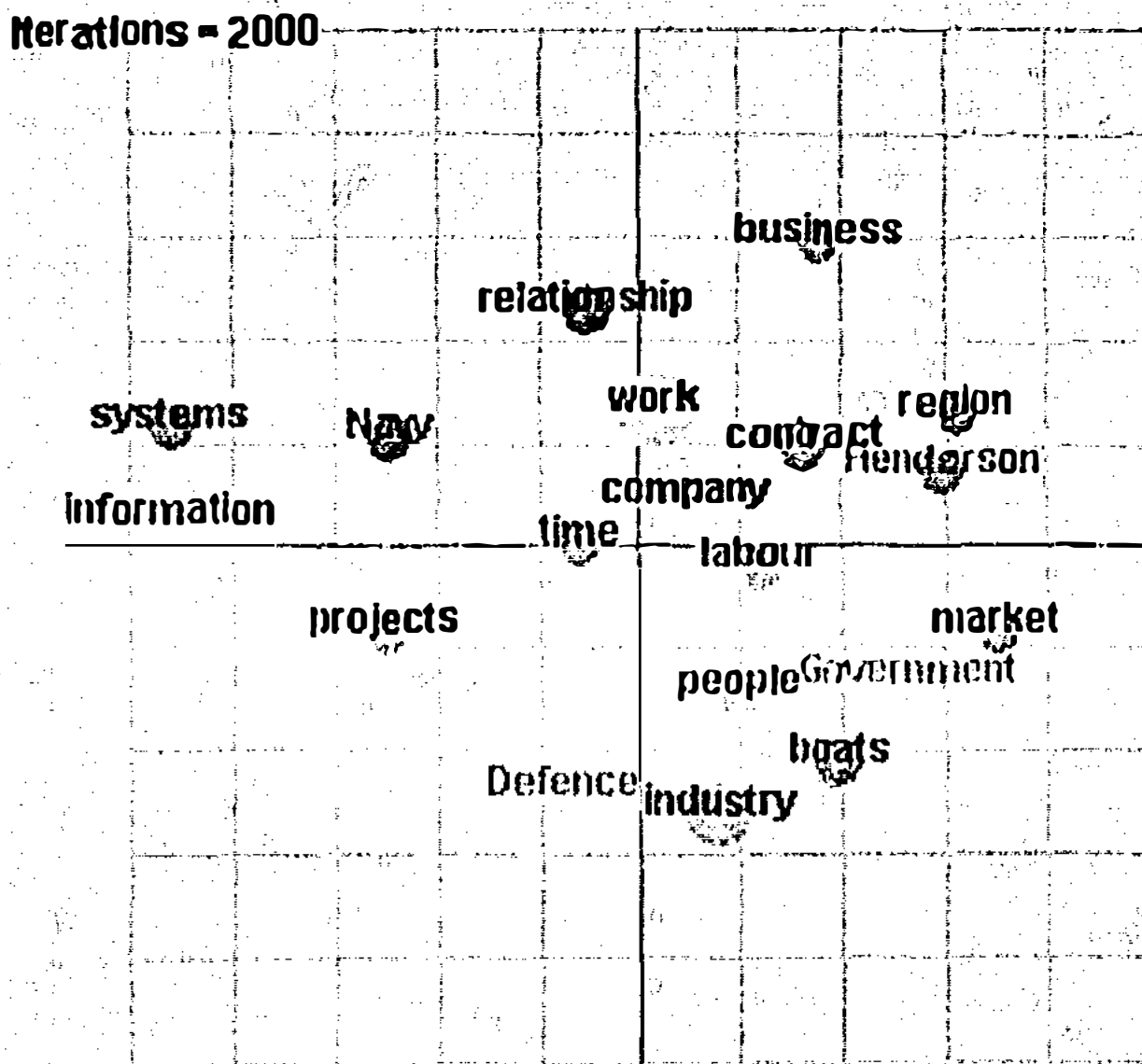


Figure 7.4 All Interviews

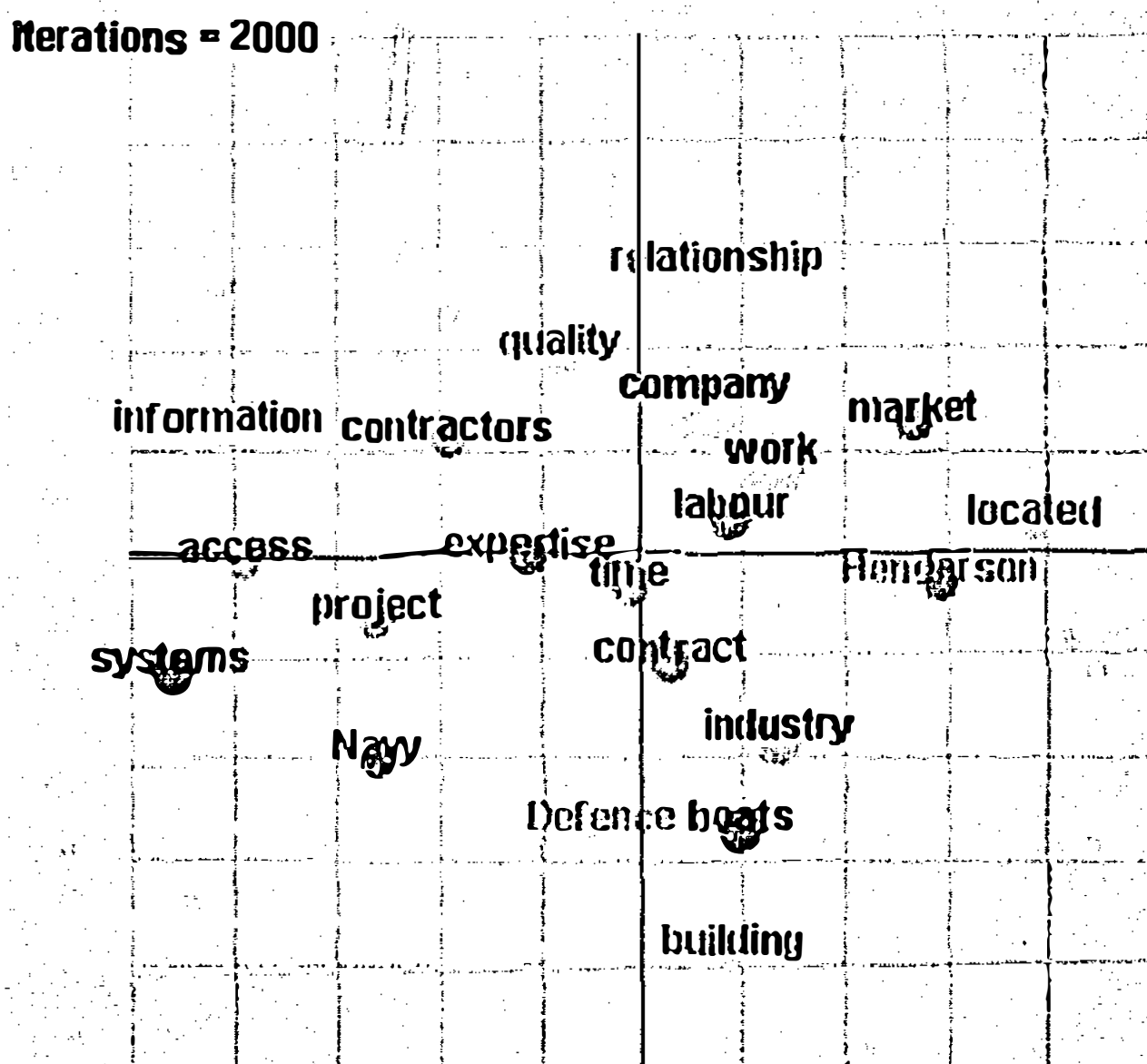


Figure 7.5 Industry Interviews

(“Iterations 2000” is the number of time the data is scanned by Leximancer in producing the map.)

7.12 Chapter Summary

Based on the research questions the results from the study have been presented in this chapter. In Chapter 8 the results will be discussed and summarised in the light of the literature and the expert interviews and conclusions drawn. The limitations of the research and areas for further research will be described.

Chapter 8: Discussion and Conclusions

8 Introduction

In this final chapter the research findings presented in Chapter 7 will be analysed in the light of the research themes, literature and expert interviews presented in chapters 1 to 6. Through comparing the research findings with the previous literature conclusions and recommendations will be made. Finally, the research limitations and areas of possible further research will be discussed. The chapter format is illustrated in Figure 8.1.

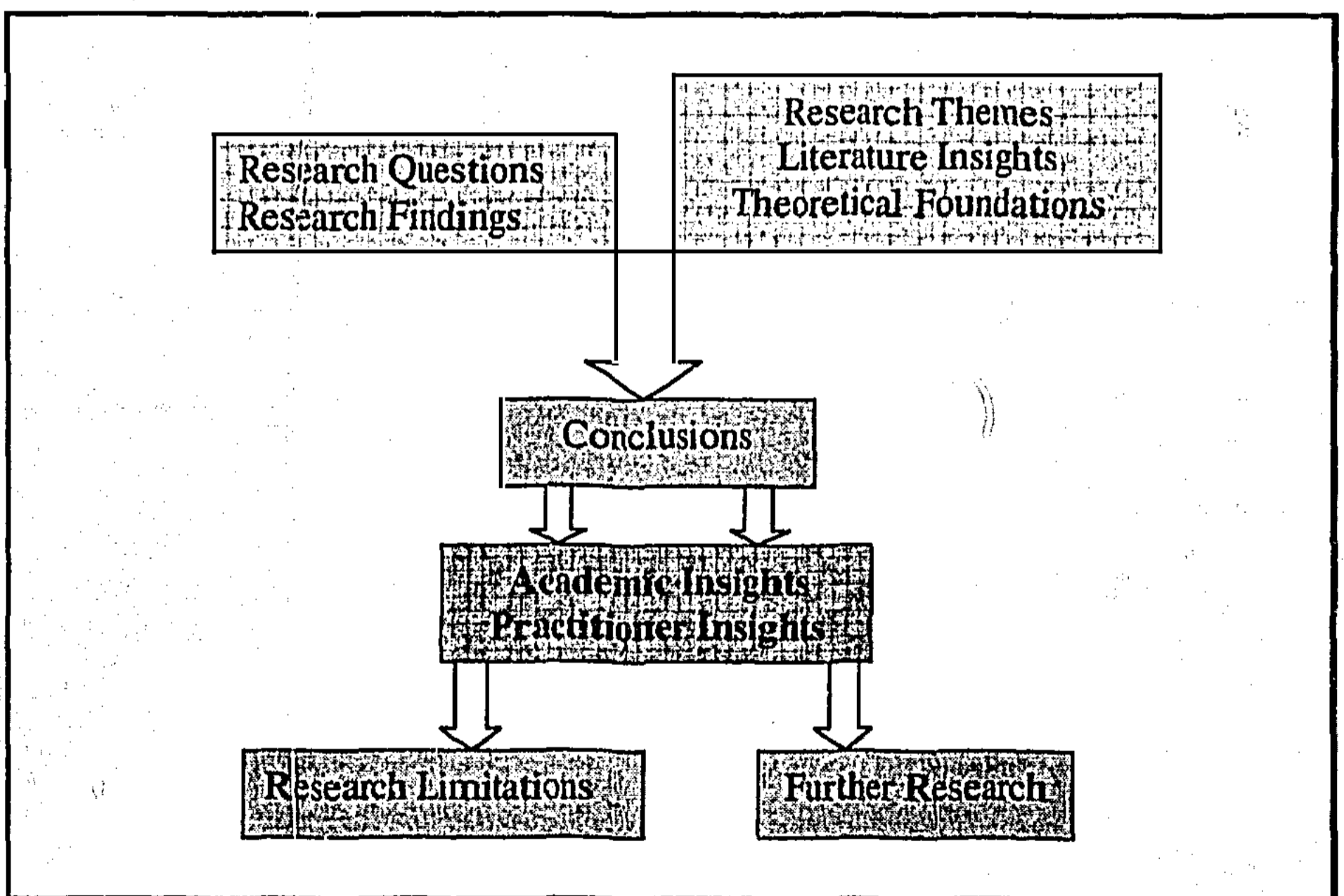


Figure 8. 1 Chapter 8 Framework

8.1 Research Context

The context of the research was outlined in Chapter 1, including the background to the research project and the involvement of the industry partners in the study. The consultation with the industry partners determined the location of the research project in the Henderson/Rockingham region with a focus on the Marine, Defence and Resources cluster. This setting for the research has impacted on the findings, making the results contextualized.

The firms which participated in the research included both industry firms and non industry organisations. This was to gain an in-depth view of the region being studied. The firms were divided by size into large, medium and small and were selected from the defence, marine commercial, resources, yachting and pleasure craft and engineering industries. There was some interaction between the various industries and public sector organisations as illustrated in Figure 8.2.

As stated in Chapter 2 the interaction between the public and private sector is part of economic development (OECD, 2002; OCED, 1997; AEF, 2005; Lundequist & Power, 2002) and as evidenced in the case studies in Chapter 4 (Chetty, 2003; Wickham, 2005) these external organisations play a role in the development of clusters. The expert interviews suggested a higher level of interaction between external agencies and the firms in the private sector particularly those in Scandinavia (Linguist, 2005; Virtanen, 2005; Koivukangas, 2005; Lundmark, 2005). There may be some underlying factors that have impeded the level of interaction between the public and private sector in the Henderson/Rockingham region as pointed out by Maude (2004). The dominance of the resource sector in the Western Australian economy has meant that this sector has been the primary focus of government economic policy rather than manufacturing. DoTaRS (2002) suggested that government at all levels had not been successful in creating an integrated approach to regional economic development.

While all the external organisations had some influence on the firms in the cluster, vocational education had the most visible impact at the time of the study due to the

shortage of skilled labour. Access to skilled labour was identified by DoTaRS (2002) as one of the impediments to regional economic development in the Australian context. The role of education in economic development was identified in a number of regional economic development strategies outlined in Chapter 2, including entrepreneurship, networking, Triple Helix and clusters.

One of the major areas where State and Federal Government policy impacted the Henderson/Rockingham cluster was through the funding of major infrastructure projects. The provision of infrastructure is part of the economic development strategies of entrepreneurship and clustering and a traditional area for government involvement (Drabenstott, 2005). In the past the majority of the infrastructure provided at Henderson/Rockingham has been related to construction and maintenance of vessels and offshore rigs. The current projects such as a technology precinct are more inline with the type of infrastructure that facilitates business development, including business incubators, laboratory space and business parks as suggested by Feser (2002); Sölvell, et al. (2003); OECD (2005).

The interaction between the industries in the cluster also varied as indicated by the width of the arrows in the Figure 8.2.

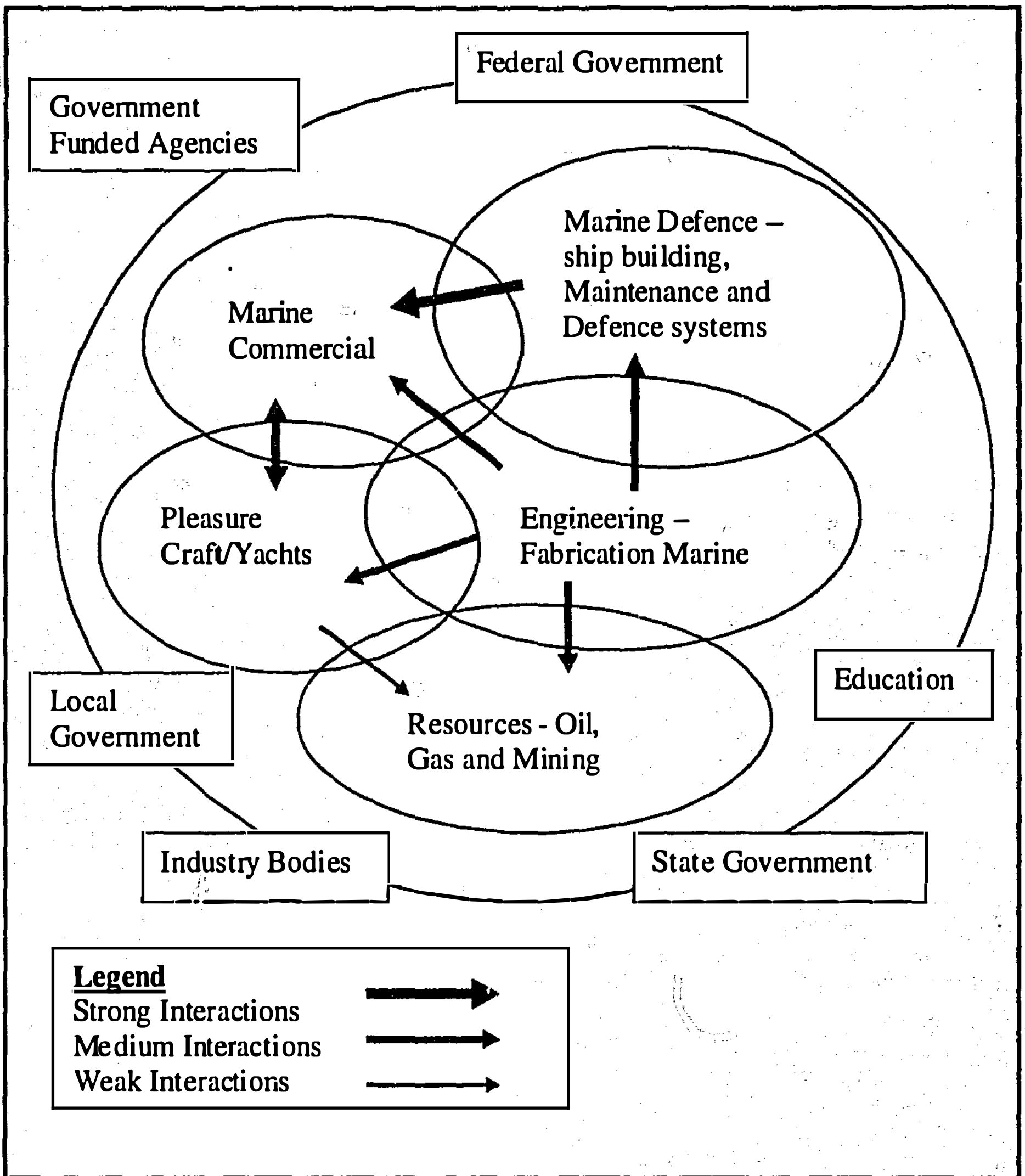


Figure 8. 2 Relationships within the Cluster

The relationships between the firms in the region seem to be hierarchical in nature with the larger firms subcontracting work to the smaller firms. The power asymmetry involved in these hierarchical relationships could lead to a lower level of trust, particularly for the smaller firm as they were usually at a disadvantage when it came to skills, technology and resources (Lawton-Smith & Dickson, 2003).

The majority of the large firms were involved in the defence industry and were subsidiaries of multi national corporations. Though no single firm was dominant the majority of the major contracts were to the primes interviewed in this study. This

small group of firms dominated the cluster and had the power to enforce conditions on the smaller firms. This is similar to the findings of Thuraisingham, et al. (2002).

The large firms in the defence and resources industries were primarily involved in high cost/low volume, multi-million dollar projects for which there was intense competition nationally and internationally. Within the commercial marine and the yachting industry there was a similar level of competition with high cost/low volume projects where firms were vying for million dollar contracts. The only industry studied which did not fit into this model was the engineering industry as it provided services across all of the industries and firms in the region.

Many of the smaller firms which subcontracted to the medium sized or larger firms were reluctant to grow beyond 30 employees due to the administrative burdens associated with employing staff. This hesitancy of smaller firms to grow past their current size runs counter to one of the main focuses of economic development for the region as outlined in Chapter 1, which was to encourage growth within existing firms. In the expert interview in Oulu, the development authority representative indicated that small firms in the region received assistance including business mentoring, market research and listings of suppliers and potential buyers. These measures were designed to assist these small firms to grow (Koivukangas, 2005). Other areas of assistance for small firms cited in the literature include financial advice, information and consultancy services, technological and innovation development, growth and export entry guidance, educational and training support, networking facilitation and relocation assistance and infrastructure provision support (Guijarro, et al., 2005; Parrilli 2005; Shapira, 2001; Audretsch, 2005; Clower, et al., 2004).

Organisations external to the cluster were also included in the study to gain further insight into the cluster and ascertain if the actions of these organisations had any impact on collaborative relationships and the use of ICT. The vocational training provider E1 was heavily involved in the provision of skilled labour to address the labour shortage. E2 was not involved directly in the region as the focus for its external relationships was in the areas of medicine, biotech and agricultural science. The lack of involvement in the region of tertiary education institutions means the

opportunities for knowledge transfer and collaborative research are limited. This may also be a contributing factor to the low level of innovation within the region as the regional economic development strategies of innovation systems, Triple Helix and clustering all considered knowledge transfer from universities and research institutions to be part of the process of assisting regional economic growth (OECD, 2002; Leydesdorff, et al., 2005; Etzkowitz, 2003, Boekholt & Thuriaux, 1999; Porter, 2000; Benneworth, 2002).

The three state government organisations interviewed were all involved in the development of major infrastructure and services to the region, there were, however, occasions when the three policy makers were in conflict as there was no single lead organisation. The lack of coordination and commitment to a common goal between the three levels of government in Australia was identified by Roberts and Enright (2004) as limiting governments' effectiveness in economic development and this could be seen in the interviewee's dissatisfaction with the uncoordinated provision of services in the region.

The six local governments in the South West Group seemed to be less involved in regional development in the Henderson/Rockingham cluster. This could be due to the cluster only covering two of the six councils and it not being a priority to all those involved in the South West Group. The lack of a single development agency for the region makes it difficult to establish and maintain coordinated policy and funding. In the case of Oulu in Finland, the national government encouraged local governments to work on a regional basis as well as create links with adjacent regions in Sweden. The combined leverage of the Regional Development Authority in Oulu has assisted in the bid to encourage existing companies relocate to the Oulu region. As noted in Chapter 2, the provision of infrastructure and services is part of the regional economic development strategies of entrepreneurship and clustering. The uncoordinated approach to infrastructure provision could be a disincentive for firms seeking to relocate to the region as they would have to deal with numerous government agencies.

A little under one-third of the firms involved in the study had moved into the area or commenced operations within the last five years which would indicate some level of

economic growth in the region. As suggested by Benneworth (2002), Lundequist and Power (2002) and Palazuelos (2005), the history and natural advantage of the region contribute to the development of a cluster. The history and natural advantages of the Henderson/Rockingham region including the location of HMAS Stirling on Garden Island, the history of boat building in the region and the natural harbour facility at Cockburn Sound may be contributing factors to the creation of a cluster in the region. The provision of State and Federally funded infrastructure over the past five years particularly focusing on the defence industry may have also contributed to the increase in the number of firms.

As identified in Chapter 2, the common themes for economic development strategies are collaboration, co-location and networking between the firms. The main reasons firms located to the region were proximity to other firms in the same industry, proximity to customers and history, therefore the study would seem to support these concepts. The low level of collaborative ICT usage in the region reduced the likelihood of virtual networks being used to collaborate hence the need for the firms to be physically located in close proximity (Lee, et al., 2003).

8.2 Discussion of the Research Questions and Results

In the context of the Henderson /Rockingham cluster the research questions in Figure 8.3 were examined in the study.

- 1. What are the drivers and inhibitors for organisations to enter collaborative relationships?*
- 2. What are the factors that impact on the creation and sustaining of collaborative relationships?*
- 3. How does ICT facilitate and sustain collaborative relationships?*
- 4. What are the benefits and drawbacks of collaborative relationships?*
- 5. Are there models of best adoption of collaborative relationships?*

Figure 8. 3 Research Questions

To explain the possible links between the concepts that were studied the following diagram was presented in Chapter 3 prior to the research being undertaken.

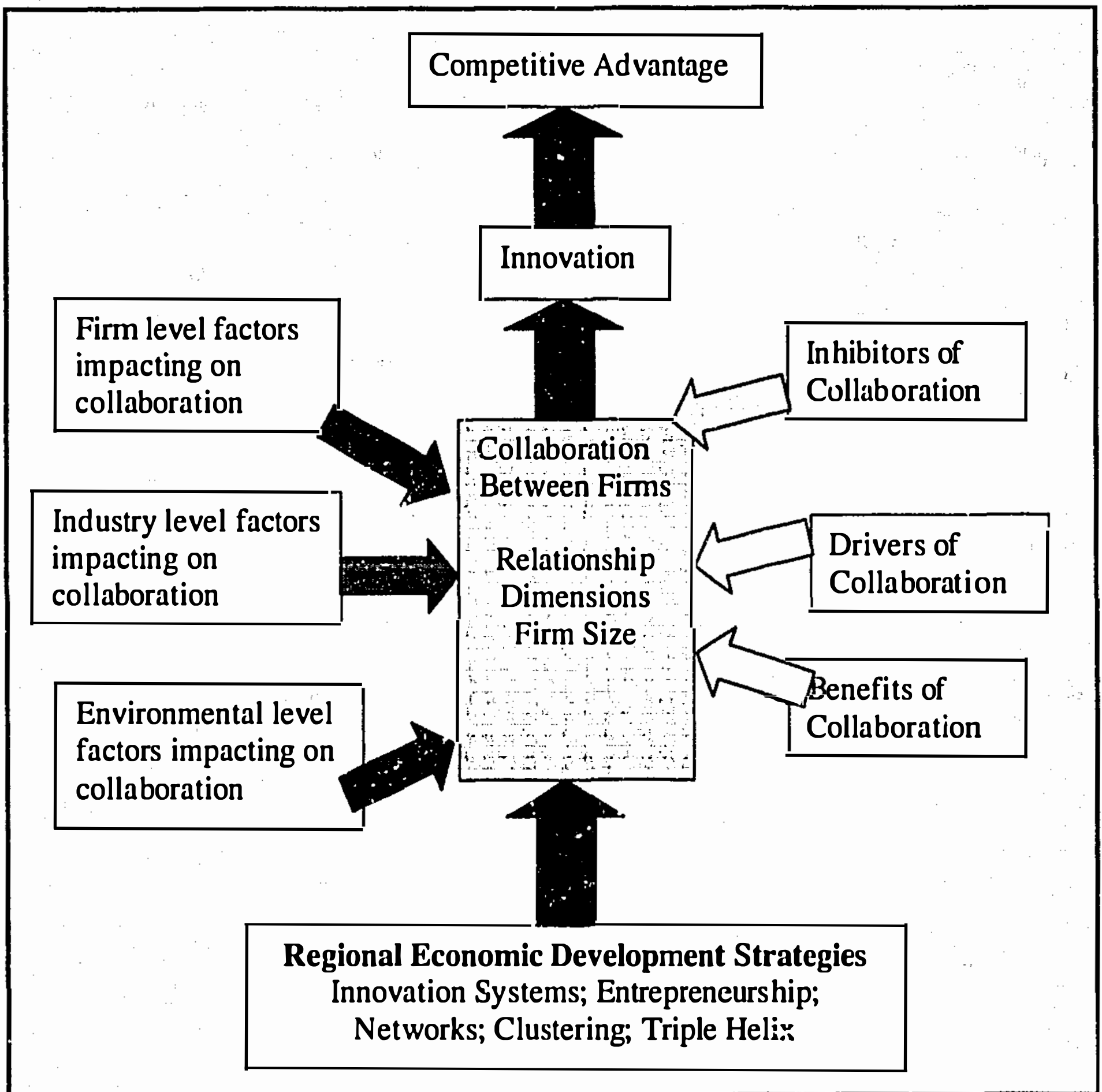


Figure 8. 4 Collaborative Factors Studied in the Cluster

Figure 8.4 illustrates the theories encompassed in the study as a flowchart with the end result of collaboration and innovation being competitive advantage, however, following the analysis of the research data Figure 8.5 is proposed. In the study there was not a strong link between collaboration and innovation, which is counter to the findings of Carlsson and Mudambi (2003), OECD, (1997), DoTaRS (2002), Roberts and Enright (2004) on a regional level and Ritter, et al. (2002), Dodourova (2003), Ryssel, et al. (2004), Veludo, et al. (2004) on a individual firm level. The high level of secrecy, security and competition may explain the findings as Iammarino (2005)

suggested that innovation systems are inhibited by factors such as a lack of organisational openness to innovation, institutional exclusiveness, fragmented social networks and an anti development ethos that relies on the inflow of external innovations rather than internal creation. Most of these inhibitors were present at some level in the research findings particularly in the defence industry.

The relationships in the study were not as linear or as clearly defined as suggested in the original model. The factors that are in the centre circle of Figure 8.5 relate to business relationships and specifically to collaboration. These include the drivers and facilitators of collaboration as well as the inhibitors and drawbacks. Also included are the benefits and measures of collaboration and the factors that firms in the study considered critical to making collaborative relationships work.

There are a number of industry factors illustrated in the middle circle that impact on relationships, these include predominance of the large defence and resource industry firms in the region, multi million dollar contracts, power asymmetry between firms of differing size, the high volume and low cost nature of production, the skilled labour shortage, the need for secrecy and security surrounding the defence industry, and the low level of ICT usage which may be the result of this need for security.

These industry factors such as the skilled labour shortage and the multi million dollar contracts impacted on collaboration positively. Conversely the high need for security and secrecy had a negative impact.

The outer circle contains the factors which have a less significant impact on collaborative relationships within the cluster however they are part of the context of the study.

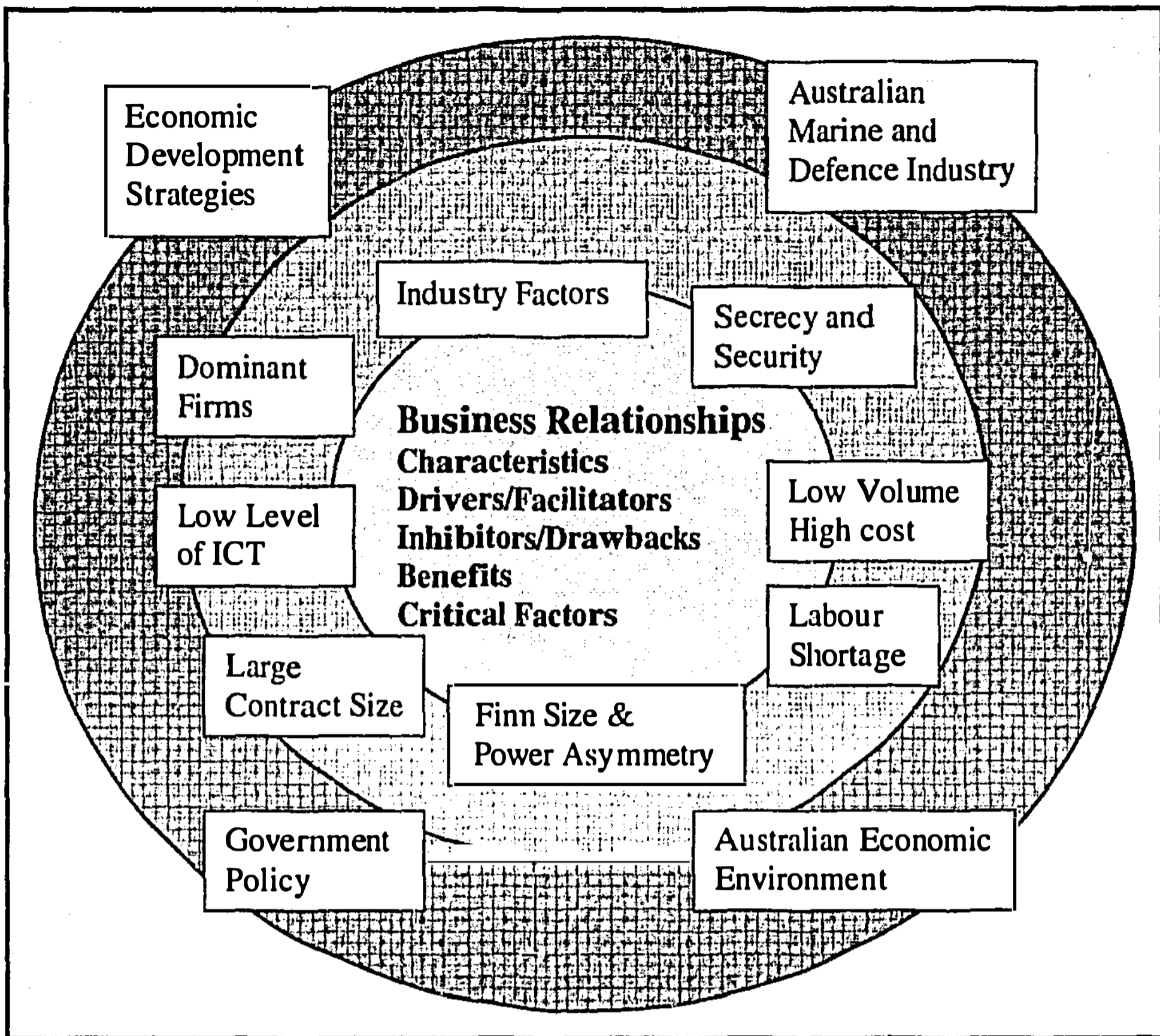


Figure 8. 5 Diagram of Relationships within the Cluster

In the following section the specific research questions of the study will be compared with previous research examined in the literature in this research.

8.3 Research Question 1 - Drivers and Inhibitors of Collaboration

The factors from the research that impacted on collaborative relationships are displayed in Table 8.1. The results of the study are analysed in the light of the drivers and facilitators identified in the literature in Chapter 3. The majority of factors identified were primarily economic in nature. The prevalence of economic drivers in the research results is consistent with the dominant focus on economic drivers in the literature as identified by authors including Arroyo (2003), Oliver,

(1990), Barringer and Harrison, (2000), Dodourova (2003); Ryssel, et al. (2004) and Veludo, et al. (2004).

There was only one driver that fitted in the category of Knowledge/Skills 'access skills and knowledge' This could be due to the size and complexity of the contracts which forced the large firms to outsource or collaborate to access expertise not held within their organisation but required to complete the contract. The accessing of knowledge and skills with the purpose of innovation was cited as a driver of collaboration by Ritter, et al. (2002) and Pittaway and Morrissey (2004). The low level of innovation found in the study may explain why the accessing of knowledge and skills was not a significant driver of collaboration.

The history of boat building in the region facilitated relationships with many of those interviewed knowing employees in other companies, having worked with them previously in the industry. This may explain why 'returning favours to/or working with friends' appeared as a driver of collaboration in this research. The one factor that could be termed a facilitator of collaborative relationships identified in the study, "pre existing relationships" also fits into the context of the long-term relationships within the region. The role of the relationship history between collaborators did not appear in the literature in association with collaborative relationships. As clusters mature over time and collaboration grows, the history of collaborative relationships and their impact on further collaboration may warrant research as a possible driver of collaboration.

Environmental drivers of collaboration have received some attention in the literature (Arroyo, 2003; Oliver, 1990; Barringer & Harrison, 2000) and in the study the drivers of 'the need to access labour' and 'to meet customer expectations' were quite significant in collaborative relationships. The relative importance of these environmental drivers is due to the skilled labour shortage and the precise and regulated nature of the defence and resources industries resulting in a significant focus on meeting customers' demands.

Table 8. 1 Factors in Collaborative Relationships

Factors	Driver/ Facilitator	Type
Access new business or markets	D	Economic
Access to resources	D	Economic
Reduce costs	D	Economic
Product development	D	Economic
Raise profile of business	D	Economic
Share the risk	D	Economic
Access work without having to go to market	D	Economic
Access skills and expertise	D	Knowledge/Skills
Return favours work with friends	D	Social
Pre existing relationship	F	Social
Access labour	D	Environmental
Customer service expectations	D	Environmental

The predominance of economic drivers in collaborative relationships needs to be taken into consideration if any government agency sought to facilitate such relationships in the region.

In Tables 8.2 and 8.3 the drivers and facilitators of collaboration identified in Chapter 3 are compared with the drivers and critical factors of collaboration found in the study. A cross represents the drivers and a tick represents critical factors that were present in the study. The list of drivers and facilitators identified in the literature are far more extensive than those of the research findings. The findings of the research were limited to the region and industries being studied were as the factors identified from the literature were drawn from research across a wide range of industries.

Table 8. 2 Drivers of Collaboration

Legend

	Drivers	Critical Factors
Drivers	Present	x
<u>Economic</u>		
Obtaining and accessing resources	x	
Create competitive advantage through control of scarce resources		
Increase competitiveness or market position and so to profit and grow		
Access to new markets	x	
New opportunities		
Efficiency by improving the input output ratio		
Reduce the production and transaction costs	x	
Creation of superior products	x	
Reduce risks associated with possible market failure	x	
Reducing competition		
Enable greater geographical coverage		
Creation of higher profits	✓	
Increase trade volumes	✓	
Facility for selling over capacity		
<u>Knowledge Skills</u>		
Need to access knowledge		
Need to access and develop new skills	x	
Increase organisational competency and value through knowledge		
Access complementary skills		
Capacity to develop new products and innovations		
Access information on customers' future intentions	x	
<u>Relationship</u>		
Similar dependencies		
Reciprocity - Pursuing mutual benefit or goals	x	
To exercise power or control over an organisation or its resources		
To justify organisational activities and appear to hold to prevailing norms		
Access to important third parties		
<u>Environmental</u>		
Reduce environmental uncertainty		
To meet legal or regulatory requirements		
To align itself with others to reduce environmental uncertainty		
To gain legitimacy within a particular environment	x	
Environmental threats <ul style="list-style-type: none"> • Opening national markets • Deregulation • Globalisation • Privatisation • Non hierarchical structures • Race for the future • Organisational networks • Information age 		
<u>Other</u>		
For survival		
Crises		
Needs * in this case skilled labour	x	

Table 8. 3 Facilitators of Collaboration

Facilitators	Present
Structural/ Infrastructure	
Information technology	
Institutional bonds	
Infrastructure	
Economic/ Financial	
Investment in the relationship	
Accepting initial costs for future benefit	
Perception of benefit	
Creation of ongoing value	✓
Reduce ambiguity	
Organisational	
Compatibility	
Flexibility	
Intellectual capital	✓
Organisational interactions	
Communication	✓
Organisational interconnectedness	
Relationship management	
Mechanism of coordination –formal and informal	
Standard values	
Top management support	
Shared goals	
Collaborative environment	
Putting collaborative interest first	
Participant's contribution to the solution	
Initiating and maintaining the collaborative relationship	✓
Competence	✓
Commitment	
Develop a common frame of reference	
Social	
Positive expectations	
Share with others	
Commitment to the relationship	✓
Trust	✓
Organisational culture	
Individual interaction	

8.3.1 Drivers of Collaboration by Industry

The research found that there was a variation between the respective industries in terms of their major drivers for collaboration. For marine, commercial, yachting and pleasure craft and external organisations, accessing labour, skills and expertise were the major drivers. For defence and engineering it was seeking new business or

markets. Interestingly, the resources industry primarily sought to collaborate with those with whom they had pre existing relationships. This could be due to the industries' need for reliability, quality and safety. In the case of the large resource industry firms interviewed they sought to build on pre existing relationships as a means of accessing new business or markets.

In the literature originally reviewed little attention seemed to have been paid to specific drivers of collaboration according to industry. Although this study is relatively small the variation in drivers of collaboration between the respective industries as illustrated in Table 8.4 may be worth further investigation.

Table 8. 4 Primary Driver of Collaboration by Industry

Industry	Primary Driver of Collaboration
Defence	Accessing new business or markets
Marine Commercial	Accessing labour
Yachting & Pleasure Craft	Accessing skills and expertise
Resources Industry	Pre existing relationship
Engineering	Accessing new business or markets Accessing labour
External Organisations	Accessing labour

8.3.2 Drivers of Collaboration by Firm Size

The drivers for collaboration according to firm size also showed a variation with smaller firms seeking skills and expertise and medium and larger firms seeking to access new business or markets. Blomqvist (1999) identified that there was a variation between drivers according to firm size in high tech industries. These findings seem to be supported in this study as illustrated in Table 8.5.

Table 8. 5 Drivers of Collaboration by Firm Size

Drivers	Small	Medium	Large
1	Accessing skills and expertise	Accessing new business or markets	Accessing new business or markets
2	Accessing labour	Accessing skills and expertise	Accessing skills and expertise
3	Access to resources	Access to resources	Pre existing relationship

If firms in different industries and of varying size do not share the same primary drivers for collaboration yet seek to work together, each firm in the relationship needs to be mindful that the drivers they are seeking are not necessarily the same as the drivers of their collaborative partner. In discussions held with the industry partner prior to the research a view was expressed that the larger firms in the region found it difficult to gain co-operation and collaboration from smaller firms. This may have been due to a lack of understanding by the larger firms of the different drivers smaller firms have for entering into collaborative relationships. If there is to be collaboration between firms of differing sizes and industries within the cluster the varying drivers need to be considered in order to create a win-win situation and encourage collaborative ventures.

8.4 Research Question 2 - Factors that Impact on Collaborative Relationships

Having reviewed economic development strategies in Chapter 2, business relationships in Chapter 3 and investigated the industry background for the study in Chapter 4 it was postulated that there may be a number of factors which could possibly impact on collaborative relationships.

8.4.1 Impact of Location within the Cluster

According to the ideas surrounding economic development, firms benefit from locating in regional clusters as it provides a greater opportunity for collaboration,

information exchange and innovation (Steinfeld, 2002). Although there was some confirmation from the data gathered in the study that firms had chosen to locate in the region in order to access customers and suppliers there was little evidence of knowledge spill-overs and radical innovation being derived from this close proximity. As stated in Chapter 7, the majority of innovations came from sources external to the cluster via the parent companies of the large firms. The main way information was exchanged was through the workforce by subcontractors working together on different projects and transferring knowledge to their counterparts.

As discussed previously in this chapter the theoretical framework from Chapter 3 (see Figure 8.6) suggested that collaboration and information sharing would give rise to innovation and competitive advantage (Ritter, et al., 2002; Ryssel, et al., 2004). This relationship was not supported due to the unwillingness of firms to share information resulting from the high level of competition, secrecy and security displayed by the industries across the Henderson/Rockingham region.

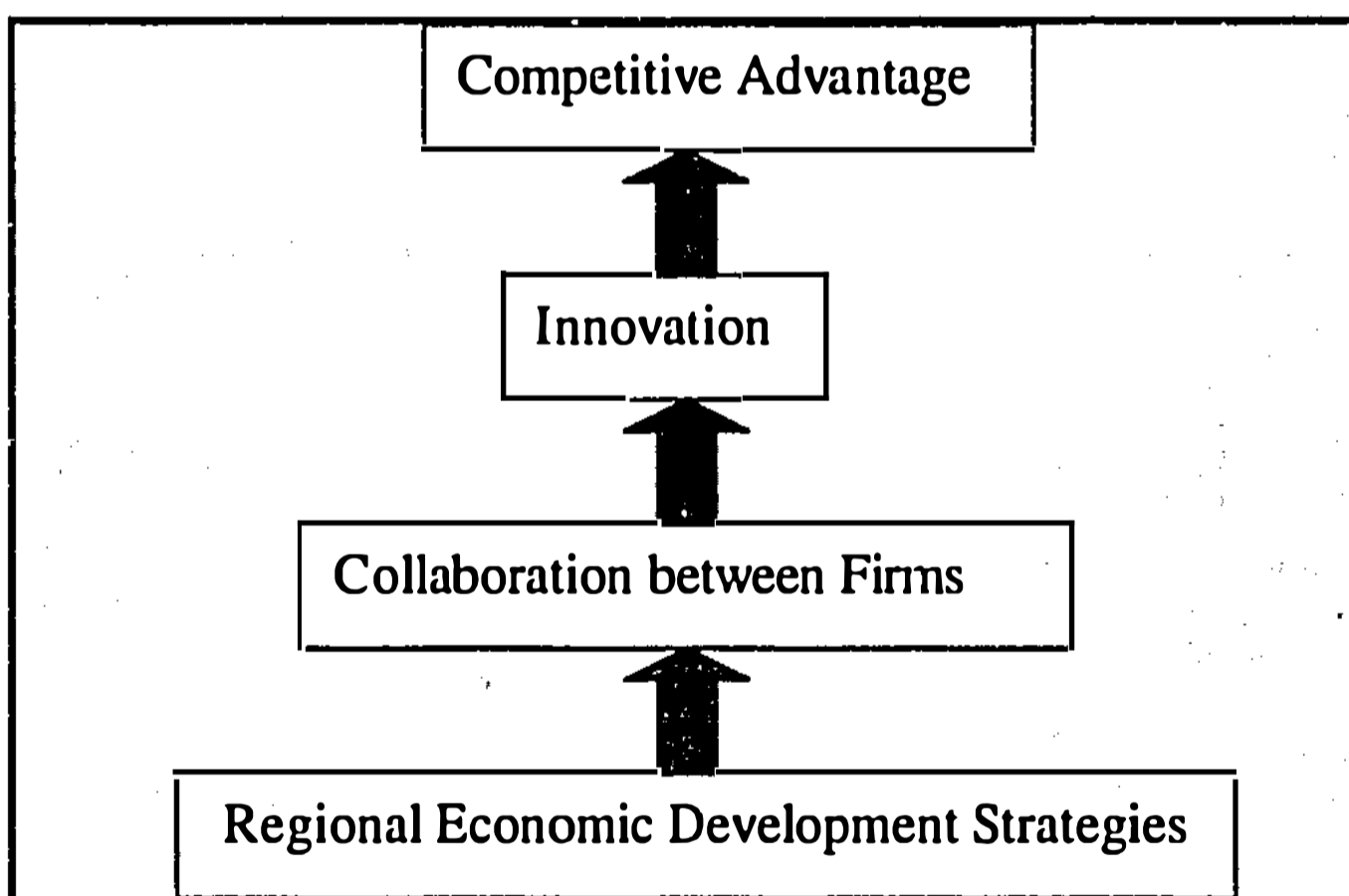


Figure 8. 6 Theoretical Framework

8.4.2 Critical Factors for Collaboration

The respondents in the study were asked what they considered were the critical factors or make or break elements for collaborative relationships. The top four factors were relationship between the firms, history or experience with other firms,

work performance/standard of the collaborating firm and trust. Though trust was not the top critical factor in this study, the literature suggests that trust is central to the operation of collaborative relationships (Seppänen, et al., 2005) and is built through the history or experiences between firms (Seppänen, et al., 2005; Sharif, et al., 2005) and the ongoing performance of the contractual obligation (Medlin & Quester, 2002; Bijlsma & Koopman, 2003). These facilitators of trust were all found in the study.

As with the drivers of collaborative relationships the critical factors also varied by industry and by firm size.

Table 8. 6 Critical Factors for Collaboration by Industry

Rank	Defence	Marine Commercial	Yachting & Pleasure Craft	Resources Industry	Engineering
1	Relationship	Relationship	Work performance standard	Relationship	History or experience
2	Financial benefits	History or experience	History or experience	History or experience	Relationship
3	Trust	Work performance standard	Financial benefits	Mutual benefit	Trust

From Table 8.6 it can be seen that for the defence, marine and the resources industries the most significant critical factor was the relationship between the firms. In general each of these industries is dealing with high cost projects and from the responses it was implied that a good working relationship between companies ensured the best outcome in collaborative ventures.

In the yachting and pleasure craft industry work performance in the form of quality, reliability and flexibility were considered the most crucial factors. This focus on performance may be due to the smaller size of the firms in this industry and their lower resource base which exposes them to greater financial risk should a job not be completed on time or to the quality required by the customer.

The most significant critical factors when analysed by firm size are the relationship, history or experience and work performance/standards as illustrated in Table 8.7.

Table 8. 7 Critical Factors by Firm Size

Rank	Small	Medium	Large
1	History or experience	Relationship	Relationship
2	Relationship	Work performance standard	Mutual benefit
3	Work performance standards	History or experience	History or experience

For small firms trust built through relationships, history or experience and work performance standards are important in reducing the risk of injury due to another firm's actions (Lawton-Smith & Dickson, 2003). The building of trust between firms through relationship, mutual benefit and history or experience is usually associated with small firms in relationships where there is a power asymmetry (Sharif, et al., 2005) as large firms tend to rely on contracts to reduce risk (Pittaway & Morrissey, 2006). The importance of these factors to the large firms in the study may be due to the risk associated with the multi-million dollar defence and resources contracts which they undertake.

It is suggested the difference between the drivers of collaboration and critical factors of collaboration is that the drivers are the reasons why firms enter into collaborative relationships and the critical factors, particularly if the relationship fail, are the deal breakers or the reason for the dissolution of the relationship. This differentiation between the reasons why firms enter a relationship and the factors which keep them in the relationship has not been clearly delineated in the previous literature apart from the work by Arroyo (2003). His work defined collaboration in terms of factors which produce and benefit collaboration and those that harm collaborative relationships.

8.4.3 Impact of External Factors on Collaboration

Of the external factors examined it was found that government policy in relation to taxation, regulation, the provision of infrastructure and defence spending impacted

on firms within the region. In relation to tax policy, as stated previously, firms were unwilling to grow past 30 employees due to the regulations involving superannuation and employment contracts. As mentioned in Chapter 7, there was considerable dissatisfaction with the level and appropriateness of infrastructure and services provided in the region.

Although not directly impacting on collaboration between the firms, government policy was seen by some of the interviewees as impeding rather than facilitating economic growth and opportunities within the region. The efforts by government to facilitate regional economic development are not always successful, as found by Tekes in Finland where their assistance to start-up firms was seen as taking market share from existing firms (Virtanen, 2005).

Federal Government defence policy had to some extent facilitated collaboration due to the Navy's desire to deal with a single entity for the building and maintenance of vessels. Although the Australian Government had chosen to create a domestic defence shipbuilding industry the level of competition within that industry, the irregularity of major contracts and the Defence Department's tendency to share the work around the major contractors has created significant difficulties for firms in the industry.

As discussed in Chapter 4, the European defence industry is being exposed to increasing competition which has resulted in collaboration, however the European market is considerably larger than Australia's. The small Australian market means that the Government's policies which seek to create competition and drive down prices (DMO, 2002) can push firms out of the market should they miss out on a large contract. The UK government has adopted a similar policy of creating competition but has faced difficulties with so few competitors in the defence market and old adversarial relationships making collaboration difficult (Humphries & Wilding, 2001). It would seem the firms in Australia that are best placed to survive this turbulent market are the multi nationals which have a far larger resource base than the smaller domestic firms.

The lag in the uptake of new technology by the defence industry compared to the private sector (Hayward, 2005) was identified in Chapter 4. The interviewees commented on the conservative culture of the defence industry in Australia and the Navy in particular, which does not mesh well with that of the private contractors who serve the Navy. The influence of the defence industry culture on relationships within the Henderson/Rockingham cluster was a consistent theme with the interviewees who dealt with the defence industry.

8.4.4 Labour Shortage

The shortage of skilled labour cited in the study was the one factor in collaboration that had not been identified in the literature; however the issue was highlighted in the expert interview in Turku in Finland. This shortage of skilled labour in the Henderson/Rockingham cluster was a primary driver for collaboration in the commercial marine industry and was in the top six drivers for all firms within the study. As with the dominance of the defence industry the shortage of labour is a characteristic which appears as a central theme in this study.

8.5 Research Question 3 - The use of ICT in Collaborative Relationships

One of the reasons this study was undertaken was to gather further information for the possible implementation of economic development strategy aimed at the facilitation of ICT adoption to assist firms to work collaboratively and grow their domestic and international markets. Unfortunately this kind of strategy would be difficult to implement at this time due to the low level of ICT use within the cluster both by the individual firms and within a collaborative context. This result was unexpected in light of the previous literature which suggested that the adoption of ICT would benefit collaborative relationships (Ratnasingam, 2004; Chatterjee & Ravichandran, 2004). Although ICT is designed to facilitate the sharing of information and assist collaboration, the characteristics of security and secretiveness

and the high level of competition in the region make the development of trust and the willingness to share information difficult. These factors have impeded the adoption of collaborative ICT in the Henderson/Rockingham cluster (Ryssel, et al., 2004; Perry; Cavaye & Coote, 2002; Ratnasingam, 2004).

The benefits and drawbacks of using ICT cited by the respondents are similar to those in the literature as illustrated in Table 8.8.

Table 8. 8 Benefits and Drawbacks of ICT Adoption

Benefits	
Results	Literature
❖ Convenience in the transfer of information and collation of data on the progress of projects.	<ul style="list-style-type: none"> ● 24 hour trading and information exchange and management.
❖ Overcoming distances particularly working in export markets.	<ul style="list-style-type: none"> ● Expanded marketplaces. ● Access to new customers and trading partners.
❖ Increased efficiency and reduced costs.	<ul style="list-style-type: none"> ● Productivity improvements.
❖ Provision of long term data on workflows which allows better scheduling.	<ul style="list-style-type: none"> ● Potential cost reductions. ● Customisation of products and services.
<ul style="list-style-type: none"> ❖ Improved communication and the reduction of confusion. ❖ Allowing the dissemination of information across organisations to obtain a uniform understanding on a collaborative project. ❖ Greater access to classified material which assists with scheduling of projects. 	<ul style="list-style-type: none"> ● Cost savings in communications and marketing. ● Greater business exposure. <p>(du Plessis & Boon, 2004; McIvor & Humphreys, 2004; Raisinghani et al, 2005; Chau, 2004)</p>

Table 8.8 Benefits and Drawbacks of ICT Adoption cont.

Drawbacks	
Results	Literature
❖ The leaking of intellectual property.	<ul style="list-style-type: none"> • Concerns over privacy and security.
❖ The general lack of technology literacy among firms in the industry.	<ul style="list-style-type: none"> • Lack of technological skill and experience.
❖ The need for cultural change within the collaborating organisations.	<ul style="list-style-type: none"> • Applicability to the organization's business model.
<ul style="list-style-type: none"> ❖ Technical problems such as network failure. ❖ The double handling of information and the lack of coordination between collaborating firms and their IT systems. ❖ Lack of compatibility between systems in the large firms and their collaborators. 	<ul style="list-style-type: none"> • Lack of awareness. • Skill shortages. • The high cost of entry. • Lack of financial resources. • Insufficient return on investment. • Lack of support from management. • Telecommunications infrastructure, customer demand for online services. • The size of the organization. <p>(Lawson, et al., 2003; Zhu et al, 2003; Wu, et al., 2003; OECD, 2004; (OECD, 2001; Lee, et al., 2003).</p>

Although there are a number of collaborative relationships represented within this study, the majority of business relationships were of a subcontractor nature with a significant power asymmetry. It has been suggested that smaller firms are more likely to adopt if pressured by a larger more powerful collaborator (Morris, et al., 2003). The lack of support for this idea in the study may be due to the overall low level of collaborative ICT use particularly by the smaller firms.

The literature suggested that the presence of a prior relationship, which builds trust, might facilitate the use of collaborative ICT (Vlosky, et al., 1997; Ratnasingam, 2004). If this is the case the relationships contained within this study were often fraught with significant difficulties that may have made the adoption of collaborative ICT even less likely. If firms require a level of ICT adoption as suggested by the diagram on the left hand side of Figure 8.7 then only four of the firms interviewed

who were at least involved in e-commerce ordering would be in a position to move on to collaborative commerce.

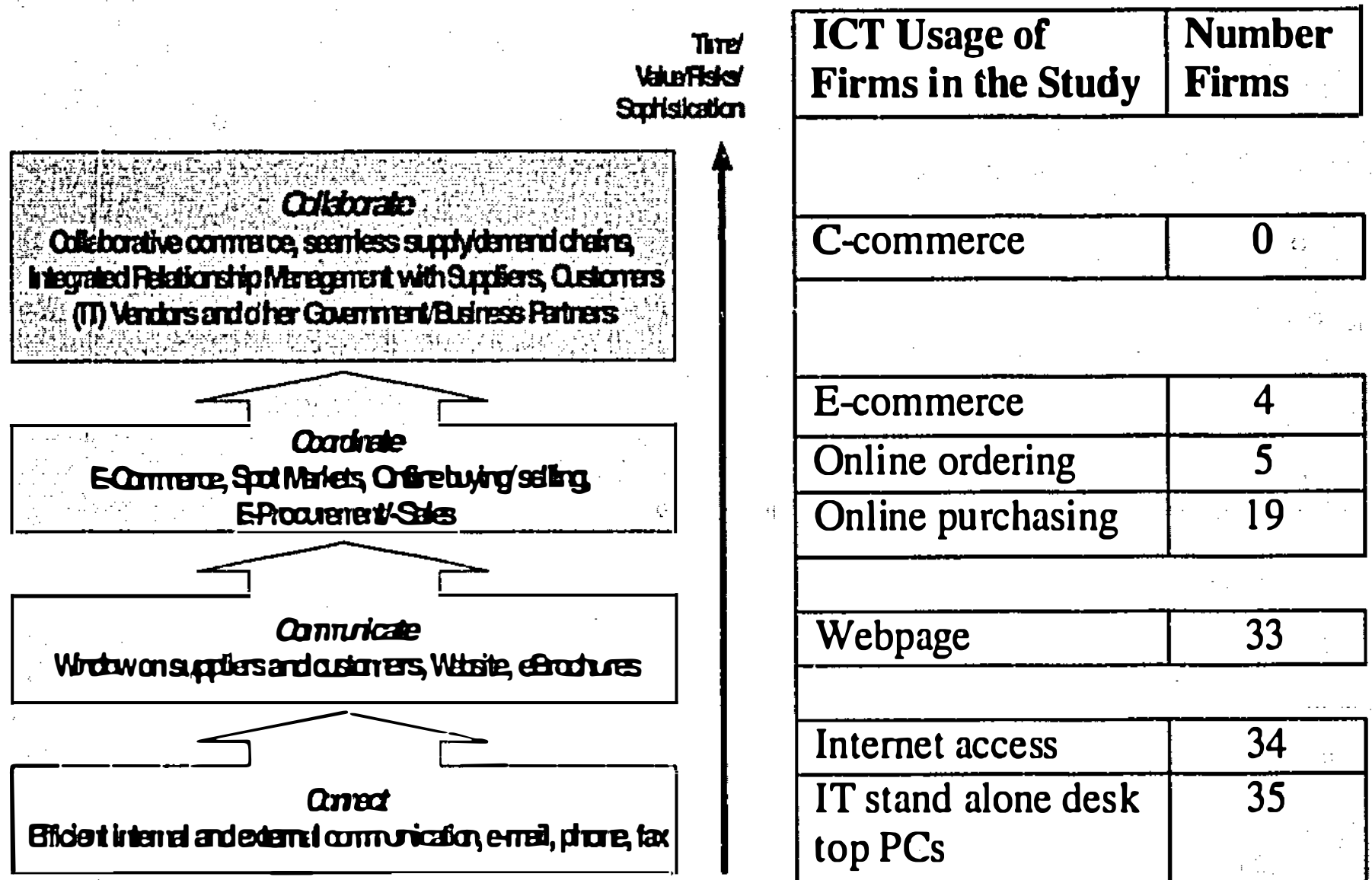


Figure 8. 7 Electronic Business's Evolution Towards Collaborative Commerce (ARC Grant Application, 2004)

Within the study there were two possible examples of what could be termed the collaborative use of ICT, the first being the alliance developed to manufacture and upgrade the ANZAC frigates where there was a limited use of common ICT and the example of P9 with its spreadsheet based, workflow management system. The interviewee from P9 had previous experience in ICT as he came from a systems management background as opposed to a Navy or trades background and this prior experience may be why he created and implemented the system (Chau, 2004; Martin & Matlay, 2001).

8.6 Research Question 4 - Benefits and Drawbacks of Collaborative Relationships

As identified in Chapter 3, the benefits of collaboration can be broken down into economic, skills knowledge, relationships and others (see Table 8.9). Of the benefits identified in the study the top one “access to skills, expertise and intellectual property” would be classified under the criteria of knowledge and skills. The next three benefits relating to “access to markets, contracts and networks”, “better products and speed of production” and “building a track record and reputation within the industry” would fall under the criteria of economic benefits. The benefits relating to the creation of relationships and a good reputation in the industry also had implied benefits of additional work in the future. When the benefits listed in Table 8.9 are compared with the drivers of collaboration in Table 8.10 (as listed in Chapter 3) it appears that the drivers are predominately economic but the benefits are a mixture of economic, skills knowledge and relationships.

Table 8. 9 Benefits of Collaboration

Benefits	Type
Access to markets, contracts and networks	Economic
Better products and speed of production	Economic
Control and moderation of workflows	Economic
Increase income and reduce costs	Economic
Access to skills, expertise and intellectual property	Knowledge/Skills
Building a track record and reputation within the industry	Relationship
Creating better relationships with others	Relationship

Table 8. 10 Drivers of Collaboration

Drivers	Type
Access new business or markets	Economic
Access to resources	Economic
Reduce costs	Economic
Product development	Economic
Raise profile of business	Economic
Share the risk	Economic
Access work without having to go to market	Economic
Access labour	Environmental
Customer service expectations	Environmental
Access skills and expertise	Knowledge/Skills
Return favours or work with friends	Social
Pre existing relationship	Social

Table 8.11 compares the benefits of collaboration found in the study with those found in the literature. As with the drivers of collaboration the literature identified more benefits than those found in the study. Issues found specific to the region included maintaining workflows, sustaining local industry and customer service. The focus on maintaining workflows and sustaining the local industry could be due to the erratic nature of contracts in the industries in the cluster. For the yachting and pleasure craft industry there was the threat of cheaper Asian imports which raised concerns about the future of the industry.

Table 8. 11 Benefits of Collaboration

Benefits	Present
Economic	
<ul style="list-style-type: none"> ➤ Save money <ul style="list-style-type: none"> • Reduce costs • Use complementary resources • Less investment 	✓
Access to resources	
Access to services	
New opportunities	
Creation of higher profits	
A growth in trade volumes	
A facility for selling over capacity	
Access to new markets	✓
Access to important third parties	
The reduction of the cost of new product development	✓
The reduction of lead times to market	✓
Sharing of core competencies between firms	
Achieving economies of scale	
Reduce and pool risk	
Acquiring complementary resources and technologies	
Knowledge Skills	
New skills	✓
New knowledge	
The capacity to develop new products and innovations	✓
Information on customers' future intentions	
Relationship	
Relationship network	✓
Satisfaction of a common interest	
Other	
<ul style="list-style-type: none"> ➤ Results <ul style="list-style-type: none"> • Increase the quality of results • Increase effectiveness • Increase efficiency • Satisfactory results but not optimal 	
Reward self-interest	
New solutions to problems	
Increased reputation	✓

(Arroyo 2003; Bengtsson & Kock, 2000; Ryssel, et al., 2004; Briship 2003a).

The drawbacks of collaborative relationships for the large firms included the leaking of intellectual property, loss of contracts due to choosing the wrong collaborative partner and increased competition from smaller companies as they grew in their expertise. For the small firms the drawbacks were rigid contracts, lower profit margin and loss of staff to collaborating firms.

When compared with the drawbacks of collaboration identified by Arroyo (2003) in Table 8.12 (as listed in Chapter 3) the factor of “rigid contracts” and “loss of reputation due to choosing the wrong collaborative partner” as cited in the study

could be considered as “restrictions” in Arroyo’s framework. Factors around the “Reduction of Harm Activities” within a collaborative relationship as suggested by Arroyo (2003) were not directly evidenced in the research findings however, these could be pursued in more detailed research.

Table 8. 12 Drawbacks and Inhibitors of Collaboration

Drawbacks	Present
Fraud	✓
Corruption	
Chaos	
Conformity	✓
Group think	
Exclusion of non collaborators	
Insufficient coordination	
Increase dependency	
Malfesance	
Collusion	
Inhibitors	
Uncertainty	
Individualism	
Risk	✓
Ambiguity	
Bad Reputation	✓
Incompetence	
Lack of information	
Lack of fairness	
Conflict	
Lack of previous interaction	
Lack of knowledge	
Restrictions <ul style="list-style-type: none"> • Time • Inertia • Prejudice • Complexity 	✓
Competitive environment	

Table 8. 13 Drawbacks and Inhibitors of Collaboration cont.

Reduction of Harm Activities	
Surveillance	
Reduced delegation	
Reduced commitment	
Reduce participation	
Reduce Dependency <ul style="list-style-type: none"> • Increase self competences • Change partners 	
Look for other alternatives sources <ul style="list-style-type: none"> • Knowledge • Skills • Resources • Services 	
Only work with well reputed parties	
Develop strong personal relationships	
Use formal agreements	
Stop collaboration	
Spread risk	

Although there is no clear identification of the drawbacks by firm size within the framework provided by Arroyo (2003) the small firms in the study seemed to be at a greater risk of loss of income, reputation or skilled labour. As mentioned in Chapter 3 the benefits of collaboration differ between smaller and larger firms (Wilson & Gorb, 1983; Blomqvist, 1999; Etemad, et al., 2001; Lawton-Smith & Dickson 2003). The size, power and resources of larger firms can place smaller firms at a power disadvantage (Wincent, 2005).

The interviewees found it easier to list the drivers of collaborative relationships than to identify the benefits and drawbacks. Even though collaborative relationships were part of doing business in the cluster very few firms had formalised measures of the benefits of being in collaborative relationships. The majority of the formalised measures were found in the defence and resources industries where the large firms were servicing the Navy or multi nationals.

The lack of formalised assessment and measurement of the benefits of collaborative relationships is similar to the findings of Tuominen and Anttila (2006). Measures of the benefits of collaborative relationships identified included quality, evaluation, costing, forecasting and scheduling within a collaborative relationship (Tuominen & Anttila, 2006).

The measurements of the benefits of collaboration identified in the study included:

- Financial performance.
- Provision of ongoing work and contracts.
- Meeting contractual requirements.
- Opening up new markets, relationships and products.
- Meeting safety, quality, reliability and time keeping requirements.
- The creation and sustaining of good working relationships.
- Positive customer and staff feedback.
- Level of service provided.

The majority of these activities are easily quantifiable, apart from the creation and sustaining of good working relationships. The social or relationship side to collaboration which often underpins its success, for example the development of trust, is extremely difficult to quantify and there is no definitive measure of trust in collaboration (Bijlsma & Koopman, 2003; Seppänen, et al., 2005). The lack of quantifiable measures for trust means though it is central to collaboration it is usually absent from a list of measures. Though the easily quantifiable measure of financial performance received twice the mentions by participants in the study, the relationships between individuals and firms within the cluster was a reoccurring theme.

When asked about their future intentions in regard to collaborative relationships the large firms considered that changing defence contracts would mean a reorganising of current relationships and alliances. For the majority of the large firms collaborative relationships were seen as being part of the firm's strategic focus as no one firm in the defence or resources industry could deliver a multi-million dollar contract on its own. All firms spoke of consolidating and improving their existing relationships; however the resources required to establish and maintain a relationship were a barrier for some of the medium sized and small firms. This is consistent with the research of Blomqvist (1999) which found that SMEs did not have the resources to build and maintain multiple collaborative relationships.

The lack of resources within smaller firms is an impediment to their adoption of information technology for both the creation of new collaborative relationships and the development and commercialisation of innovation (OECD, 2001; Lee, et al., 2003; Blomqvist 1999). When considering entering into a collaborative relationship large firms must be aware of the limitations of smaller firms and the higher level of risk to which the smaller firms are exposed (Lawton-Smith & Dickson, 2003).

8.7 Research Question 5: Models of Best Adoption of Collaborative Relationships

No single model of the adoption for collaborative relationships was identified through the literature, the expert interviews or the study. What has been identified are factors to be considered in relation to the implementation of economic development strategies to a specific industry or region and factors involved in the collaborative relationships between firms. The implementation of an economic development strategy to facilitating greater use of collaborative ICT within the Henderson/Rockingham region would, according to the findings of this study, pose some difficulties due to the characteristics of the industries in the cluster, specifically the defence industry which has a high level of security. Another difficulty is the low level of ICT adoption among the small firms due to the low volume/high cost nature of the manufacturing industries in the region which means that supply chain mechanisms such as IOS are less cost effective.

Though not a model for the best adoption of collaborative relationships, the framework in Figure 8.8 could be used for the development of regional economic development strategies and the adoption of collaborative relationships.

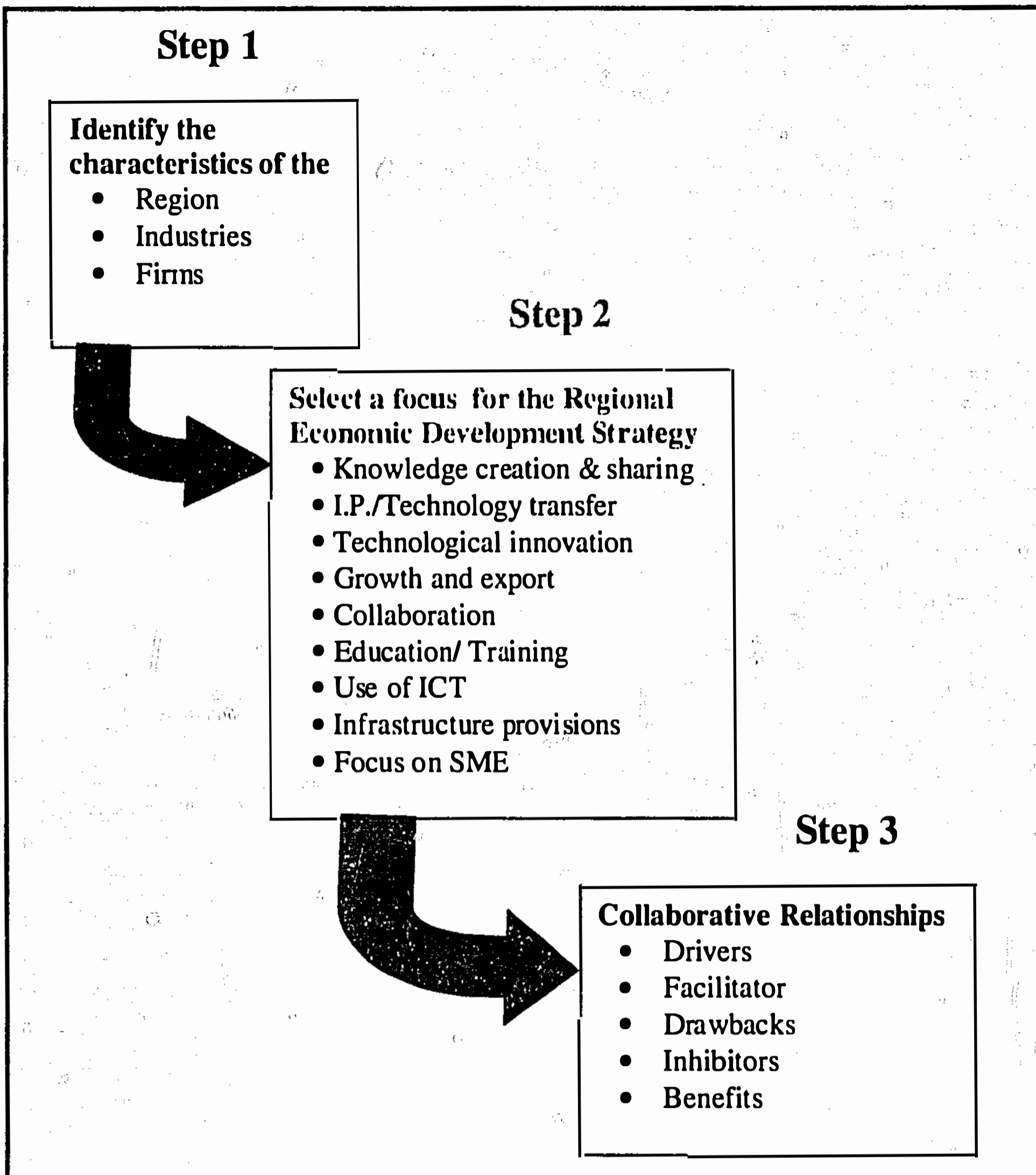


Figure 8. 8 Framework for Regional Economic Development and Collaborative Relationships

8.7.1 Step 1 - Assessing the Characteristics of the Region

Through the literature, expert interviews and the study it has become evident that the characteristics of the region, the industries within it and individual firms need to be considered when devising and implementing regional economic development strategies. As every region is different it is important to identify and take into consideration factors including the history and natural advantages of the region, buy in from the private sector and industry groups, the specific qualities of the firms in

the region and the formation of a common policy platform for the region (Benneworth, 2002; ABF, 2005; Lundequist & Power, 2002; Porter, 2000; Roberts & Enright, 2004). In Australia the pre-eminence of the SMEs in the economy must also be considered as they are still lagging behind in the adoption of ICT (Boekholt & Thuriaux, 1999; DCITA, 2004; ABS, 2006). The study found that characteristics of the industries and the individual firms in the cluster impacted the adoption of ICT and the level of secrecy reduced the flow of information and intellectual property between the firms. These characteristics would mean regional economic development strategies aimed at the facilitation of knowledge creation and sharing, intellectual property and technology transfer and the increased use of ICT may face difficulty in the Henderson/Rockingham region.

8.7.2 Step 2 - The Focus of the Regional Economic Development Strategy

Once the characteristics of the region have been assessed the economic development strategies can be chosen. In Chapter 2 common characteristics or focuses of economic development strategies were identified as illustrated in Figure 8.9. One or more of these could be selected as the focus of a regional economic development strategy for a specific region depending on its fit with the characteristics of that region.

- Facilitation of knowledge creation and sharing
- Facilitation of intellectual property and technology transfer
- Facilitation of technological innovation
- Increased economic growth and export
- Facilitation of collaboration
- Facilitation of higher levels of education and training
- Increased use of ICT
- Increased infrastructure provisions
- Focus on SME development

Figure 8. 9 Common Focuses of Economic Development Strategies

The following considerations, facilitating factors and activities have been identified from the literature, expert insights and the pilot case study may assist practitioners in regional economic development and specifically in the growth of clusters.

Table 8. 14 Cluster Development

Factors to be Considered in Cluster Development
<ul style="list-style-type: none">➤ Is there a sustainable market for the products and industries?➤ Will the presence of an external facilitator such as the government lead to leadership problems and conflict of interests?➤ What are the agreed targets identified for the cluster?➤ Are any of the following drivers for the establishment of clusters present?<ul style="list-style-type: none">○ joint production through purchasing○ logistics and supply chain development○ firm formation through incubation○ spin off and business service○ joint sales through joint product or regional branding and foreign market promotion○ joint R&D○ intelligence on the market or innovations○ lobbying government policy, regulations and for the provision of infrastructure and human resource upgrading – technical, managerial training and education system interface
Precipitating Factors in the Region
<ul style="list-style-type: none">● The presence of a dominant firm or a cluster champion.● Inter regional collaboration to gain larger markets and a wider mix of competencies.● An existing culture of collaboration and participation.● An existing export focus.● Clusters need a combination of different companies.● History or advantage for a region or industry.● Government and peak industry bodies in support.● The creation of supply chains and the development of complementary providers.
Specific Facilitation Activities

Table 8.13 Cluster Development cont.

<p>Mapping the Cluster</p> <ul style="list-style-type: none">• Identify and map the common and rare capabilities within the cluster and identify related industries to counter the instability in the market by providing firms with alternative markets for their competencies should the dominant market suffer a downturn.• Creating a database of companies' capabilities in the region in order to identify capabilities that link to certain industries so that companies can have flexibility to switch industries in the case of a down turn.• Mapping industries in the region to identify linkages/supply chains between industries both direct and indirect.• Use the database to aid local contracting by firms and to develop consortiums to tender for contracts using the search capability.
<p>Collaboration</p> <ul style="list-style-type: none">• Encouragement of projects involving collaboration between companies and the academic sector.• Facilitate collaboration between competitors.• Find a champion to lead collaboration.• Collaboration around a common goal.
<p>Firm Level Support</p> <ul style="list-style-type: none">• Encourage existing companies to relocate into the area using economic, environmental and life style factors and incentives.• Provide service including business mentoring, business incubators, market research and listings of suppliers and potential buyers.• Develop flexibility within the firms in the region so as to enable them to ride out fluctuations in the market conditions in order to ensure the continuing survival of the cluster.• Seek ideas and expertise from around the world and modify it to work in the specific region.• Remember no cluster is complete, there is always room for improvement.

8.7.3 Step 3 – Collaborative Relationships

Finally, the research identified comprehensive lists of drivers and facilitators, critical factors, drawbacks, inhibitors and benefits of collaborative relationships. Though not a model for the best adoption of collaborative relationships it is suggested that firms consider the drivers, drawbacks and inhibitors of collaboration listed in Table 8.14 to evaluate the potential of the relationship. They should also identify the presence or

otherwise of the facilitators to collaboration and the potential benefits to the firm as a means of assessing value and sustainability of the relationship.

Table 8. 15 Collaboration Evaluation

Drivers	Drawbacks
<p>Economic Obtaining and accessing resources Create competitive advantage through control of scarce resources Increase competitiveness or market position and so to profit and growth Access to new markets New opportunities Efficiency by improving input output ratio Reduce the production and transaction cost Creation of superior products Reduced risks associated with possible market failure Reducing competition Enable greater geographical coverage Creation of higher profits Increased trade volumes Facility for selling over capacity</p> <p>Knowledge Skills Need access to knowledge Need to access and develop new skills Increase organisational competency and value through knowledge Access complementary skills Capacity to develop new products and innovations Access information on customers' future intentions</p> <p>Relationship Similar dependencies Reciprocity - Pursuing mutual benefit or goals To exercise power of control over an organisations or its resources To justify organisational activities and appear to hold to prevailing norms Access to important third parties</p> <p>Environmental Reduce environmental uncertainty To meet legal or regulatory requirements To align itself with others to reduce environmental uncertainty To gain legitimacy within a particular environment Environmental threats</p>	<p>Fraud Corruption Chaos Conformity Group think Exclusion of non collaborators Insufficient coordination Increase dependency Malfeasance Collusion</p> <p>Inhibitors Uncertainty Individualism Risk Ambiguity Bad reputation Incompetence Lack of information Lack of fairness Conflict Lack of previous interaction Lack of knowledge Restrictions</p> <ul style="list-style-type: none"> • Time • Inertia • Prejudice • Complexity <p>Competitive environment</p> <p>Reduction of Harm Activities Surveillance Reduced delegation Reduced commitment Reduce participation Reduce dependency</p> <ul style="list-style-type: none"> • Increase self competences • Change partners <p>Look for other alternatives sources</p> <ul style="list-style-type: none"> • Knowledge • Skills • Resources • Services <p>Only work with well reputed parties Develop strong personal relationships Use formal agreements Stop collaboration Spread risk</p>

Table 8.15: Collaboration Evaluation cont.

Facilitators	Benefits
<p>Structural/ Infrastructure Information Technology Institutional Bonds Infrastructure</p> <p>Economic/ Financial Investment in the relationship Accepting initial cost for future benefit Perception of benefit Creation of ongoing value Reduce ambiguity</p> <p>Organisational Compatibility Flexibility Intellectual capital Organisational interactions Communication Organisational interconnectedness Relationship management Mechanism of coordination – formal and informal Standard values Top management support Shared goals Collaborative environment Putting collaborative interest first Participant's contribution to the solution Initiating and maintaining the collaborative relationship Competence Commitment Develop a common frame of reference</p> <p>Social Positive expectations Share with others Commitment to the relationship Trust Organisational culture Individual interaction</p>	<p>Economic ➤ Save money <ul style="list-style-type: none"> • Reduce costs • Use complementary resources • Less investment Access to resources Access to services New opportunities Creation of higher profits A growth in trade volumes A facility for selling over capacity Access to new markets Access to important third parties The reduction of the cost of new product development The reduction of lead times to market Sharing of core competencies between firms Achieving economies of scale Reduce and pool risk Acquiring complementary resources and technologies</p> <p>Knowledge Skills New skills New knowledge The capacity to develop new products and innovations Information on customers' future intentions</p> <p>Relationship Relationship network Satisfaction of a common interest</p> <p>Other ➤ Results <ul style="list-style-type: none"> • Increase the quality of results • Increase effectiveness • Increase efficiency • Satisfactory results but not optimal Reward self-interest New solutions to problems Increased reputation</p>

By identifying the factors from the table that relate to a particular relationship firms would be able to clearly articulate what they were seeking from a collaborative relationship and if the potential collaborative partner had enough areas of common or complementary focus to make the collaboration viable. The other function of assessing the potential collaboration is to clearly identify the possible benefits which would assist in determining the methods for measuring those benefits. The ongoing

evaluation and measurement of benefits enables the firm to ascertain the value of the collaborative relationship.

From the interviews conducted there was little evidence that any form of evaluation was undertaken prior, during or after the collaboration and that any measures of benefits had been established or were in use.

8.8 Insights for the Industry Partners and Practitioners

One of the outcomes of the research project was to provide insights into collaborative relationships and the use of ICT in these relationships at both the macro and micro level.

8.8.1 At the Strategic Level

The study identified a number of issues to be considered by government in the development and implementation of economic development strategies in the region. On a regional level, the fragmented nature of government intervention in the region is hampering communication across the various industries. The lack of inter industry communication and collaboration is reducing the likelihood the cluster will reach the point where the sum of the parts is greater than the whole.

The lack of a single organisation or authority to guide the ongoing development of the cluster, while taking into account the interests of all the stakeholders, may also be impacting on the growth of the region. Government should consider the development of a collaborative industry/government group made up of representatives of all those involved in the cluster to guide its strategic and structural development.

If government wishes to facilitate the economic growth of the cluster at Henderson/Rockingham it needs to address the following factors relating to successful cluster development as identified in the study:

- Building on pre-existing relationships within the cluster.
- The engagement of key decision makers.
- The identification of a cluster champion or champions.
- Identifying and working with those willing to embrace change.
- Mapping the cluster to identify common and rare capabilities.
- The exploitation of regional strength and history.
- The willingness to provide a united identity within the market place.
- The development and implementation of consistent policies across all levels of government.

In relation to government policies, the Federal Government's defence policy in relation to naval supply and the current Navy culture were both seen as inhibiting factors to economic growth by the interviewees. Though these may be difficult to change on a local level they are part of the unique character of the cluster and as such should be taken into account when formulating regional economic development strategies.

The current focus on the dominant defence industry means that should there be a downturn in that industry, or the cluster missing out on a significant contract the implication for Henderson/Rockingham would be significant. As identified in the expert interviews flexibility within the firms allows them to adjust when there is a downturn in their industry (Koivukangas, 2005; Weeks, 2005). In the case of the Henderson/Rockingham region, the development of the resources, commercial marine and yachting and pleasure craft industries could build a more sustainable cluster.

The concerns raised by the interviewees regarding the provision of infrastructure in the region indicated that they consider it a significant inhibitor to their further economic growth and this may require addressing. Currently, the dominant focus is

on defence industry infrastructure which is limiting the opportunities for the commercial marine and yachting and pleasure craft industries to expand.

When attempting to facilitate collaborative relationships at the industry and firm level there are a number of characteristics identified in the study that require consideration including:

- The low usage of ICT within this cluster due to its characteristics of high security, competition and low volume/high cost projects.
- The hierarchal nature of the relationships within the cluster with the dominance of less than ten national or international firms.
- The unwillingness of the small firms in the region to grow beyond a certain size.
- Lack of collaboration between firms, especially the smaller ones, to access export markets.
- The lack of cross collaboration between industries in the region and the lack of information exchange and local innovation.

These factors mean that any form of strategy considered by government agencies to facilitate economic growth, collaboration and the use of ICT would require significant resources and a cultural shift within the cluster to be effective at this point in time.

8.8.2 The Operational Level

Concerning collaborative relationships the research has provided insights into the variations in drivers, inhibitors and benefits of collaborative relationships for firms in different industries and of differing sizes. To build more successful collaborative relationships it is suggested that firms take a greater interest in the reasons why they and their partners are in the collaborative relationships. The framework for evaluating collaboration identified in this study may assist firms to more productively engage in and benefit from collaboration.

For the larger firms in particular the study has illustrated the difference between their approach to collaboration and that of the smaller firms. Using a common structure and terminology to assess collaborative relationships may assist larger firms to identify and accommodate the needs of smaller firms. The study has provided insights into specific needs of smaller firms which may also assist larger firms to engage them as collaborative partners.

Firms of all size and from all the industries should re-assess their low level use of collaborative ICT as it is impeding opportunities for growth and is reducing the competitiveness of the industries in a global market place.

8.9 Limitations of the Research

The research was designed to view collaborative relationships at the firm level, in the industry context and from the external environmental. This cross section was achieved by the selection of industry and public sector interviewees. To check the findings of the research two methods of qualitative data analysis were used. Though NVivo was the primary tool, the use of Leximancer indicated the importance of the themes of obtaining ongoing work and the staffing to carry out the contracts.

The small sample size, the industry specific focus and the regional setting were required by the industry partner. The involvement of an external party in the research project precipitated a focused study with the findings primarily applied to a specific region. The nature of the research makes generalisations from the study's findings difficult; however the value of doing such a focused piece of research is that it provides insights at a firm and industry level which are of value to the industry partners and practitioners involved in the region. The study also showed variations in drivers and inhibitors of collaboration between industries that had not been previously identified. The study highlighted a number of areas for further research which will be discussed in the next section.

8.10 Further Research

The interpretivist nature of the research created far more questions than it answered. Around the theme of collaborative relationships, further research could be conducted in order to identify if there is a difference between drivers and facilitators of collaboration as well as inhibitors and drawbacks.

Through the research and the literature extensive lists of relationship characteristics, drivers, facilitators, inhibitors, drawbacks, benefits and critical factors for collaborative relationships have been identified. Further research is required to ascertain if these are common across all industries and firm sizes and to develop any means of gauging whether these factors were measurable and if their “strength” impacted on collaborative relationships. The factors could be tested through a quantitative study in which organisations identified the presence of and ranked the importance of these factors in collaborative relationships. If this was replicated across various industries and firms of different sizes it is possible that some form of framework may emerge.

The previous research on collaborative relationships between firms of different sizes has identified variations in the factors surrounding collaborative business relationships and these were supported by the findings of this study. If further research was to be undertaken into the drivers, facilitators, drawbacks, inhibitors and benefits of collaborative relationships a focus on firm size may enable the development of a framework to help companies of varying size understand the needs of the firms with which they collaborate. In the current environment of increased subcontracting and the drive for innovation, greater understanding in this area may be of use to firms seeking to collaborate more effectively.

The benefits arising from collaboration and their measurement has received little attention in the literature, but this study was able to identify a small number of benefits and measurements. The benefits and measures could be industry specific and further research may bring to light a wider range of benefits and possible methods for their measurement. The development of a framework or tools for the

measurement of the benefits of collaborative relationships would assist firms in their management.

The research included the investigation of “critical factors” to collaborative relationships. The study found that the interviewees were able to identify specific factors which they considered to be “make or break” for collaborative relationships and in the absence of which the relationship would not commence or continue. The concept of “critical factors” in collaborative relationships could be further investigated to ascertain if they are in fact distinct from drivers and facilitators.

The low level of ICT usage among the firms in the study made it difficult to find any examples of collaborative commerce. It was suggested in Chapter 1 of this thesis that there was an evolution that firms moved through in order to reach collaborative commerce. This focuses predominantly on the adoption of ICT as a means of moving towards collaborative commerce but neglects the role and or possible importance of relationships between the firms collaborating. The study was unable to ascertain if a collaborative relationship was required before there was the adoption of collaborative ICT and if the relationship and ICT were interlinked. The firms in the ANZAC frigate alliance certainly had pre existing relationships but it was unclear if this assisted the adoption of collaborative ICT. Further research could be conducted into the process of entering into collaborative commerce and the role of prior relationships between those collaborating electronically on their decision to do so.

The focused nature of this research means that it requires considerable replication both in regard to the industries studied and the location of the research. The specific characteristics of the marine, defence and resources industries studied may have skewed the data. Further research could assist in ascertaining if factors such as the high cost/low volume nature of supply in the industries, the requirement for secrecy and security, the low level of ICT usage and the presence of dominant firms within the cluster setting have precipitated the research findings concerning collaborative relationships. Other factors which may have impacted the research were the political and economic environment within Australia. Factors such as regional isolation, a small economy and the three tiered form of government may have to a lesser extent

affected the research findings. What holds true for the Rockingham/Henderson region may not be applicable in an equivalent European cluster.

The framework for regional economic development and for the creation of collaborative relationships proposed in this chapter is untested and further research or practitioner application would ascertain its validity. At the conclusion of this study the findings of the research are to be made available to the industry partners and this could provide an opportunity for testing the framework in the context of the Henderson/Rockingham region.

8.11 Conclusion

Collaborative business relationships are a part of today's global economy and their management can be central to a firm's success. This study has provided insights into these collaborative relationships which may assist those in industry to create and sustain beneficial collaborative relationships. Although the role of ICT in these relationships could not be extensively explored within this study it is suggested that the characteristics of the industry in which the firm is involved be considered when implementing shared ICT.

The study raises questions as to whether economic development strategies such as clustering can be applied directly in an Australian setting. Although theories and models are useful for the insights that they provide, the study found that the unique characteristics of the region and the industries studied meant that all economic development strategies were not applicable in this case. Issues such as the skilled labour shortage in Western Australia, the hierarchical nature of relationships, the conservative culture of the Navy and the lack of collaborative ICT meant that a number of assumptions drawn from the literature and expert interviews were not supported in this study. It is the anomalies present in a given situation that must first be considered before any model, theory, strategies or previous experience is applied.

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Appendix 1 NVivo Codes for Data Analysis

Node	Tree
Company Description	
	Education
	Government
	Medium
	Navy
	Peak body
	Prime
	Small
IT Usage	
	C-commerce
	E-commerce
	Internet access
	IT stand alone desk top PCs
	Online ordering
	Online purchasing
	Webpage
Number of employees	
	101-500
	11-15
	1-5
	16-20
	21-30
	31-40
	41-50
	501-1000
	51-75
	6-10
	76-100
	Over 1001

2 Years Trading or working in Area	
	11-15
	1-5
	16-20
	21-30
	31-40
	41-50
	51-75
	6-10
3 Main focus of Business or Role	
	Defence
	Engineering
	Marine commercial
	Other
	Resources industry
	Yachting & pleasure craft
Collaboration	
4 Who do you deal with Region	
	Defence
	Educational
	Local government
	Marine
	Oil industries
	Other
	State government
5 Proportion of business in the Region	
	0-10
	11-20
	21-30
	31-40
	41-50
	51-60
	61-70
	71-80
	81-90
	91-100
	Reason for locating in the region
	<ul style="list-style-type: none"> • History • Other • Proximity to customers • Proximity to other companies

6 Factors that encourage collaborative relationships

	Access labour
	Access new business or markets
	Access skills and expertise
	Access to resources
	Access work without having to go to market
	Customer service expectations
	Goals of relationships
	Other
	Pre existing relationship
	Product development
	Raise profile of business
	Reduce costs
	Return favours work with friends
	Share the risk

7 Benefits

	Access to markets, contracts and networks
	Access to skills, expertise and IP
	Better product and production time
	Better relationships with others
	Building track record and reputation
	Customer service
	Drawbacks
	Increase income and reduce costs
	Other
	Sustaining local industry
	Workflows

8 Measurement

	Contractual requirements
	Creation and sustaining of good working relationships
	Customer and staff feedback
	Financial performance
	Ongoing work and contracts
	Open up new markets, relationships and products
	Safety quality reliability timekeeping
	Service provided

9 Critical Factors	
	Business growth
	Communication
	Financial benefits
	History or experience
	Knowledge management
	Mutual benefit
	Negative factors
	Other
	Relationship
	Security and IP
	Trust
	Work performance standard
	Workflow
10 External Factors that Impact Collaboration	
	Access to the AMC
	Defence policy
	Education provision
	Government policy
	Infrastructure
	Location of Henderson
	Other
	Previous work history of collaborators
	The economy
11 Role of Shared Technology	
	Collaboration through external party
	Email collaboration
	Face to face collaboration
	Inhibitors
	Internal networking
	Not used in collaboration
	Use CRM
12 Benefits or Drawbacks of shared ICT	
	Benefits of technology
	Drawbacks
	Preference for face to face
13 Process for Introduction of Systems	
	Defence
14 Knowledge Management	
	Electronic system
	Email
	External interface
	Non Electronic

15 Innovation	
	Collaborative innovation
	External innovation
	Process innovation
	Product innovation
16 Future intentions	
	Create new relationships
	Other
	Solidify existing relationships
17 Other comments	
	Labour shortage

Appendix 2 Pilot of the Study

Collaborative Relationships

For the two large organisations ICT was used in the collaborative relationships and consequently the benefits cited in the interviews centred on areas such as streamlining the purchasing process, reduction in workloads, staffing requirements, lower prices, an increase in the level of service provided, increased access to market information and increased expertise in supply chain technology.

Organisation 1 experienced some problems including the lack of a common ICT system and a diverse user group across the large organisation. The longevity of the relationship with the supplier meant that over time the system became personalised to organisation 1's needs. The reduction in use of organisational resources such as paper means the relationship could be termed as economically sustainable and meeting with industry standard for organisation 1 of triple bottom line philosophy which focused on more than just profit but also people and the environment.

Organisation 2 found that their reliance on a single supplier created increases in the cost of some purchases but the interviewee felt that this was outweighed by a reduction in staffing costs afforded by online purchasing.

The SMEs considered that the feedback gained from the collaborative relationships with suppliers had assisted them to improve product design and manufacturing techniques. These relationships have also provided leads for new business opportunities.

Factors Critical for Collaborative Relationships

Organisations 1 and 2 cited similar factors critical to collaborative relationships including trust and reliability. These qualities were built through activities such as the delivery of purchased products to specified location, supply of quality products and services, timeliness of supply, ongoing information during the supply process,

being kept in a loop using email, open communications and supplying value for dollar in the market place. It was noted that organisation 1 did not consider that the similar values between the companies were important for a collaborative relationship.

For the SMEs, critical factors included completion of the job at a high standard, feedback about the quality of work being undertaken by the sub contractor and maintenance of a good personal relationship between management and the sub-contractor.

External Factors Impacting on Collaborative Relationships

Organisation 1 indicated that the government regulation which forced it to go out to tender every three years made it difficult to establish long-term collaborative relationships with suppliers as there was always the possibility that they would lose their preferred provider status. For organisation 2 being part of a multi-national restricted the interviewee's ability to set up collaborative ICT systems due to use of a global purchasing system.

Often the adoption of ICT by companies with which a firm trades can create external pressure for the adoption of online systems. In the case of the SME in the pilot study the larger companies up the supply chain had adopted online purchasing, however no pressure had been placed on the SME to adopt as the companies with whom it deals directly still preferred to use emails and faxes over online ordering.

Level of ICT Usage within the Organisation

Organisations 1 and 2 both used on-line purchasing, with the larger of the two having a more sophisticated level of ICT use. This is consistent with the literature that suggests the larger the organisation the more resources it has to devote to the purchase and implementation of ICT (Lee, et al., 2003).

The SMEs ICT use was limited to email for communications and provision of a basic webpage. The interviewee felt that the volume of transactions did not warrant the use of online systems as limited economies of scale would not provide a financial return on the ICT investment.

The SME was keen to stay with a paper based system as it was considered that an online system would not be accessible to the staff on the workshop floor as they lacked expertise in ICT systems.

Use of ICT in Collaborative Relationships

Organisation 1 has worked collaboratively with its supplier to develop an interface between the supplier's catalogue and the interviewee's system allowing for the procurement and payment for stationery online. This system was an innovation of organisation 1's purchasing officer. The interviewee in organisation 2 had made modifications to the standard corporate system to allow the supplier access to his organisation's systems which provided a form of online purchasing.

The technology used to collaborate by the SME was limited to email and they always kept a hardcopy as a backup system in the belief that everyone could easily track the information without knowledge of ICT. Due to the size of the SME and the organisations it dealt with the interviewee did not feel that there was a need to use an online system for tracking purchases.

The Benefits or Drawbacks of Using Collaborative ICT

According to organisation 1, shared technology provided a streamlining of processes with a robust approval process which allowed for auditing. Problems were experienced early on in the adoption process when the system would crash and prices would change without notice. Organisation 1 has had ongoing staff problems, including people making unauthorised changes to the system which is symptomatic of staff resistance. For organisation 1 the drawback of the collaborative ICT system

was the additional resources required to counter staff resistance to its introduction. Strategies used to reduce resistance were training programmes and briefing sessions, a staged introduction of the system, creation of a process for staff feedback and modification of working processes.

Organisation 2 could not identify any direct monetary benefits of the collaborative ICT system but the system did provide more control. A hard copy system was preferred by staff but the interviewee considered that the system was the only way to do business effectively without employing more purchasing staff.

The SME found email useful in dealing with the time differences between the different regions in which it trades. As a small producer that makes products to order, the SME considered investing in technology would not benefit the company in its operations or the generation of income.

For organisation 1 the new system had required the collaborative development of a new product to allow it to interface with suppliers' ordering systems. In the case of organisation 2 the interviewee gave supplier access to organisation 2's purchasing system. This access has not been granted to any other supplier.

The knowledge sharing for organisation 1 has taken the form of the exchanging of tacit knowledge through the development of electronic interface and online purchasing which can now be extended to any supplier no matter what their size. For organisation 2 its knowledge is managed through tracking of email during the supply process.

For the SME email, fax and phone provided the means of communicating with suppliers, over 50% of whom the purchasing manager had never met.

Appendix 3 Results of Pilot Case Study

Benefits of Collaborative Relationships

Organisation 1 benchmarks the performance of the collaborative relationship for purchasing goods and services against other organisations in the same industry.

Organisation 2 had no formalized measures of the benefits of their online purchasing system but used reduced staff cost compared to the mark-up on preferred supplier's products as an indicator of benefit. For the SME the measures were the quality of the job done and no additional costs on service provided by sub-contractors with which they had developed collaborative relationships.

Innovations from Collaboration

For the two larger organisations innovations centred on the development of new areas of knowledge including tender preparation for electronic interface systems, the development of an electronic interface system for online purchasing and the creation of operating protocols for online purchasing. The SME used the feedback supplied from the subcontractor to help its development of more successful products.

Future of Relationships

For organisation 1 the close collaborative relationship with the supplier will continue with the development of new technology and systems including an improved purchasing and payment process with automatic payments to the supplier.

Introduction of a new global operating system in organisation 2 may change the relationship with the supplier due to the requirement for a purchase order. The new system is linked straight to the company and may not allow for the existing arrangement where the supplier has been given access to organisation 2's system.

The SME does not see the existing relationships growing to the point of activities such as joint tendering. The collaborative relationships with subcontractors are based on personal relationships between individuals, not just companies.

Factors Critical for Collaborative Relationships

The respondents indicated that the primary driving force for collaborative relationships is the identification of a common benefit or risk of loss to be avoided by working together. The opportunities to be exploited through collaboration may include increased competitiveness, a change of business model in response to changing market needs and the differentiation of identity in the market place.

The existence of some form of relationship prior to cluster formation was considered beneficial as was the engagement of the real decision makers with power to effect change. The building of a collaborative relationship can require change management for the organisations involved with the building of trust and credibility of importance if organisations are going to engage in a relationship. Finally, the attitude of participants needs to be co-operative, open, entrepreneurial, demonstrating 'stickability' and commitment to the relationship and participants must show a united front to the market.

External Factors Impacting on Collaborative Relationships

The culture of the positive regional collaboration, entrepreneurship, tourism and customer service in the region of the pilot case study was considered to have a positive impact on collaborative relationships. It was commented that some government policies were not consistent with the culture and the processes of the region. An example was the introduction of new legislation significantly restricting access to traditional fishing areas. This devastated the major fishing industry but also forced the creation of an eco fishing cluster which assisted members to move into new industries and employment. On the other positive side the government's agreement to lift the Goods and Service Tax on maintenance work performed on

international vessels has helped boost the yachting cluster. The tsunami disaster of 2005 has seen a change in the movements of super yachts away from the devastated areas and increased arrivals of yachts in the region of the pilot case study.

Level of ICT Usage within the Organisation

Organisations within the industry clusters studied as part of the pilot case study did not use any online purchasing as the majority of organisations were relatively small. The CEO of the RDA came from an ICT background and had introduced a Customer Relationship Management Database (CRM) into the RDA's clients and the system has been adopted by many of the industry organisations involved in clusters across the region. This is reflective of a CEO/senior manager lead adoption of ICT where others follow in response to its introduction by a dominant actor.

Use of ICT in Collaborative Relationship

The RDA used integrated emails and their webpage to get information out to the majority of those involved in the clusters in a timely manner without the duplication of data. The firms that made up the clusters in the pilot case study for the whole did not use cooperative online purchasing. It was suggested by the RDA that the provision of such a system could be addressed as part of the cluster, however external funding would be required to develop a system that meets the needs of the respective clusters in the region. There also needs to be a visibility of systems so that companies are encouraged to adopt shared systems.

Technology is shared through collaboration with other companies following the leaders. It was observed by one of the interviewees that the current members of the clusters are quite behind in their ICT adoption but as they access larger or international networks there may be a flow down effect increasing adoption.

The Benefits or Drawbacks of Using Collaborative ICT

Within the regional clusters it was considered that shared technology allowed for quick and easy sharing of ideas, created efficiencies to free up dollars and time and gave small organisations the ability to compete in new markets and take up new opportunities which were once the realm of large companies. For the Super Yacht cluster technology facilitated international contact in offshore markets with email being used for ordering and to maintaining relationships over a distance.

It was suggested that shared technology could produce spheres of isolation with reduced face to face interaction and opportunities for innovation. Another drawback was the adoption of ICT by smaller firms in an attempt to follow the industry leader, despite the ICT not matching the smaller firms' business strategy or model.

The companies within the region served by the RDA use a CRM system which was introduced by the CEO of the RDA. A group license to purchase the CRM system has meant the uptake by individual companies and peak organisations within the region. ICT has also been introduced through collaborative advertising on Web pages or through a firm placing online advertising on an existing site of a collaborator.

The CRM package used within the regional clusters has been expanded beyond the original parameters of the package to provide some knowledge management and networking support. Emails were sent out to selected organisations using CRM to filter appropriate recipients and a quarterly online newsletter was posted on the Web.

All those interviewed in the pilot case study stressed the importance of face to face meetings, both formal and informal, as the primary focus of relationship development and information exchange.

Benefits of Collaborative Relationships

Benefits of collaborative relationships cited in the pilot case study included increased profile and reputation, the identification of synergies which lead to new ways to introduce products into the market, new forms of packaging products for the market place and innovations. Other benefits suggested were the sharing of expertise, the creation of new work, formalisation of channels of supply and building up the existing companies.

At a regional level the flow on effects of the collaborative relationships in the clusters included increased income for the local economy and the attraction of new organisations to the clusters. The culture of collaboration and the perceived economic benefits has meant an increase in the number of industry clusters in the region and increased inter relation between the clusters to build new business "super clusters".

The RDA and ICR were both required to meet the performance measures attached to government funding they received. For the ICR these performance measures included jobs created, investment, sales of boats and industry revenue generated. The RDA and the ICR are in the process of developing new measures with a Canadian agency as part of a collaborative project on cluster benchmarking.

Other informal measures included new funding obtained, the growth in the number of clusters, feedback from cluster membership, increased business turnover in the region, the diversification of firms within respective clusters, a rise in the media profile of the region, increased capabilities and skills within the region and indirect revenue to the region.

Innovations from Collaboration

Some of the tangible innovations in the pilot case study were the development of data mining software to measure the cluster programme that has other commercial applications. New collaborative projects have also arisen for the region with

international organisations such as the Competitiveness Institute and its involvement in a Canadian clusters benchmarking initiative. Other less quantifiable innovations included the building of international profile, the generation of new intellectual property through networks and changes in business processes and practices.

Future of Relationships

When looking at relationships on the cluster level the CEO of the RDA observed that clusters tended to have a life cycle re-inventing themselves to match the changing political agendas, changes in the market and through members leaving and new ones joining. The CEO can see a time when a kind of super cluster will develop in the region where the boundaries between the individual clusters will blur.

Some clusters are seeking to extend their boundaries through forming relationships with other similar clusters in the state to grow new opportunities and markets. There has also been a move to open up channels and connections with similar clusters on a global scale.

One of the long term goals for the CEO was to build further robustness in the clusters so that they could respond to current and future trends with flexibility. There is also a move to promote networking between the clusters at various stages of development to assist emerging clusters to grow through the transference of expertise and experience.

Summary of Pilot Research Findings

Theme	Finding
Critical Factors for Collaborative Relationships	<p>Intangible factors trust, reliability and credibility which can be demonstrated by:</p> <ul style="list-style-type: none"> • Delivery of products as specified • Quality products and services, • Timeliness • Feedback and open communications • Value for money <p>Other Factors:</p> <ul style="list-style-type: none"> • Benefit to be gained • Improved competitiveness • Improved position in the market • A pre-existing relationship • Engagement of the real decision makers • Collaborative attitude
External Factors Impacting on Collaborative Relationships	<ul style="list-style-type: none"> • Government Regulation • Practices of Parent Company • Industry/Regional culture positive towards collaboration
Level of ICT Adoption and Use	<p>Factor that influenced adoption of ICT:</p> <ul style="list-style-type: none"> • Firm Size - the larger the firm the more complex the level of ICT used in business relationships • Level of staff expertise – low expertise in ICT lead to non adoption. • Level of adoption by external organisations – RDA assisted in the adoption of CRM and SME not required to adopt by trading partners
ICT in Collaborative Relationships	<p>The more sophisticated the level of collaborative ICT seems to be related to:</p> <ul style="list-style-type: none"> • Company size - Larger the company the more collaborative ICT is used • Company size in that higher volume of work/turnover prompts the investment in more sophisticated ICT <p>Barriers include:</p> <ul style="list-style-type: none"> ○ Lack of expertise ○ No demand for adoption by trading partners ○ Lack of uniform interface between systems ○ Cost of adoption

Benefits or Drawbacks of using Collaborative Technology	Benefits: <ul style="list-style-type: none"> ○ Streamlining of purchasing process ○ Provision of an audit trail ○ Flexible international communication ○ Efficiencies which free up resources Drawbacks: <ul style="list-style-type: none"> ○ Early teething problems with systems ○ Staff sabotage and resistance to the system ○ Hard copy system preferred by staff ○ Technology not interfacing with existing systems
Process for Technology Introduction	Technology Introduction lead by: <ul style="list-style-type: none"> ○ Customer ○ Regional Development Authority
Knowledge Sharing and Management	<ul style="list-style-type: none"> ● Identification of tacit knowledge shared between organisations ● Email tracking of transactions and projects ● Use of CRM to focus information dissemination ● Face to Face communication is still important
Costs/Benefits of Collaborative Relationships	<ul style="list-style-type: none"> ● Sharing of knowledge ● Improved Product design ● New business opportunities ● New business models and markets ● New supply channels ● Development of a culture of collaboration
Costs/Benefits of Collaborative Relationships Relating to ICT	<ul style="list-style-type: none"> ● Positives were reduction in cost, staff and time and higher level of information concerning the supply process ● Costs were staff resistance and the implementation of resolution strategies.
Measurement of Relationships Benefit	<ul style="list-style-type: none"> ● Larger the organisation the more formalised the measurement process, eg benchmarking. ● All relationships subject to some kind of informal measures
Innovations from Collaboration	New knowledge and expertise in: <ul style="list-style-type: none"> ○ Tender preparation, ○ Inter organisational systems development, ○ Product improvement ○ Data mining software ○ Benchmarking
Relationship Future	Existing relationships threatened by: <ul style="list-style-type: none"> ○ Tendering requirement ○ Introduction of new software ○ Interpersonal conflict between the management of collaborating companies ○ Building on positive experiences of collaboration and outcomes generate created further interest in collaboration and cluster development.