CHAPTER ONE
INTRODUCTION

~ Men are so much governed by what they are accustomed to see and practice, that the simplest and most obvious improvements in the most ordinary occupations are adopted with hesitation, reluctance and by slow graduations. (Alexander Hamilton, 1791) ~

1.1 Background

Many organisations face challenges in this turbulent and dynamic environment. In order to stay abreast with economic changes, they have to constantly strive to find ways and methods to sustain or improve their competitive advantage. Uncertain business markets have been evident in the recent years, compelling many organisations to seek betterment in various ways. For instance, the recent Asian currency crisis in 1997, and oil price hike in 1999, had unexpectedly affected economies on a global scale. Companies are experiencing significant pressures from increased levels of competition, rapidly changing market requirements, higher rates of technical obsolescence, shorter product life-cycles, and the heightened importance of meeting the needs of increasingly sophisticated customers (McGrath, Shapiro and Anthony; 1992).

Technology is also advancing rapidly, with many new opportunities and threats emerging. The economy today is mainly driven by the Information and Communication Technology (ICT) revolution - based on knowledge and ideas, unlike the old economy many years ago which was dependent on natural resources and geography. This new economy entails technological advances that have accelerated the pace and scale of change. The rapid spread of knowledge has sped up the creation of new products and services, and the development of sophisticated production processes. Technological progress has led to the surge in variety of products and services, as well as improvements in the quality of (work) life (Boer, 2002b). For example, this is visible in the telecommunication sector, with numerous new products and services introduced, since the breakthrough adoption of optical networks and systems, broadcast technologies, cryptographic methods and optimisation tools for networks. The advance of ICT can be characterised by marketing paradigms, with mass customisation and e-business (Boer, 2002b).
The requirements of customers are also changing with the growing affluence and rising standards of living. During the 1970s and 1980s, one main feature of an industrial economy was the escalating significance placed on internal quality of execution (rather than price), as a major competitive tool accreditation (Shepherd and Ahmed, 2000). During that time, quality was viewed as the key differentiator, resulting in many firms defining and improving processes, adopting and implementing total quality management systems, and attaining quality standards accreditation. Customer requirements and sophistication were relatively low, allowing organisations to flourish using an inwardly focused strategy. However during the late 1980s and 1990s, there was a discernible shift from the technology push to market pull, as customer needs became more demanding, sophisticated and complex. This compelled companies to focus more on quality (Shepherd and Ahmed, 2000). Furthermore, there are regulatory pressures imposed by the government in the economy, which organisations have to comply with. Today, society has developed in the form of a better-educated workforce, with legislation covering democracy, labour relations and work conditions. The increased customer expectations for products and services have to be developed with lower costs and better quality. Firms have to meet increasingly customised or unique products, delivered quickly and on time (Bolvijn and Kumpe, 1998).

Organisations face stronger competition in the struggle to capture optimum market share. Globalisation has paved the way for intense competition for every sector in the economy. Singapore’s Prime Minister reinforced this during his speech at the 2000 Productivity Campaign Rally. It seems to be the keyword now, as firms venture forward into untouched markets, or compete with the already existing players in the economy. By the end of the 1950s, there was a domination of large, stable and vertically integrated companies (Boer, 2002b). Firms need to innovate quickly before others do to stay ahead. To be producing the same things more efficiently alone is no longer sufficient. Strategies and programmes that have worked in the past may not be relevant today. The Prime Minister, His Excellency Goh Chok Tong mentioned in his speech that the saying used to be "If it ain't broken, don't fix it". Then it was changed to "If it ain't broken, fix it so that it will not break one day." Now the saying is "If it ain't broken, break it before your competitors do" (Singapore Standards, Productivity and Innovation Board, 2000a; p.3). What it means is that when things are going well, firms need to look for something else, for new ways of doing things, and for new things.
to do. In this way, innovation will be the differentiating factor in sustaining an organisation's long-term competitiveness, because it allows for quantum leaps in capability and value-added growth.

At present, markets are experiencing the internationalisation of technology-driven competition, globalisation of manufacturing, due to faster transitional flows of materials and money, compression of product life-cycles, need for greater integration of technologies, and increasingly sophisticated customers (Shepherd and Ahmed, 2000). With challenges such as competition, increasing consumer demands, technological progress and the dramatic change of industries, it is critical for firms today to seek recourse to other measures to survive in the market. The ways in which companies meet these challenges depend largely on the nature of the business they are in, the dynamic forces of the market in which they operate, and the resources and skills that can be applied, to ensure their business objectives are met (Shepherd and Ahmed, 2000). These challenges have inevitably resulted in many organisations turning to innovative measures and strategies.

1.2 Continuous Innovation

The concept of innovation is viewed now as an essential factor in most organisations. To many people the word innovation conjures up images of science laboratories, high-technology computers, and people with a string of academic qualifications. Although innovation is often associated with advanced technology, it is neither the exclusive domain of high-technology industry, nor confined only to R&D scientists. Another popular misconception concerning innovation is that it is limited to radical improvement or a one-time big bang change and that a specialist who works apart from the mainstream operations of organisations normally drives this practice (Bessant and Caffyn, 1997). However, innovation is nothing more than coming up with good ideas and implementing them to realise value creation. New technologies can be applied to a vast range of activities such that there are opportunities to do not only new things, but to do old things differently. To be successful in the long-term, it is important for companies to be able to involve all personnel in a constant push for innovation.

Continuous Innovation refers to the process of successively applying new ideas and methods of improvement in the organisation. This encompasses all aspects of the
organisation – work functions, products, technologies, facilities, etc. This concept requires a methodical, programmed, incremental or radical approach throughout the company involving employees at all levels in the organisational structure. It is an ongoing process, and the motive for this is to improve performance and remain competitive. Organisations will have to realise that it takes risk, investment and commitment to embark on an innovation programme (Ahmed, 1998a). The employees too, would need to have an innovation mindset – being aware of the mission and strategy of the firm which would enable them to be constantly innovative. “Deriving from Theodore Levitt’s succinct description that ‘Creativity is thinking up new things’ and ‘Innovation is doing new things’, the Innovation Mindset is defined as ‘Think and do new things to better the best’” (Singapore Standards, Productivity and Innovation Board, 2000b; p.4). Innovative employees will not be content with just solving problems and perfecting the known. They constantly aim to surpass the status quo, with breakthrough ideas, and seek new ways of doing the job to create an extra value.

A creative and innovative manager takes the initiative to find new markets and investments for the future of the company. He taps his workers' knowledge to streamline processes, cut costs, and raise productivity. As a result, it is characteristic of innovative employees to have an enquiring mind and thirst for life-long learning. This is essential to the foundation of a knowledge-based economy. In Singapore, the Ministry of Manpower has listed some essential characteristics of a dynamic and innovative workforce. These characteristics are described in Table 1.1.
### Characteristics of an innovative workforce

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Learning to learn</strong></td>
<td>Employees have to independently acquire and apply new knowledge and skills required for meeting constantly changing needs. They find resources that facilitate learning.</td>
</tr>
<tr>
<td><strong>Literacy</strong></td>
<td>This is essential, as people are then able to raise their proficiency in reading, writing and computation for interpreting, analysing and using more complex information and data. From this they can express ideas in writing and interpret data, identify trends, estimate results and make recommendations.</td>
</tr>
<tr>
<td><strong>Listening and oral communication</strong></td>
<td>Employees have to learn from co-workers and customers, understand needs and explore new opportunities. Participants learn how to sharpen their listening skills and express ideas orally to enhance their interaction with co-workers and customers.</td>
</tr>
<tr>
<td><strong>Problem solving and creativity</strong></td>
<td>Employees go beyond conventional approaches, offer novel solutions and make the leap to innovation. They learn how to identify potential problems and apply creativity in problem solving that generates innovative ideas.</td>
</tr>
<tr>
<td><strong>Personal effectiveness</strong></td>
<td>Employees take personal responsibility for self-development and meeting the changing needs of the organisation. They motivate themselves and set goals for improving work performance, then plan beyond the current jobs and prepare for the future by improving themselves through continuous learning.</td>
</tr>
<tr>
<td><strong>Group effectiveness</strong></td>
<td>Employees achieve synergy among team members for achieving higher performance. They acquire techniques for interacting effectively with team members from diverse backgrounds and collaborating for mutual benefit. They communicate, provide feedback, resolve conflicts, negotiate and tap the strengths of each other.</td>
</tr>
<tr>
<td><strong>Organisational effectiveness and leadership</strong></td>
<td>Employees understand the values and systems, take the lead and make decisions which support the organisation goal. They function more effectively given the specific goals, values, culture and mode of operation. They inspire confidence, direct activities, lead co-workers, external contractors and customers and to anticipate the consequences of their decisions and assess their appropriateness.</td>
</tr>
</tbody>
</table>

**Table 1.1 Characteristics of an innovative workforce**

*Adapted from Singapore Ministry of Manpower, 2000*

Executive Director, Dr Tang, P.S. of Singapore Flextech Holdings Limited uses this analogy to describe Continuous Innovation "...Imagine running on a treadmill. You have to remain at the top and not slow down for fear of falling backwards. You
must also make sure you do not fall off as it will be difficult to get back on..." (Singapore Standards, Productivity and Innovation Board, 1999; p.40).

1.3 **Continuous Improvement versus Continuous Innovation**

The concept of Continuous Innovation is rather similar to Continuous Improvement. The investigation of Continuous Improvement is an ongoing study by academics and researchers in the Euro-Australian cooperation project. (Euro-Australian Cooperation Centre for Continuous Improvement and Innovation Management – with the acronym, CIMA). A model was created from the research study used for the product innovation process in various manufacturing companies and mainly for new product development (Hyland, Gieskes and Sloan, 2001).

For many people, Continuous Improvement may be synonymous with innovation (Bessant and Caffyn, 1997; p.7). Defining the philosophy of Continuous Improvement could be problematic, as it is closely linked to Total Quality. Collins (1994) believes that it describes an approach to quality assurance, which stresses the importance of creating a culture in which concern for quality is an integral part of the product or service delivery. In conjunction to this, there is an ownership of responsibility for quality at all levels, and involves employees in pursuit of clear and explicit quality objectives (McAdam, Stevenson, and Armstrong, 2000). Wilkinson et. al. (1998) also define Continuous Improvement to include the application of quality assurance to every company activity, and is characterised by the application of good practice for the attainment of continuously improving customer satisfaction. Continuous Improvement divulges judgments of indistinct factors that are not readily measurable or easily tied down (McAdam, Stevenson and Armstrong, 2000). Davies and West-Burnham (1997) suggest that there may be both strengths and weaknesses in the range of interpretations they permit, consequently giving leeway for critiques on this concept. Davies and West-Burnham (1997) conclude that there can be no one authoritative definition of Continuous Improvement (Wilkinson et. al., 1998).

However, other authors suggest this as an idea, relating to efforts of increasing participation in the innovation process within organisations over a sustained period of time (Bessant and Caffyn, 1997). For instance, it is a significant step to complement radical changes with a series of focused incremental innovation throughout the
organisation. Continuous Improvement is defined as "the planned, organised and systematic process of ongoing, incremental and company-wide change of existing practices, aimed at improving company performance" (Boer et. al., 2000; p.1). Consequently, it is a concept focusing on the process within the organisation of new product development in manufacturing organisations. Tushman and Nadler (1986) illustrate product and process innovation, and contend that it is the creation of any product, service or process which is new to the business unit. They also say that the vast majority of successful innovations are based on the cumulative effect of incremental changes in ideas and methods. This would be possible through the concept of Continuous Improvement (Tushman and Nadler, 1986). Continuous Improvement can be said to be a subset of innovation. Consequently Continuous Innovation could be an illustration of innovation through Continuous Improvement. This is illustrated through Pereira and Aspinwall's (1997) comparison of Continuous Improvement and Business Process Reengineering (BPR). They concluded that BPR is synonymous with innovation, and evolves out of a Continuous Improvement initiative. In addition, business organisations can progress from Continuous Improvement to effective business innovation, a substantial role in the process, by inculcating and developing a culture which encourages innovation (Wiele and Brown, 1998).

Like Continuous Improvement, Continuous Innovation constitutes a substantial range of opinions and ideas. In fact, it is a much broader view concerning the learning and improvement of individuals and groups - how knowledge can be acquired, created, diffused, consolidated, and then applied in the organisation (Boer et. al., 2001). The learning and improvement not only involves organisation processes; but covers additional areas such as the products, technology, system, and all other aspects of the business, including radical innovation as well. According to the Continuous Innovation Network (CINet), [a global network of researchers and industrialists] Continuous Innovation is the ongoing process aimed at creating a product-market-technology-organisationcombination that is new to an individual, a group of people, an organisation, a market sector, or even society as a whole (Coughlan et. al., 2000). Continuous Innovation can be defined as the “ongoing interaction between operations, incremental improvement, learning and radical innovation aimed at effectively combining operational effectiveness and strategic flexibility, exploitation and exploration” (Boer, 2002a).
1.4 Beyond Continuous Improvement to innovation

Reflecting on the above discussion, many businesses would want to harness the creative ability within individuals and their workforce, in response to change. This is by doing things differently or better across products, processes and systems, through a continual improvement process of techniques, and the successful production, assimilation and exploitation of novelty (McAdam, Stevenson and Armstrong, 2000). The definition of Continuous Improvement refers to a better way to compete based on an approach, that it adds value to existing processes of manufacturing. Wiele and Brown (1998) contend that organisations should view Continuous Improvement as the starting point of a journey that will increasingly become innovative, and which is closely linked to increased competitiveness. Similarly Samaha (1996) contends when a company is an industry leader, quality processes can produce incremental improvements that will help maintain its leadership position for a time only. However, to maintain a leadership position in the long run, it needs to relentlessly innovate continuously. This move for Continuous Innovation was restated in the UK Government’s White Paper on Innovation and Competitiveness (DTI, 1998). The current European-Australian research on Continuous Improvement focuses on new product development in manufacturing, whereas this study looks at Continuous Innovation taking into account a broader perspective encompassing both radical and incremental innovation in processes; particularly in Distribution Centres providing warehousing and distribution services.

1.5 Objectives of the research

The objective of this study is to adapt and apply existing theories of innovation found in the literature, and determine the form applicable to organisations in the service sector as a foundation of implementing and managing Continuous Innovation in logistics. The findings will facilitate academics, researchers and students in subsequent papers, works and studies. With an idea of what has been discovered through empirical findings in this exploratory study, new theories and scope for further studies could be carried out. These will also serve as a guideline for practitioners in the business economy to highlight the concept of Continuous Innovation. The findings will moreover assist service organisations to implement Continuous Innovation more effectively; to analyse the various factors and situations they are faced with, and further examine their capabilities and competencies. Organisations could also emulate the
competent and efficient practices from successful companies and competitors within the industry as illustrated in this study.

The study has been carried out by adapting concepts from literature, and some variables from an exploratory model known as the CIMA (Continuous Improvement and Product Innovation Management) model. This model was shaped by Australian and European institutions for product innovation process in various manufacturing companies. It was developed during a three-year joint study of Continuous Improvement in new product development funded by the European Union from 1998 to 2000. It involved researchers from the University of Western Sydney, Monash University, and Edith Cowan University in Australia; along with researchers from European universities and research institutes from Trinity College Dublin, Ireland; Brighton University, England; Chalmers University, Sweden; University of Twente, The Netherlands; and Politecnico Milano, Italy. The CIMA model enables measurement of how effectively firms continuously improve by introducing various variables such as the levers, capabilities, contingencies and barriers. The variables of the model were identified, analysed and slightly modified to design a new framework applicable for service organisations. These will be mentioned again and explained in more detail in Chapters Four and Five of this study.

1.6 Key aspects of the research

The key aspects of this research are as follows:

1. Innovation theory: definition, various categories (radical, incremental, knowledge management and learning) and understanding the opportunities behind it, the factors affecting it and the outcome to firms in the supply chain.

2. Incremental innovation and change implementation as evident in firms, especially in logistics services, particularly in the warehousing and distribution operations of Distribution Centres.

3. Application of the CIMA model developed to appraise and improve CI practices in product innovation provides a useful basis to the study. Variables from the model are adopted and applied to Distribution Centres, analysing how innovation occurs. With these concepts, a new model was developed.
4. Analysis of the drivers of innovation, organisational capabilities, behaviours and individual competencies required encouraging innovation or improvements in such firms.

5. Identifying the performance measures in such firms.

6. Case studies of ten firms in Australia and Singapore.

7. Comparison between the firms in the two countries.

1.7 The research question

It is suspected that there is some variance in the application of innovation among different organisations and among different countries. This study proposes to identify, evaluate, compare and contrast the factors in Distribution Centres in Australia, and in Singapore, that affect the use of Continuous Innovation in their operations and processes. The focus of this study will investigate the drivers, capabilities, behaviours, contingencies, individual competencies and performance measures of innovation in Distribution Centres with warehousing and distribution services. It will analyse the differences and similarities in practices between the two countries. Therefore, the central research question is defined as:

*How do organisations with logistics operations providing warehousing and distribution services improve through Continuous Innovation; and what are the drivers and performance measures of this process?*

The central research question can be divided into six research sub-questions that together lead to answer the central question. To understand the application of innovation, it is necessary to investigate the current situation of companies. There is a need to identify the areas where the organisation is effective in improving its performance and remaining competitive. Moreover, it is important to identify those inadequate areas so that recommendations could be made for improvement. This leads to the following questions:

i. *What are the main drivers of innovation in the selected Distribution Centres providing warehousing and distribution services?*

ii. *What capabilities do the selected Distribution Centres have to be innovative?*
iii. What behaviours are indicative of these capabilities in the selected Distribution Centres?

iv. What competencies are evident in individuals to operationalise the behaviours and capabilities for innovation?

v. What are the performance measures adopted by the selected firms to sustain Continuous Innovation?

vi. What links do firm contingencies have with the drivers, performance measures, capabilities, behaviours and competencies?

1.8 Methodology

The research was conducted in the following fashion:

1.8.1 Literature review

At this phase of the research, the literature on the various aspects of innovation was reviewed. It has identified the different practices and methods of innovation implemented, as well as the various theories and models developed by many authors. Other aspects of innovation such as knowledge management, culture, climate, organisational learning, capabilities, and competencies for innovation have been examined. The service sector was highlighted to further elucidate its pivotal role in today's dynamic global business environment and how competitive it is. Finally, the importance of logistics that provide an array of important services, and subsequently, the need to be competitive within that industry was highlighted. All these were built to form a theoretical framework in a separate chapter, setting the direction for this study.

1.8.2 Case studies

This stage tested and administered the real world practices of the theories identified in the reviewed literature. In-depth exploratory, qualitative, multiple case studies were conducted on logistics in various Distribution Centres providing warehousing and distribution services in Sydney, Australia and Singapore. The study adapted variables from the CIMA model to outline the management of innovation in logistics. A series of preliminary studies, field study observations and semi-structured interviews were conducted for the data collection. Such data assisted in identifying and further elaborating the practices of Continuous Innovation within the organisations. This iterative process of data collection enabled the researcher to conduct a qualitative study which yielded empirical data for analysis.
The notion of Continuous Innovation was measured through the indicative individual competencies, organisational capabilities and supporting behaviours, contingencies, drivers and measure of outcomes for innovation identified. It is from these variables that the study was able to establish the approach to deal with innovation in the service organisations selected. The research in this study adapted and modified the CIMA model to suit the situations of logistics services in Distribution Centres. The CIMA model assisted in designing a supplementary framework to study innovation of such firms. It examined cross-project and cross-unit learning, and continuous improvement within process innovation. It also facilitated the identification of outcomes of innovative strategies, and conclusions derived with regards to these as a consequence of this research.

Five organisations in Sydney, Australia and another five in Singapore were selected based on their nature and appropriateness for the study. These organisations were Distribution Centres, encompassing warehousing and distribution operations of logistics services. The primary interest of the research was on their processes and systems. The firms selected varied in terms of size and goods distributed. Three senior personnel were solicited for interview from each of these organisations, to render a wider viewpoint of the operations and functions. The targeted areas were mainly Operations, Human Resource and Planning so as to gain insight on output focus, the training, development and competencies of employees to enhance learning and behaviours, as well as information and planning activities in the organisation. Interviewing these relevant managers gave a broader, cross-functional view for the researcher; in contrast to obtaining a biased view from a single manager.

An in-depth analysis of the case studies was then conducted to test the similarities and the differences in factors and practices of innovation between the firms of the two countries. This was to provide resolution to the research questions set forth for the study. The results were then used to substantiate how to confront such issues and recommendations made afterwards.
1.9 Outline of the report

The report is built into nine chapters specifically pertaining to the direction of the research as outlined in this chapter. This introductory chapter gives an overview of the research aim and how the project was conducted. Chapters Two and Three are reviews of the literature on innovation, innovation theories, some concepts affecting innovation such as learning, knowledge management, and culture. A review and discussion of the service industry is also conducted, focusing on the importance of logistics in Chapter Three.

Chapter Four discusses in detail how the main research themes emerged, as well as how the gaps identified from the literature steered the direction and focus of this research, thereby constructing the theoretical framework. A model is presented, showing the theoretical constructs adopted and variables used in conducting the research. It explains how and why the CIMA model was modified to tailor it to the service sector for measuring innovation. Chapter Five explains the research philosophy underlying this thesis, which caused the researcher to take a preliminary approach, utilising the techniques based on grounded theory research, and collection of empirical data. It describes the research strategy, and shows the practicalities and usefulness of the application of the various methods. It also considers the limitations, rigour, and the degree of validity and reliability of this research to build a credible picture of how firms with logistics services can innovate.

Chapter Six reports the findings from the preliminary interviews and field studies within three Distribution Centres. It gives an in-depth description of the functions, operations and major issues present in those firms. The implication for research is explored, before presenting the ten case studies. The findings from the research are disclosed, giving a general overview and the profile components of each firm and the managers interviewed. The research questions are subsequently investigated and interpreted with the analysis in Chapters Seven and Eight. The chapters also discuss some commonalities and differences of the variables and factors in the organisations studied. These are revealed and elucidated through comparative tables, figures and charts. Finally, Chapter Nine presents some recommendations and scope for further research opportunities. It gives an insight to assist organisations to
improve their current operations and processes to enable them to be more inclined towards Continuous Innovation.

1.10 Delimitations of scope and key assumptions

The study will not attempt to generalise the findings to the logistics industry or service sector, but rather, aims to find empirical evidence leading to scope for further investigation and research in future. The research does not evaluate innovation for the country as a whole using national policies and systems, but focuses on the firm level. In addition, as logistics is a service encompassing a wide range of activities, the study has restricted the investigation to focus on warehousing and distribution operations only. Exploratory case studies were conducted to give further insight into the practices of Continuous Innovation in ten organisations due to limited resources and other constraints.

There are some assumptions that this study has made in order to carry out the research. Firstly, it is presupposed that there is some form of innovation occurring and evident in organisations, especially in those with logistics functions. Secondly, the variables identified and formulated into a framework, are applicable in the real world sense. Another assumption made in conducting comparisons between organisations in two locations, is that there were anticipated differences in the practices or extent of innovative activities. Such differences could then lead to comparisons made, further analysis and recommendations to organisations.

1.11 Conclusion

Innovation today is considered critical in many business practices in order to compete effectively. A large number of organisations feel the need to keep up with changes, new ways of doing business, and to engage in innovative practices. As a result, this study gave subsequent distinction as to the different methods and techniques deployed, and the various issues encountered in service innovation. This was especially within logistics services dealing with warehousing and distribution operations, and to varying situations among the countries.

The concept of incremental or Continuous Innovation is relatively new, as a spin-off from the Continuous Improvement research studies in Australia and Europe.
Furthermore, this research adapted some variables from the CIMA model and applied a modified framework to the service sector. Upon the successful implementation of this exploratory research, it gave recommendations that there is scope for further empirical research and other studies to be conducted on innovation in other operations of the service sector. This is very significant in opening up new horizons for the application of the variables from the CIMA model. This research is also in line with the work of the Innovation and Continuous Improvement Management (InCITE) Centre in Australia. Currently, studies have been conducted in manufacturing organisations and comparisons have been made between Australian and European organisations.

By comparing service organisations in Singapore with those of Australia, there will be some scope for subsequent research, comparisons to be conducted with other developed countries in future. These include Asian countries such as Hong Kong and Japan, and Europe integrated, to provide the international perspective necessary for successful companies to improve on their innovative strategies, measure their performance and benchmark themselves against international standards.
CHAPTER TWO
LITERATURE REVIEW – INNOVATION AND INNOVATION MANAGEMENT

~ It takes a lot of courage to release the familiar and seemingly secure, to embrace the new. But there is no real security in what is no longer meaningful. There is more security in the adventurous and exciting, for in movement there is life, and in change there is power. (Alan Cohen) ~

2.1 Introduction

Chapters Two and Three review the plethora of literature produced by authors and organisations, through various publications and websites. They help to build a theoretical foundation, upon which the research is based, to identify issues worth researching, as will be explained in Chapter Four on Theoretical Framework. This chapter looks at innovation, the issues and other relevant disciplines that have some impact upon it. Innovation is looked at on a general level, including the definitions, several models, and how it is diffused in organisations. The chapter then goes on into congruous themes such as learning, knowledge management, creativity, and culture, all of which relate back to innovation.

Chapter Three however, narrows in and focuses on innovation in services. This is pertinent to this research, and it looks at the barriers apparent and the logistics industry. It explains why there is a need for innovation in services, especially in logistics, and touches upon the capabilities and competencies that are required for firms to innovate.

2.2 Innovation

Organisations competing in dynamic markets with rapidly changing technology should attempt to counter the risk of being overtaken by competitors, or underestimating any potential challenges they face. For them to be successful, they may need to innovate (Johne, 1999). Innovation is considered a fundamental component of entrepreneurship and a key element of business prosperity (Nonaka and Takeuchi, 1995). This is becoming even more evident as developed economies move into a post-
capitalist, knowledge-based society (Drucker, 1992). There is continuous change in the state of knowledge, as well as exponential advancements in technology, consumer demands and global competition (Johannessen, Olaisen and Olsen, 1999). The combination of a strong market presence, compelling product offerings and the ability to attract, retain and harness the energy of the best and brightest employees, will enable companies to sustain profit margins, sales growth and market valuations. Innovation in products, processes and organisations is required to make the difference (Brafman and Folmer, 1998).

D'Aveni (1994) stated that we are moving into a knowledge-based society with firms facing hyper-competition. This will require organisations to focus on being innovative in the ways they use knowledge to sustain competitiveness. Virtually all companies talk about innovation and its importance. The reality is that innovation is inevitably linked to risk, and requires some form of investment and commitment. Although innovation is intangible in nature, it is best illustrated as a pervasive attitude that allows the business to see beyond the present and create the future (Ahmed, 1998a). Innovation is the engine of change; and in this vast dynamic environment, resistance to change is deleterious to organisations. Despite their excellence or immensity of resources, organisations cannot safeguard themselves from change. Although they face risk and uncertainty, it creates opportunity and the major driver of change is innovation (Ahmed, 1998a).

Today, the innovations of many companies are propelled by management desires, internal capabilities or channel demands. These innovations succeed mainly because they have vision, and meet the defined strategic goals. In the future, it is anticipated that successful innovations will be even more demanding, with little room for compromise. New innovations must first meet the needs of customers, whilst satisfying management, providing a good business proposition for the company, and using feasible and affordable technology (Innovation Management Incorporated, 1999). The operating environment before and at current can be illustrated in the Table 2.1 following.
The operating environment before and current

<table>
<thead>
<tr>
<th>Yesterday</th>
<th>Today</th>
</tr>
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<tbody>
<tr>
<td>Slow product and service introduction</td>
<td>Constant flow of new products and services</td>
</tr>
<tr>
<td>Satisfied with me-to products</td>
<td>Strong need for differentiation</td>
</tr>
<tr>
<td>Traditional sales force</td>
<td>Consulting personnel</td>
</tr>
<tr>
<td>Personal computer</td>
<td>E-commerce</td>
</tr>
<tr>
<td>Gaining share</td>
<td>Creating loyal customers</td>
</tr>
</tbody>
</table>

Table 2.1 The operating environment

*Adapted from Innovation Management Incorporated, 1999*

What the future will bring is uncertain, and organisations have to continuously adapt to change and surprise. This will enable the ability to focus on skills and capabilities to achieve sustainable value creation and competitive advantage (Innovation Management Incorporated, 1999).

2.3 Definitions of innovation

Over the last few decades, there has been unprecedented attention, both in the press and among academics, on innovation as a means to create and maintain sustainable competitive advantage. Many authors have written over the decades depicting the changing nature of the term innovation. They have explored the way in which developments in materials and other technologies have acted to enable innovation to take place. Each of them has their own nuance. For instance in 1968, innovation was defined as a series of technical, industrial and commercial steps (Robertson, 1974). Then in 1969, innovation was a unit of technological change according to Marquis (1969), who defined technical change as enterprises, using new methods or inputs in producing goods and services. Marquis (1969) stressed the importance that only the first enterprise to adopt the change is the innovator. Subsequent adopters are considered as imitators.

In the 1970s, a study was conducted from 188 publications defining innovation, and Tinnesand (1973) reinterpreted the meaning from them. The findings of what innovation is can be summarised as follows:
Defining innovation

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9%</td>
<td>An invention</td>
</tr>
<tr>
<td>11%</td>
<td>The introduction of an idea disrupting prevailing behaviour</td>
</tr>
<tr>
<td>14%</td>
<td>The introduction of an invention</td>
</tr>
<tr>
<td>14%</td>
<td>An idea different from existing ideas</td>
</tr>
<tr>
<td>16%</td>
<td>A new idea</td>
</tr>
<tr>
<td>36%</td>
<td>The introduction of a new idea</td>
</tr>
</tbody>
</table>

Table 2.2 Illustration of what is innovation.

Adapted from Tinnesand, 1973

Kuhn (1985), in discussing creativity, suggests that it forms something from nothing; then innovation shapes that something into products and services (Kuhn, 1985). Another similar view from Badaway (1988) states that creativity brings something new into being, and innovation brings something new into use. Other authors such as Urabe (1988) contend that innovation is the generation of a new idea, and its implementation into a new product, service or process. This leads to dynamic growth of the national economy and increase in employment, as well as the creation of profit for the innovative enterprise (Urabe, 1988).

A wider interpretation of innovation specifies that the first use of an idea by a common set of organisations with a common goal constitutes innovation (Kimberly and Evanisko, 1981). This limits recognition of the concept to first movers within the industry. Some authors share the belief that innovation is based on when the adopter acted, relative to others. For instance Rogers (1983) proposed the first 2.5 percent, whilst Midgley and Dowling (1993) proposed the first 29 percent that adopt the given innovation, display the attributes of innovators.

Other authors contend that the definition of innovation should include success as a qualifier. Krasner (1982) argues that using the term should be confined only to the commercial development of new ideas, processes or technologies. There may be some disadvantage in the approach, as information or knowledge does not diffuse simultaneously. It is influenced by spatial, economic, social and political proximity to information sources (Cooper, 1998). The firm may successfully be innovative out of luck or happenstance, more than a matter of strategic choice (Midgley and Dowling, 1978). So there may be two firms adopting the same motives, and using the same
techniques. Yet, the firm with some level of economic success would be termed innovative. With regard to this, the classification of simultaneous behaviours differently, based on a fabricated post-measure of success, can overshadow the understanding of the underlying behaviour. There is an element of risk and uncertainty that innovators would have to take into consideration. For example, the adopter has incomplete knowledge with which to evaluate and make their judgements about the appropriateness of the innovation, and the long-term consequences of the adoption (Gatignon, Eliashberg and Robertson, 1989).

Other authors in the 1990s also had different views about innovation. Udwadia (1990) included the successful creation, development and introduction of new products, services or process, whilst Twiss (1992) felt that for an invention to become an innovation, it must succeed in the marketplace.

According to the STEP Group (Studies in Technology, Innovation and Economic Policy), the concept of innovation is understood as organised activities producing outcomes that change market characteristics (Hauknes, 1996). Innovations are organised activities by the firm – deliberate and institutionally based activities – that have the effect of changing characteristics of the markets in which the firm operates, including the performance of the firm itself. Learning, as the enabler of knowledge generation, is an integrated part of the production process that generates such knowledge products or services. This concept of learning will be dealt in a later section, as it forms the behaviour conducive for innovative capabilities.

So what then encourages innovation? Many authors write that the adoption of innovation separates the term from measures of absolute time since the conception of the idea, product or process (Cooper, 1998). In addition, authors such as Bigoness and Perreault (1981) purport that the adoption of the product, process or technology does not equate to the firm’s tendency towards innovation. They argue that it is the consistency of the firm towards adoptive innovative processes and ideas that befittingly demonstrates innovative tendencies.

It is evident that the concept of innovation has subtly changed over the years. From the 1960s and 1970s, authors regarded innovation as a process in the induction of
change, or the generation of new ideas (Cumming, 1998). However in recent years, many authors appear to agree that creativity is essential to innovation. The definitions include conditions such as success, effectiveness, profitability, satisfied customers and business competitiveness. In looking at all these authors' views, Cumming (1998) concluded broadly that innovation needed to have the successful application of a product, service or process in general.

2.4 Innovation as newness

Nearly every definition of innovation focuses on the concept of newness. It is argued that the perception of newness is essential to the concept of innovation, as it serves to differentiate innovation from change (Slappendel, 1996). All innovation presupposes change, but not all change presupposes innovation. This proposition is important to understanding the link between innovation and entrepreneurship, as studies show the central role in new venture creation and management. For instance, Vesper (1988) writes about new business startup, Lumpkin and Dess (1996) about new entry, Gartner (1988) about new organisations, and Stevenson and Jarillo (1990) about organisation renewal. To isolate a useful definition and the measure of innovation, it is important to address this proposition of newness: what is new, how new, and new to whom?

2.4.1 What is new?

In Zaltman, Duncan and Holbek (1973), the definition of innovation is any idea, practice or material artefact, perceived to be new by the relevant unit of adoption. Other researchers have used methods that are consistent with this notion of newness. McGrath et. al. (1996) also operationalised innovation by having participants address to what extent 15 project characteristics were new to the firm at the moment. The characteristics ranged from new products to the skill of the project team. Damanpour (1996) operationalised innovation to encompass a range of types including new products, services, organisational structures, administrative systems, process technologies or new programmes. It can be said that these authors closely follow Schumpeter’s work (1934, 1939 and 1942) to operationalise what is new in a manner that applies to a range of activities across the relevant units of adoption.
2.4.2 How new?

The literature reveals that there are several approaches to address the issue of the degree of newness to constitute an innovation. Gersick (1991) gives considerable attention to the issue of revolutionary innovation. These innovations often reflected in equilibrium models that describe situations, were discontinuities that totally redefine the meaning of an industry, by creating new technological reign or prototypes (Tushman and Romanelli, 1985). Henderson and Clark (1990) also point out the importance of architectural innovations involved in reconfiguring existing products. Drazin and Schoonhoven (1996) noted the emergence of a dominant design, which leads to additional innovation bringing new approaches and technologies to its course. Radical innovation is associated with revolutionary innovation, whereas incremental innovation is associated with innovations within a paradigm (Dosi, 1982; Dewar and Dutton, 1986). Damanpour (1996) used the term radical innovations to characterise innovations that produce fundamental changes in the activities, and large deviation from existing practices. Incremental innovation is used to depict innovations with less extent of deviations from existing practices (Damanpour, 1996).

2.4.3 New to whom?

The extent of newness of an innovation relates to the field into which the innovation is adopted (Johannessen, Olsen and Lumpkin, 2001). For instance Cooper (1993); Kotabe and Swan (1995); Damanpour (1996); Utterback and Abernathy (1975); and Johannessen, Olsen and Lumpkin (2001) argued that innovation can be investigated in terms of both newness to the company, newness to the market, as well as newness to the industry.

2.5 Innovation versus invention

Several authors have written about the confusion in the study of innovation adoption, which deals with the scope of behaviours. Definitions of innovation range from treating innovation and invention synonymously, to regarding any idea practice, process or product that is new to the user organisation as innovation (Cooper, 1998). Both innovation and invention refer to creative processes, involving the application of existing ideas to create a unique solution to a problem. This implies that innovation does not occur very frequently, involve only a few organisations, or that innovation helps firms achieve competitive advantage through radical change. Similarly, Knox
(2002) wrote that managers often confuse invention and innovation. Invention is about bringing new products and technologies to market, while innovation is about providing new solutions that offer value to customers.

In the real sense however, Utterback (1973) stated that innovative organisations seek to develop new processes, choosing to refrain from commercial use of invention for long periods. It is evident that many organisations achieve competitive advantage, not just by invention, but also by the resourceful use of existing processes, products or technology (Cooper, 1998).

2.6 Types of innovation

Innovation is a concept where there is considerable variance in individual observers’ definitions, both between common sense (layman understanding), and analytical approaches. A common element among all these approaches is that market introduction is a crucial aspect of innovation. This is what distinguishes innovation from invention. The concepts are incomparable, in the sense that invention is a technical concept, and innovation an economic concept. It is necessary to have technical feasibility in innovation, but invention alone, is not a sufficient condition for economic feasibility (Hauknes, 1996).

2.6.1 Product innovation

Product innovation provides the most distinct means of generating revenues (Johne, 1999). According to Hart, (1996) the long-term business growth depends primarily on improved radically changed products. There is no doubt that product innovation helps companies to retain their market position and grow competitively. It is therefore important for firms to constantly update and renew products in accordance with customer’s needs. Mitchell (1996) has written about the concept of ‘innflation’, where firms should not engage in product innovation for the sake of it. Firms have to outline in detail the core features of the product that need to be improved or radically changed (Mitchell, 1996).

2.6.2 Process innovation

Process innovation provides the means for safeguarding and improving quality and saving costs. It may be a rather complex form of innovation, but the benefits are
well worth the time and effort spent. For instance, suppliers who efficiently work on productivity gains will, over time, expect to develop products with better performance, but at a lower cost. Customers can reap the gains in terms of lower product prices. In service firms, process innovation not only assists in reducing operating costs, but also increases service quality. Process innovation is important in both the supply of the core product, as well as in the support part of any offer (Johne, 1999).

It is important to articulate the importance of clarity in reference and intent when discussing innovation. One should hold the perspective that innovation is appropriate and desirable in a given situation, and if it is acknowledged that it is a non-chance event influenced by strategic intent, managerial action and organisation policy, then a common understanding of what innovation means would be the prominent definition. As highlighted previously, there are strengths and weaknesses of some of the definitions of innovation by various authors. It is therefore significant to establish the validity of findings, propositions and policies for innovation to the investigation for this study.

2.6.3 Organisational innovation

An important type of innovation which relates directly to this research is organisational innovation. Within the organisation, innovation is increasingly about teamwork and the creative combination of different disciplines and perspectives of employees (Tidd, Bessant and Pavitt, 2001; p. 313). An innovative organisation is “an integrative set of components which work together to create and reinforce the kind of environment which enables innovation to flourish” (Tidd, Bessant and Pavitt, 2001; p. 315). To be innovative, there are several factors or components that contribute to the success of innovative organisations. These factors are adapted from Tidd, Bessant and Pavitt (2001) and are highlighted in the following sub-sections.

2.6.3.1 Shared vision, leadership and the will to innovate

Management has to identify core competencies as a source of strength within the organisation and change the mind-set of employees, refocussing organisational energies towards the right direction. This can be done through top management commitment and stating the strategic intent (Tidd, Bessant and Pavitt; 2001).
2.6.3.2 Appropriate structure

Secondly, there must be an appropriate organisation design which enables creativity, learning and interaction. Organisation structures vary and are influenced by the nature of tasks performed, taking into account the need for flexibility and structuring of relationships. The main issue confronting firms is adopting the most appropriate organisational structure for the particular situation. Managers have to consider if this facilitates and reinforces innovative behaviour (Tidd, Bessant and Pavitt; 2001).

2.6.3.3 Key individuals

An important element is the presence of key personnel or figures within the organisation that can have an impact on innovation. Sometimes certain individuals provide the energy, enthusiasm, inspiration, power and influence on an innovation’s progress. There is a need to identify sources of knowledge and information within employees (Tidd, Bessant and Pavitt; 2001).

2.6.3.4 Effective teamworking

According to Tidd, Bessant and Pavitt (2001), groups have more to offer than individuals in terms of idea generation and flexibility of solutions developed. Teamwork can be seen as a mechanism for bridging boundaries and dealing with issues within the organisation. It could be a form of decentralised operating structure, with autonomy and effective output that can increase the innovativeness of organisations (Tidd, Bessant and Pavitt; 2001).

2.6.3.5 Continuing and stretching individual development

The continual training and development of employees determine the performance and innovation capability of firms. It has considerable potential and affects motivation levels of individuals. They value the experience of acquiring new skills and abilities; and may also feel part of the organisation. With empowerment, employees may demonstrate more initiative that leads to innovation (Tidd, Bessant and Pavitt; 2001).

2.6.3.6 Extensive communication

Just as important as customer focus is the requirement for extensive communication that is multidirectional and uses various sources, channels and media.
Innovation depends on the creation, combination, sharing and deployment of knowledge. These in turn put strong emphasis on the channels and mechanisms for communication (Tidd, Bessant and Pavitt; 2001).

2.6.3.7 High involvement in innovation

Managers need to focus on harnessing creative skills and problem solving abilities of employees regularly. They need to be constantly developed and contribute to innovation in the organisation. Firms that possess this culture to support and encourage innovation achieve competitive advantage (Tidd, Bessant and Pavitt; 2001).

2.6.3.8 External focus

Another characteristic is an orientation which is open to new stimuli from outside. Developing a sense of external orientation (such as to customers, technology and new developments) and ensuring that this pervades organisational thinking at all levels are of considerable importance in building an innovative organisation (Tidd, Bessant and Pavitt; 2001).

2.6.3.9 Creative Climate

There is a responsibility for management to facilitate a creative climate conducive for innovation. They have to create and reinforce behavioural norms which inspire creativity and lead to a culture thriving in innovation. Management should be compelled to "building a creative climate involving systematic development of organisation structures, communication policies and procedures, reward and recognition systems, training policy, accounting and measurement systems and deployment of strategy" (Tidd, Bessant and Pavitt; 2001; p. 337).

2.6.3.10 Learning Organisation

The concept of ‘learning organisation’ involves the importance of mobilising and managing knowledge as the basis for competition. Innovation can be represented as a learning cycle. Managing the process is primarily a function of the creation and conditions under which learning opportunities emerge and are exploited (Tidd, Bessant and Pavitt; 2001).
Some of these elements will be discussed in more detail in further sections of the literature review. A table summarising the points can be found in the Appendices as Appendix 2A.

2.7 Dimensions of innovation

It is obvious that there are many forms of innovation. But the relevance of the dimensionality issues comes from the interplay between variations in organisational characteristics, and the various types of innovation (Cooper, 1998). Daft (1978) and Damanpour (1991) suggest that the structural characteristics of an organisation vary with the type of innovation being adopted. For instance, the size of the firm, or its centralisation may affect differences in process or product innovation. This implies that the tendency for firms to adopt innovation is assumed to be sporadic across all innovations. The different organisational attributes correlate together with the various dimensions an innovation maintains, so as to ascertain the probability of adopting innovation. There is still some deliberation with respect to what the attributes are, and how they correlate with various types of innovation (Cooper, 1998).

2.7.1 Strategy

Authors such as Chandler (1962) contend that there is a relationship between organisational structure and innovation type. He argues that a successful firm will survive and be competitive if the structure corresponds with the strategy. He conducted studies and observations to demonstrate that assigning authority, responsibility and communication suit the type of innovation in the management of the firm. This is also important in establishing a connection between strategy, structure and innovation (Chandler, 1962). Porter (1990), on the other hand, reports in a low-cost strategy, the firm’s competence lies in decreasing costs through process innovation, whereas the differentiation strategy depends on the firm’s ability to generate new ideas or features in products (Porter, 1990).

2.7.2 Power

In the dual core model of innovation, Daft (1978) suggested that firms with organic structures tend to display technological innovation (mainly from technical specialists and engineers). The innovation involves the adoption of an idea that directly influences the basic output processes. Damanpour (1987) also concluded that this
includes both product innovations and process innovations. Whereas in firms with more bureaucractic structures, Daft (1978) advocates that this leads to administrative innovation. It occurs mainly from managers affecting policies, allocation of resources, and other factors associated with the social structure of the organisation. It is apparent that there are many dimensions and factors affecting innovation, and it should be concluded that innovation exists as a multidimensional concept (Cooper, 1998).

2.8 Models of innovation

2.8.1 Static models

2.8.1.1 Incremental versus radical innovation

Firstly, in the organisational view, innovation can be defined in terms of the extent to which it impacts the firm’s capabilities (Afuah, 1998). Innovation is radical if the technological knowledge required to exploit it is different from the existing knowledge, rendering the existing knowledge obsolete. For example, the refrigerator was invented, integrating knowledge of thermodynamics, coolants and electric motors, as compared to the knowledge of harvesting and hauling ice. For incremental innovation however, the knowledge required to offer a product, builds on existing knowledge. An example would be the microprocessor chip by Intel that was tremendously reduced in size, and could run at 200MHz (Afuah, 1998; p. 15).

Secondly, in the economic view, since innovation results in superior products with lower costs or better features, for instance, it can be labelled as a function of the extent to which it renders old products to be non-competitive. Innovation is radical when the result is a superior product, making existing products non-competitive (Afuah, 1998; p. 15). The EFTPOS system (Electronic Funds Transfer at Point Of Sale) in Australia is an example of innovation in the economic sense, making mechanical cash registers ‘non-competitive’. For incremental innovation, the innovation still allows the existing products to remain competitive. An example is diet soft drinks that allow existing standard soft drinks to remain competitive (Afuah, 1998).

These two views of innovation prompt companies to consider the strategic incentives of investing, and their organisational capabilities. An organisation with market power may be disinclined to radically innovate, for fear of savaging its existing products (Reinganum, 1989). It would be more willing to invest in incremental
innovation, to allow existing products remain competitive in the market (Arrow, 1962; Gilbert and Newberry, 1982; Henderson, 1993). Whereas for newcomers, it would be easier to invest in radical innovation, as they have nothing to lose. Organisations would need to look at their capabilities before engaging in radical or incremental innovation. For instance, the existing capabilities may be futile, or be a handicap to the introduction and development of the innovation (Leonard-Barton, 1992). They have to unlearn the old way, break habits, routines and procedures to exploit old technology (Afuah, 1998). So incremental innovation may prove more worthwhile, since they already have the required knowledge builds in place.

This model tends to suggest that existing organisations are more likely to perform better in incremental innovation, and that it is more worthwhile for new entrants to venture in radical innovation. It assumes that firms have recognised the potential of the innovation, and for radical innovation, the only consternation is in ‘cannibalising existing products’ that prevents existing organisations from exploiting it (Afuah, 1998; p16).

2.8.1.2 Abernathy-Clark model

In contrast to the above model, the Abernathy-Clark Model explains why existing firms may do better than new entrants in terms of radical innovation (Abernathy and Clark, 1985). The model suggests that technological and market knowledge reinforces an innovation. It is possible for a firm’s technological capabilities to mature, while its market capabilities remain competitive. If such capabilities are important and difficult to accomplish, the firm with obsolete technological capabilities, can then employ the market ones to excel over a new entrant (Abernathy and Clark, 1985).

Focusing on the perspective of the innovating firm, the model categorises innovations according to their impact on the existing technological and market knowledge of the manufacturer. An innovation is ‘regular’, if it conserves the manufacturer’s existing technological and market capabilities, but obsolete market capabilities. The innovation is ‘revolutionary’ if it outmodes technological capabilities, but enhances market capabilities. Thirdly, the innovation may be ‘architectural’, if both technological and market capabilities become obsolete (Afuah, 1998; p.18). While this
model explains the indicative categories of innovation, market knowledge can be just as considerable as technological knowledge.

2.8.1.3 Henderson-Clark model

Henderson and Clark (1990) studied the issue of organisations having difficulty with incremental innovations. They suggested that since products are normally made up of components connected together, building them must require two kinds of knowledge – namely of the components and of the linkages between them (architectural knowledge). As a result, innovation affects component knowledge and architectural knowledge. The effect has different consequences for different firms (Henderson and Clark, 1990). In addition, the model suggests four kinds of innovation, in accordance with the effects of innovation on knowledge.

<table>
<thead>
<tr>
<th>Types of Innovation</th>
<th>Effects</th>
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<tr>
<td>Incremental</td>
<td>Innovation enhances both component knowledge and architectural knowledge.</td>
</tr>
<tr>
<td>Radical</td>
<td>Innovation destroys both component knowledge and architectural knowledge.</td>
</tr>
<tr>
<td>Architectural</td>
<td>Innovation destroys architectural knowledge and enhances component knowledge.</td>
</tr>
<tr>
<td>Modular</td>
<td>Innovation destroys component knowledge and enhances architectural knowledge.</td>
</tr>
</tbody>
</table>

Table 2.3 Types of innovation

The usefulness of the model helps to demonstrate why firms have problems with incremental innovation. They may mistake incremental innovation for architectural innovation. While the component knowledge required to exploit the innovations had not changed, architectural knowledge had changed or been destroyed. Firms have problems realising this, because architectural knowledge is often tacit, and embedded in the routines and procedures of an organisation, consequently making it difficult to discern and respond to (Afuah, 1998; p.19).

2.8.1.4 Porter’s value added chain

The innovation value added chain model explains why an organisation outperforms new entrants at radical innovation, and why it may fail in incremental innovation. Porter (1985) focuses on the effect of innovation in competitiveness and
capabilities of the firm's suppliers, customers, and complementary innovators, besides the manufacturer alone. An innovation that is incremental to a manufacturer can be incremental to the supplier, but radical to its customers and complementary innovators. This is because the innovation has different impacts at each of the stages of the innovation value-added chain (Porter, 1985). For example, Dvorak Simplified Keyboard (DSK) arrangement performs better than the 'QWERTY' arrangement. All that was done was just rearranging the keys on the keyboard. It was competence enhancing to the innovator, (Dvorak) and the manufacturing suppliers in terms of manufacturing the new keyboards. But was competence destroying to customers because they were already used to the QWERTY keyboard (David, 1985).

Organisations that face competence destruction in innovation may still succeed if the innovation is competence enhancing in the value chain (Afuah, 1998; p.21). The implication of Porter's model is that a firm's accomplishment in exploiting an innovation may depend as much on what the innovation does to the capabilities of the firm, as on what it does to the capabilities of its innovation value-added chain of suppliers, customers and complementary innovators.

2.8.1.5 Strategic leadership view

According to Afuah (1998), the beliefs and values of top management are important to innovation. The decision to invest in an innovation only occurs once management has recognised the potential of the innovation. This ability of top management is a function of its managerial logic, or view of the world (Finkelstein and Hambrick, 1990) which in turn, depends on management experiences, organisational logic and industry logic (Hamel and Prahalad, 1994). For that reason, Afuah (1998) suggests that it does not matter if the firm is an existing player, or a new entrant, because the factor here lies in 'strategic leadership's dominant logic' (Afuah, 1998 p.21).

2.8.1.6 Roberts-Berry model

Roberts and Berry (1985) argue that the success of an innovation depends on the mechanism that the firm uses in the adoption process. They suggest that there are seven mechanisms, depending on how familiar the technology and the market are. They are namely: internal development, acquisitions, licensing, internal ventures, joint ventures
or alliances, venture capital, and nurturing and educational acquisitions. The appropriate mechanisms depend on how radical the innovation is to the firm.

If the technology and the market are familiar to the firm, it may be better off developing the innovation internally, since it has the competencies and endowments to do so. If the market is new but familiar, while the technology is the firm’s existing one, the firm can also pursue internal development, since the marketing capabilities required build on existing ones, and the firm already has the technological capabilities. A similar strategy applies when the technology is new but familiar, and the market is an existing one. The firm can also develop the technology internally, since the capabilities required build on existing ones (Roberts and Berry, 1985).

**Market and technology affecting innovation**

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<th>New and unfamiliar</th>
<th>New but familiar</th>
<th>Existing</th>
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<tr>
<td><strong>M A R K E T</strong></td>
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<td>Venture capital</td>
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<td>Venture nurturing</td>
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<td>Educational Acquisition</td>
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<td>Internal market development Acquisition</td>
<td>Internal venture Acquisition</td>
<td>Venture capital</td>
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<td></td>
<td>Licensing</td>
<td>Educational acquisition</td>
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<td>Internal development (or acquisition)</td>
<td>Internal Product development Acquisition</td>
<td>“new style” joint venture</td>
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<td></td>
<td>Licensing</td>
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**TECHNOLOGY**

*Figure 2.1 Roberts-Berry model*

*Adapted from Roberts and Berry, 1985.*
2.8.1.7 Quantity and quality of new knowledge

An innovation can be described as a function of how much knowledge goes into it, and the form the knowledge takes. According to Arthur (1994), products and services can be grouped into bulk processing or knowledge based. For instance, bulk processing products could be coal, lumber, heavy chemicals, etc, which are heavy on natural resources and light on know-how. Knowledge based products refer to aircraft, pharmaceuticals, telecommunication equipment, computers and software. They are low in natural resources and high in technology know-how. Bulk processing products exhibit diminishing returns, as the supply depends on the natural physical resources. This means that there would technically be less land available for lumber, for instance. There is an optimum scale of operations, beyond which, costs start to increase (Arthur, 1994).

Knowledge-based products on the other hand, exhibit increasing returns with high up-front costs and low per-unit production costs (Arthur, 1994). These products also exhibit network effects, where the more people use the products, the more valuable they become (Katz and Shapiro, 1985). How much knowledge a firm collects is important, and one has to consider the form of knowledge that it takes - if it is tacit or explicit. Besides knowing how new the knowledge is, it is important to know how much the new knowledge is needed and how tacit it is (Polanyi, 1962).

2.8.1.9 Teece model

Teece (1986) proposed a model to help explain why organisations can profit from technologically radical innovations. People have been perplexed about why RC Cola, who was the first to introduce the diet cola still did not earn as much profits or gain leadership from Pepsi and Coca Cola. Teece (1986) argued that two factors are instrumental to profiting from innovation: the ‘appropriability’ regime and complementary assets.

The appropriability regime is the extent to which the technology can be protected from imitation such as intellectual property, protection of technology, or competencies to imitate the technology (Teece, 1986). Complementary assets are all other capabilities (besides technology related) that the firm needs. It refers to manufacturing, marketing, distribution channels, services, reputation, brand name and
complementary technologies. If the appropriability regime is weak (where technology can be imitated), and complementary assets are easily available, then it is difficult for the organisation to profit from innovation. On that account, Pepsi and Coca Cola profited from RC Cola’s innovation, because they had the brand name reputation, better distribution channels, and the innovation was easy to imitate (Teece, 1986).

2.8.1.10 Theory of environment

Afuah (1998) suggests that the environment outside the firm affect innovation. Other authors as well have agreed and written on this aspect. Thomas (1993) argues that a very demanding environment can be conducive to innovation, through the comparison of industrial policies in ten nations. His study discovered that pharmaceutical firms in the demanding United States and United Kingdom environments were more innovative, as they had strict government regulations as compared to France. Similarly, Porter’s diamond theory argues that the innovativeness of the firm depends on the four characteristics of its environment: demand conditions; related and supporting industries; firm strategy and structure; and rivalry (Porter 1990).

Afuah (1998) claims that factor conditions (such as natural resources, skilled labour, capital, educational institutions, universities and private research laboratories) which are a supply of scientific, technological and market knowledge, can be sources of local advantage. The new ideas can be nurtured into products and services. Given that such knowledge is often tacit, and accordingly best transferred in person, local firms have the advantage in exploiting an innovation (Afuah, 1998). Secondly, the nature of the local demand of products and services reflect the local firm’s ability to innovate. Customer needs, preferences and expectations should be articulated to organisations and manufacturers to provide for them. In addition, suppliers can also be critical in generating new product or service ideas, and supporting them through subsequent development and commercialisation. For example, suppliers could interact and provide input to manufacturers, to develop components or equipment. Thirdly, local rivalry could improve the ability of firms to innovate. Firms may pick up knowledge from each other, and build on it to improve and survive competition, and consequently leading to innovative ideas. Fourthly, government policies of some countries assist organisations to innovate through funding, assistance, consultancy and policies (Afuah, 1998; p. 28).
2.8.2 Models of innovation - dynamic models

2.8.2.1 Utterback-Abernathy model

Utterback and Abernathy (1978) studied the patterns of innovation in technology. They detailed the dynamic processes that took place within an industry and its firms during the evolution of a technology, from the fluid phase through a transitional phase, to the specific phase. In the fluid phase, there are market uncertainties. Technology is in a state of exigency, and firms are unsure about investing in R&D. Characteristics of products are mainly custom designs, with new product technology expensive and unreliable. Process innovation accounts for very little in the fluid phase. The basis of competition is mainly on product features (Utterback and Abernathy, 1978).

During the transitional phase, producers are better informed in meeting customer needs. They engage in product experimentation, some standardisation of components, and product design features. A dominant design emerges. This suggests reduction in uncertainty, experimentation and major design changes. The rate of product innovation decreases as process innovation takes prominence. Competition now is on the basis of differentiated products (Utterback and Abernathy, 1978).

In the specific phase, there is a proliferation of products built around a dominant design, and more emphasis on process innovation, and incremental product innovations. Materials and equipment are highly specialised, and the basis of competition is low cost. The pattern of innovation is continuous, and repeats itself when a new technology is introduced, rendering the old one non-competitive. There is discontinuity, and this plunges the innovation cycle back to the fluid phase with another wave. This model implies that firms need to have different capabilities throughout the different phases to benefit from innovation and profitability.

2.8.2.2 Tushman – Rosenkopf technology life-cycle model

Tushman and Rosenkopf (1992) explored the dynamics of innovation, and looked at the extent of a firm’s influence on the evolution of the innovation and the industry standard. They argued that this depends on the amount of technological
uncertainty, complexity of technology, and stage of the evolution. Complexity is a function of a few factors:
- the innovation’s dimension of merit and its attributes as perceived by the local environment,
- the number of interfaces between the innovation and complementary innovations,
- the number of components that make up the innovation and the linkages among them and
- the number of organisations in the local environment impacted on.

Tushman and Rosenkopfs’ (1992) technology life-cycle starts with a technological discontinuity, that can either enhance or destroy competence (Afuah, 1998). They are those “...rare, unpredictable innovations, which advance a relevant technological frontier, by an order of magnitude, and which involve fundamentally different product or process design, and that command a decisive cost, performance or quality advantage over prior product forms...” (Tushman and Rosenkopf, 1992; p.318). After the discontinuity, there is a significant amount of technological and market uncertainty, with competition for acceptance between designs using new technology. Additionally, there is competition between the old and new technologies. Thereafter, a dominant design emerges, to reduce technological uncertainty, and guides the beginning of the ‘era of incremental change’ (Afuah, 1998). At this stage, product features are established, and there is incremental innovation with technology gathering momentum, until a new technology or discontinuity occurs.

This model also suggests that firms need to have different capabilities at the various stages of the life-cycle – in terms of how effective competencies are at influencing technology evolution, with regards to complexity of the product.

2.8.2.3 Foster’s S-curve model

In discussing the Utterback-Abernathy and Tushman-Rosenkopf models, the state (or era of incremental change) ends with discontinuity. It is hard to predict this discontinuity. Foster (1986) however, argues that the rate of technology advancement depends on the effort put in, and this resembles an ‘S’-shaped curve. Technological progress begins sluggishly, then increases very swiftly, and eventually decreases, when
there are physical limits. A new curve however, takes place when new technology allows the firm to overcome the physical limit of the old technology (Foster, 1986).

2.9 The CIMA model

The CIMA model is based on collaborative research by various authors, based on their involvement in the Euro-Australian cooperation project called the Euro-Australian cooperation centre for Continuous Improvement and Innovation Management (CIMA). The model was created from a research study by Australian and European institutions for product innovation process in various manufacturing companies. This model was developed in a three-year joint study of Continuous Improvement in new product development, funded by the European Union from 1998 to 2000. It involved research from various universities and research centres in Australia and Europe. The CIMA model measures how effectively firms continuously innovate by using various variables.

The CIMA model has been designed for researchers, acting as facilitators to help companies foster and sustain the process of continuous learning in product innovation. The project began with an extensive literature study into the state of the art, in the fields of knowledge transfer in product innovation processes, Continuous Improvement, organisational learning, and enabling mechanisms for facilitating and stimulating Continuous Improvement. This resulted in a draft model on Continuous Improvement and learning, that was tested for its validity and reliability, through in-depth case studies in several companies in different countries (Hyland, Gieskes and Sloan, 2001).

It identifies a firm’s strengths and weaknesses and suggests mechanisms to be implemented by the firm to stimulate Continuous Improvement and learning. The main instrument underpinning the methodology is the CIMA explanatory model of continuous learning. The methodology helps to identify actions to foster and sustain improvement activities. The model describes the process of continuous learning within product innovation using various interrelated variables. The CIMA methodology relates to learning across boundaries integrating knowledge, transferring knowledge, abstracting and generalising knowledge, incorporating knowledge into vehicles and assimilating knowledge from external sources (Caffyn et. al., 2000).
Figure 2.2 The CIMA model for Continuous Improvement in new product development

2.9.1 Performances

Performances are the result of improvement activities carried out in the innovation process. Measures of performance include the traditional financial measures, capacity measures, and the more recently adopted measures of customer value (Hyland et. al., 2000). Continuous Improvement performance is achieved by a set of eight categories of behaviours, enacted by individuals such as creating, using and transferring knowledge. They align improvement activities with strategic goals and objectives, as well as experimenting with new solutions. The implementation and application of certain levers can influence these behaviours.

2.9.2 Levers

Levers are mechanisms for organisational control that managers can use when managing the product innovation process, even though they may not be consciously aimed at improvement and stimulating learning. If adequately oriented, however, these
mechanisms can have a substantial influence on a firm’s attitudes and practices in creating, storing and transferring knowledge. The behaviours impact on the capabilities of the organisation or strategic business unit.

2.9.3 Contingencies

Contingencies are considered as both external and internal variables to the company. External variables are related to the environment in which the company is operating, whilst the internal variables relate to the company’s characteristics.

2.9.4 Capabilities

Capabilities can only be developed over time by the progressive consolidation of behaviours, or by strategic actions, aimed at creating new assets, or at reorganising the stock of existing resources. The integrated stocks of resources accumulated over time through learning, or through deliberate decisions. These resources include internalised behaviours, technical skills, organisational routines and corporate assets. The level of an organisation’s innovation capabilities determines the efforts that are needed to influence the corresponding behaviours.

In looking at all the models highlighted in Section 2.8, the CIMA model is the most appropriate model to apply to this study. It is a dynamic model that encompasses many factors and investigates the process of innovation within the organisation. It measures how effectively firms continuously innovate by using various variables such as organisational capabilities, learning behaviours of individuals, mechanisms for organisational control, and contingencies related to the environment and internal company characteristics. However, since it is applicable for manufacturing industries only, there is a need to modify it and tailor to suit the relevant service industry for this study. This will be discussed in Chapter Four in the Thoeretical Framework.

2.10 Diffusion of innovation

The importance of reliable predictions for the successful diffusion of a new product, service or process is a key factor in the strategic planning of any organisation. The diffusion process can sometimes prevail over the innovation itself, since the adopters of the innovation generate the economic and social impacts. These impacts on the other hand, can become a stimulus for new innovations (Mahajan and Muller, 1979).
According to Rogers (1983), the diffusion of innovation is a process transmitted over time, throughout the members of a given social system, by means of certain communication channels. Rogers' definition contains four elements that are present in the diffusion of innovation process. The four main elements are:

- **innovation** - ideas, practices, or objects that are perceived as new by an individual or other unit of adoption.
- **communication channels** - the means by which messages get from one individual to another.
- **time** - three factors namely:
  
  (a) innovation-decision processes.
  
  (b) relative time within which an individual or group adopts an innovation.
  
  (c) innovation's rate of adoption.
- **social system** - a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

Such channels could be inter-personal, mass media, the type of social system involved, the timing, and the very essence of innovation has come to mean a form of communication (Rogers, 1983). It implies that diffusion is considered as the propagation of messages related to new ideas that lead to subsequent innovations, awaiting a change in the behaviour of the receiver which will be evident in the adoption or rejection of the innovation (Conde and Ruiz, 2001).

This underlying behavioural theory by Rogers (1983) insinuates that a time lag exists during the adoption period among the different members of a social system. At the beginning, the new product, service or process is adopted by a group of innovative consumers. With time, they then initiate the other imitators. This social interaction between the adopting pioneers and the different potentials of the innovation elucidates the construction of rapid expansion in diffusion (Rogers, 1983).

The diffusion of innovation process consists of four main elements: the innovation, communication through certain channels over time, and among the members of a social system. Research concerning the diffusion of innovation process
has grown considerably over many years because of its' flexibility. A similarity discovered in the various research studies on the diffusion of innovation process, is that the adoption process or the rate of diffusion can be plotted on a curve akin to an s-shape (University of Texas, 2001).

Rogers (1983) defines the innovation-decision process as the process through which an individual passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation and use of the new idea, and to confirmation of this decision. The diffusion of innovation can be pursued at the micro level such as an individual, or depicted at the macro level such as economic development or technological advances. In whichever way adopted, the diffusion of innovation theory has been known to be versatile, widely used, and relevant (University of Texas, 2001).

2.10.1 Innovation diffusion models

An examination of the literature shows that there are a number of models of diffusion adopted by various authors. The adoption process of new products or services has been measured in the models using time-series, and various variables or factors such as marketing. Jones and Ritz (1991) came up with a system of equations to reflect the distribution using retailers and consumers. Other models such as the Bass model (Bass, 1969) and the NUI model (Easingwood, Mahajan and Muler, 1983) prove to be less accurate, as they do not incorporate variables such as marketing factors. However, Mesak (1996) offered a single equation model, reflecting diffusion at the consumer’s level, combining the three dimensions of price, advertising and distribution (Mesak, 1996).

Conde and Ruiz (2001) have written that besides the socio-economic factors that influence innovation diffusion, consideration should be taken of the social, economic, political, demographic, and cultural differences in various countries. The knowledge and understanding of such factors must be predominant to the decision makers, because it could indicate how innovation should be introduced in each country which in turn, could support its commercialisation in other countries of similar characteristics (Conde and Ruiz, 2001).
In relation to the previous discussion, other researchers such as Gatignon, Eliashberg and Robertson (1989); Takada and Jain (1991); Helsen, Jedidi and DeSarbo (1993); Redmond (1994); and Kumar, Ganesh and Echambadi (1998) have considered geographical aspects in examining the diffusion of innovation among countries. They conclude that the differences in the adoption process and diffusion parameters may be illustrated by specific factors in each country beyond the firms’ control. The factors include cosmopolitan populations, geographical mobility, percentage of working women, cultural levels, prosperity and lifestyles. Another important factor is the time lag that always exists between the period an innovation is introduced into its own pioneering country, and when it is finally introduced into a late-coming country (Conde and Ruiz, 2001).

Some research projects have shown that innovation spreads in different ways among different cultures, depending on their socio-cultural and socio-economic environments (Redmond, 1994). Rogers (1983) indicated that time is one of the main factors. Takada and Jain (1991), Mahajan and Muller (1994) and Kumar, Ganesh, and Echambadi (1998) show that the longer the introduction of innovation into a country, the faster the adoption process. However, Helson, Jedidi, and DeSarbo (1993) demonstrate the opposite.

A study was conducted on three European countries by Conde and Ruiz (2001) and they found that the influence of external sources and the experience of previous adopters are basic factors in reducing uncertainty in the new adopters for innovation. Also consumer preferences, cultural, economic and social differences among the countries were found to have some effect on the diffusion of innovation.

2.11 Organisational learning for innovation

In viewing innovation, many authors tend to focus on the management and organisation of resources. An important aspect of it stems from a different perspective, as to how learning could be examined. It is crucial to know the way firms share and transfer knowledge and learning experiences. Firms wishing to develop learning strategies, that will enable them to gain a competitive advantage in the innovation process, will require open communication channels, and a culture that values the sharing of skills and knowledge (Sloan and Hyland, 2000).
Kim (1993) states that all organisations learn, whether they deliberately choose to or not. Since individuals make up the organisation, learning is, in essence, within and by the individuals (Caffyn et. al., 2000). It is necessary to understand the relationship between individual and organisational learning, and how individual learning is transferred to the organisation.

Learning is a “purposive quest to retain and improve competitiveness, productivity and innovativeness in uncertain technological and market circumstances” (Dodgson, 1993a; p.378). A learning organisation is one that facilitates the learning of all its members, and continually transforms itself (Pedler, Boydell and Burgoyne, 1989). The learning in the organisation consists of more than just individuals gaining knowledge in the simplest sense. The knowledge captured has to be shared, disseminated throughout the organisation and applied, consequently creating a culture embracing constant change (Sloan and Hyland, 2000). It is therefore the synergistic efforts of the organisation as a whole, rather than looking at the cumulative learning of individuals as reported by Hedberg (1981). Similarly, Schein (1985) wrote that there must be the internal integration of individuals within a shared culture that promotes learning. Only then, can organisational learning be effective. In addition, knowledge must be readily available to individuals as well. In another research, Hyland et. al. (2000) expressed that product innovation is a continuous and cross-functional process, involving and integrating a growing number of different competencies inside and outside the organisation.

Organisational learning has been a topic of high interest in management literature for around the past forty years (Gieskes and Hyland, 2000). Starting in the 1960s, from works by Cangelosi and Dill (1965), Bateson (1972) and Argyris (1977), there has been increasing concern with regards to organisational learning. In the 1980s, the works began to display more on conceptual aspects such as Hedberg (1981), Shrivastava (1983), Fiol and Lyles (1985), and Levitt and March (1988). Then in 1989, Pedler, Boydell and Burgoyne wrote on learning organisations as well as Senge’s (1990) infamous Fifth Discipline on building the learning organisation.
Organisations need to realise the importance of learning, in order to identify and implement management techniques and practices to improve their processes. To be successful in innovative efforts, there is a need for a transformation in behaviours, attitudes and organisational culture that requires widespread learning. The process of reviewing, evaluating and re-directing resources - that is to learn – is the defining feature of lucrative organisations. In other words, the learning behaviours will demonstrate a change in the organisation, as they become embedded, and shape the structures and culture (Sloan and Hyland, 2000). Accomplishing the sharing and transferring of knowledge, is a powerful competitive instrument, but requires competent managerial skills. Management should foster learning, by giving employees at all levels the opportunities and tools to learn from their own and others’ experience. Only then, can they use this learning to innovate according to organisational objectives (Gieskes and Langenberg, 1999). Other authors such as Salaman and Butler (1990) write that managers and workers must be able and willing to learn, and to learn from their learning. They must have the ability to learn faster than competitors. This strategy can help organisation decision makers achieve the substantive management goals of commitment, flexibility and quality (Beer, Lawrence and Mills, 1984; Ulrich, 2000; Pfeffer, 1998).

During problem solving, when employees find out what is wrong in the process and how to correct it, this reflects single-loop learning. Wang and Ahmed (2002) claim that the attainment of total quality management requires double-loop learning, where employees not only ask what is wrong and how to make corrections, but also move on to question why the errors occur, and how to make modifications, in terms of both quality techniques and the organisation’s underlying norms, policies and objectives, so that errors can be prevented. This double-loop learning process involves knowledge refinement and knowledge creation. According to Couger (1996), both the single and double loop learning process lead to a problem solving approach which involves the process of defining the problem, searching for alternatives, and selecting the best solution (Couger, 1996). In terms of innovation, both levels of learning are associated with Continuous Improvement. Radical changes may occur through the accumulation of incremental changes.
Wang and Ahmed (2002) propose a new concept of the triple-loop learning. It involves knowledge creation, and is about re-evaluating all existing techniques and systems, reconsidering where the organisation should stand in the marketplace, and how to redefine existing techniques and systems, develop new concepts, and even change fundamentals of judgement. Coupled with organisational creativity, it becomes the main prescription for the creative quality process, and quantum leap in an organisation, i.e. value innovation. There is an interaction between tacit and explicit knowledge (Nonaka and Takeuchi, 1995), and this interaction is critical in the triple-loop learning process. (This concept of tacit and explicit knowledge will be elaborated in Section 2.12 on Knowledge Management).

Innovation can be seen as a learning process that sustains competitive advantage according to Caffyn et. al. (2000). R&D has a primary role in generating knowledge, and can assist the flow of information throughout the organisation. Learning can be equated with knowledge development and accumulation (Carlsson, Keane and Martin, 1976). Organisations need to have “internal diversity in strategies, structures, people and processes to facilitate different kinds of innovation and organisational learning” (Sloan and Hyland, 2000; p.681). A stable yet diverse workforce is valuable in reducing the costs associated with training and educating employees.

2.11.1 Mechanisms for learning

The literature from various authors such as Geus (1988); Stata (1989); Pedler, Boydell and Burgoyne (1989); Senge (1990); Hedberg (1981); Leonard-Barton (1992); McGill, Slocum and Lei (1992); McKee (1992); Dixon (1992); Dodgson (1993b); Bowen et. al. (1994); and Leroy and Ramanantsoa (1997) have provided empirical studies aimed at identifying mechanisms for learning. Studies by these authors were done in the context of factors affecting the direction, content and amount of learning. These mechanisms can be summarised in the following table:
### Mechanisms for learning

<table>
<thead>
<tr>
<th>Organisation strategy and goals</th>
<th>The strategies and goals of the organisation should be made clear to employees as they guide and focus learning processes through communication on strategic decisions and activities.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance measurement</td>
<td>The performance measurements in the organisation facilitate the development of shared perception of a gap between actual and desired state of performance. They include benchmarking and reward systems. These gaps could then be regarded as opportunities for learning.</td>
</tr>
<tr>
<td>Human resource management practices</td>
<td>The human resource management practices could help in the process of learning by providing opportunities to develop and change behaviours, skills and increase knowledge. For instance, the company could engage in human resource development, managerial rotation, teamwork, education and training, and bringing in people from the outside with new knowledge.</td>
</tr>
<tr>
<td>Organisational arrangements (structural and integration mechanisms)</td>
<td>The organisation could deploy additional resources or special arrangements in enabling learning and development; such as small teams, temporary teams, appointment of gate-keepers or boundary spanners who connect the organisation to the realisation of its goals and relate parts of the organisation and processes.</td>
</tr>
<tr>
<td>Project planning and control mechanisms</td>
<td>The organisation could also influence the behaviour repertoires by setting standard operating procedures and protocols. In this way, they can constitute a set of expected behaviours and outcomes as employees conform and adapt to the rules as set.</td>
</tr>
<tr>
<td>Computer based technologies (including ICT and design tools)</td>
<td>The information and technology that the organisation institutes can also steer the direction of and enhance communication and cooperation. With ICT and designing the mechanisms, there will be standardisation and normalisation of employee behaviours and learning processes.</td>
</tr>
</tbody>
</table>

Table 2.4 Mechanisms for learning

Adapted from Caffyn et al., 2000.

The effectiveness of such mechanisms tends to be depicted in different patterns of behaviours, decisions, improved output and performance.

#### 2.11.2 Cultural diversity and learning

Schein (1996) wrote about the classification of management culture which is useful in analysing cultural diversity. There are implications for understanding learning in organisations. He identified three distinct cultures of management. Schein (1996)
argues that organisational innovations fail due mainly to learning failures. This in turn, is caused by the misalignment of his three cultures; namely the internal operator culture, engineering culture and executive culture, both of which are external. By aligning the cultures, there are successful communication, alignment of group values, morals and ethics of the workforce (Schein, 1996).

Most firms contain a mix of functional roles with the diverse nature of individuals. Companies face the challenge of managing and capitalising from the diversity of their workforce with regards to culture, age and gender mix. It is important to consider besides the age, gender or ethnic origins of employees that influence their action, performance and contribution. There are also other aspects such as competencies, occupational background and training, that play a crucial role (Hyland et. al., 2000).

Most countries face an increasingly diverse workforce, with the changing social structures and globalisation of businesses. There are more ethnic groups, older people and women in the workforce now as compared to before. These impel organisations to employ a different perspective, and to recognise the need of a more diverse workforce. For instance, they will bring a wide range of backgrounds, interests, points of view, and different ways of doing things (Abbassi and Hollman, 1991). On that account, organisations that are flexible, and able to respond successfully, will reap the benefits and have a competitive edge. They have to be aware, adopt existing structures and practices to develop a more open, flexible system, to provide an environment conducive to learning and development. These organisations that support diversity, will facilitate approaches to problem solving, creativity in the workplace, learning, and most of all innovation. There will also be lower employee turnover, greater satisfaction, productivity, better quality and organisational performance (Hyland et. al., 2000).

Granstand, Patel and Pavitt (1997) did a study on large technological firms, and discovered that the workforce diversity had a positive impact on the generation of technological advances and innovative practices. The concept of sub-cultures (i.e. divisions, groups, departments or work teams) also needs to be addressed. The group affiliation and conformity are strong determinants of the behaviour of individuals within organisations. If there is respect and understanding for the differences between
individuals or groups, the result will be improved relationships, productivity and greater output (Hyland et. al., 2000). Cox and Blake (1991) also address diversity as the most significant impetus influencing organisational change strategies. There lie further pressures on management to recognise such diverse cultures (Vitiello, 1998). Adler (1991) did a UCLA study on culturally homogenous and heterogeneous groups. He discovered that the heterogeneous groups were apparently more productive than homogenous groups.

2.11.3 Barriers to learning

Despite all the attention on organisational learning written by various authors, there were relatively less assessment or empirical research on obstacles to learning. Miner and Mezias (1996) also correspond with this view that there is little information conducted on barriers to learning. To foster successful learning in organisations, it is important for management to research and identify potential barriers to learning. This would then assist in streamlining methods and strategies on overcoming such barriers and defensive mechanisms. The obstacles that have been written by some authors will be discussed.

Hedberg's (1981) arguments skew towards the limitations of man’s short-term memory that may prevent the impetus from being perceived. For the organisation to learn, Hedberg states that the people will first have to unlearn, to pave for new responses. On the other hand, Levinthal and March (1993) postulate their theory of learning myopia. They reported that the mechanisms for learning which lead to improvements concurrently could also limit those improvements. The obstacles here associate with the individual, the organisation, as well as the relation between individual and organisation (Gieskes and Hyland, 2000). Also the barriers could be behavioural, or psychological, or both. For instance, Leroy and Ramanantsoa (1997) observed that impaired learning occurs when there is a resistance between behavioural change and cognitive change.

Senge (1990) writes about the importance of mental modes in learning. There are different types of mental modes that people uphold, and they are the ones that guide their actions and thinking in general. The barriers, as written by Gieskes and Hyland (2000) can come under various terminology. According to Senge, they are termed as
learning disabilities. Other authors define barriers using various terms such as learning errors (Marsick and Watkins, 1990), barriers to innovation (Quinn, 1985), learning barriers (Shaw and Perkins, 1991), learning obstacles (McGill and Slocum, 1994) and Organisational Learning Disorders (OLD) (Snyder and Cummings, 1998).

Furthermore, empirical research found that barriers are, as a matter of fact, the operationalisations of the previous conceptual barriers (Gieskes and Hyland, 2000; p.170). These include information systems, reward systems, human resource practices, leaders’ ruling, structure of departments, measurement and control systems, organisational culture, short-term orientation, and lack of management support (Morgan, 1986; Stata, 1988; Hayes, Wheelwright and Clark, 1988; Dixon, 1992; Dodgson, 1993b; McGill and Slocum, 1994; Bowen et. al., 1994; Miner and Mezias, 1996).

It is the role of management to comprehend these barriers, and facilitate organisational learning. They have to generate and encourage individuals to be more questioning, to surface their views, be evaluative of procedures, and make attributions to outcomes. This is provided that individuals have the necessary valid information, informed choice, personal responsibility for monitoring their performance and act rationally (Argyris, 1996).

2.11.4 The need for trust in learning

Bijlsma-Frankema (1999) asserts that organisational learning and trust are related. She argues that inter- and intra-organisational relationships are moving upwards, as changes are evident in the social structures of societies, economic exchange relations and organisational forms. There are more lateral relationships, network forms and alliances in contrast to the hierarchical relationships that used to dominate the framing of work relations (Sheppard and Tuschinsky, 1996). Other authors also hover around the issue that regular interaction, dialogue and positive exchange experiences not only stimulate learning, but also promote trust (Argyris, 1983; Nonaka and Takeuchi, 1995; Creed and Miles, 1996; March and Olsen, 1975). Trust is seen as being of considerable importance in the process of building and maintaining relationships (Lagace, Dahlstrom and Gassenheimer 1991; Morgan and Hunt, 1994; Oakes, 1990).
In her case study involving 552 employees from a health care organisation, Bijlsma-Frankema (1999) found that the lack of organisational learning and innovation are linked to low levels of trust in (vertical and horizontal) relationships. Uncertainty seems pivotal in organisational learning. It implies that people have to unlearn knowledge and actions that were relied upon, and embark into the unfamiliar, without much certainty (Bijlsma-Frankema, 1999). It is further argued that trust is an important factor in situations of innovation. "Without trust, risk is avoided, innovative actions dry up, only routine actions are available for retrospective sense making, and uncertainty remains unsolved" (Meyerson, Weick and Kramer 1996; p.179). As March and Olsen (1975) reasoned, trust promotes willingness to engage in interaction, and learning to share seeing, liking and relevance with others- all favourable conditions to learning. Distrust however impairs learning.

2.12 Knowledge management

Management is increasingly aware that knowledge resources are essential to the development of their organisations. Knowledge management is a process that deals with the development, storage, retrieval and dissemination of information, and expertise within an organisation to support and improve its business performance (Gupta, Iyer and Aronson, 2000). Knowledge can be conceptualised as tacit and explicit, as first distinguished by Polanyi (1958). Nonaka and Takeuchi (1995) contend that often companies overlook intangible factors such as insights, intuitions, hunches, values, images, metaphors and analogies that could add value to their daily operations.

Tacit knowledge is in the field of subjective, cognitive and experiential learning; whereas explicit knowledge deals with more objective, rational and technical knowledge. Tacit knowledge is developed in and strongly bound to actions of individuals. It is hard to communicate to others outside the range of such actions. Training on the job is a good method to learn the tacit knowledge of others. Explicit knowledge is more formalised knowledge that can be more easily communicated to others, because it is less context bound. Nonaka and Takeuchi (1995) reasoned that organisations gain competitive advantage by making use of their tacit knowledge, because it is a rich source of problem signals and ideas about possible solutions. Organisations must recognise the need to integrate both knowledge types, to convert tacit into explicit knowledge, for effective productive output from employees. This
effective concept has conceived the development and importance of knowledge management, and its application to organisations (Nonaka and Takeuchi, 1995).

Knowledge management is still a relatively new, but important topic in management. Leading companies from different industries such as Matsushita, Toyota, Price Waterhouse Coopers and Microsoft have reshaped their organisations in order to become more effective in knowledge management (Bartezzaghi et. al., 2000). Knowledge management today is not a single emanation of literature, but still reflects its very diverse roots. Much literature on knowledge management comes from studies on organisational learning. The work by Nonaka and Takeuchi (1995) refers to the concept by Senge (1990) of learning organisations, and even earlier works by Argyris and Schon (1978). Innovation management is another field related to knowledge management, with a large number of contributions from various fields such as Continuous Improvement, R&D management, and new product development (Bartezzaghi et. al., 2000). Strategy has also emphasised the resource-based view of the firm, noting its capabilities, strengths and weaknesses which are critical in changing conditions (Grant, 1991). In addition, Hamel and Prahalad’s (1994) notion of core competencies to competitive advantage are fundamentally derived from knowledge based origins (Bartezzaghi et. al., 2000).

According to Carneiro (2000), knowledge and information technologies are the critical success factors for strategic formulation. Such strategies and their implementation should be supported by a set of informational data and a knowledge development process (Carneiro, 2000). Knowledge is befittingly seen as more important, as management is taking into account the value of creativity. This creativity enables the transformation of one form of knowledge to the next level, where a new perceived value is created. Consequently the knowledge evolution affects the innovation course to a large extent (Carneiro, 2000).

Organisations should develop a feasible strategic knowledge system. The valuable asset of any organisation owes to its human attributes, and managers should distinguish between the different levels of knowledge. For instance knowledge workers such as strategists, engineers, technicians and researchers render valuable insights and values to the company. They are the core intellectual competence of the firm, and know
how to optimise the situation relevant to decision making. According to Carneiro (2000), they are the ones that create the most value in some industries, and increase innovation and competitiveness, as evident in software, pharmaceutical, health care, communications, consulting and financial services (Carneiro, 2000). Other authors also support this idea and state that knowledge workers are often exposed to incomplete information on new events and modifications, but they have the option to search for additional information to update their knowledge levels (Ozanne, Brucks and Grewal, 1992; Burke, 1990).

Employees' knowledge levels can be an asset if they are enhanced and efficiently used to benefit the organisation. Managers have to organise and motivate the development of the human resources, to support innovation and creativity (Brooking, 1996). They should consider and focus more attention on the intellectual capital of their organisations and innovation structure, as these people could be one of the real sources of future competitiveness (Leonard-Barton, 1995). Similarly, Mowery (1983) elucidates that there are higher knowledge levels in dynamic industries which lead to new products, services and innovative processes. Institutions such as universities and government laboratories, provide an important role, with their research and assistance to industries, proposing incremental innovation (Mowery, 1983). Management needs to show more interest in the intellectual capital, the importance of creativity, the need to sustain a constant flow of innovation, and the new concept of the learning organisation (Carneiro, 2000).

2.12.1 Competitiveness and knowledge management

From the discussion above, knowledge management is a valuable strategic tool, as it could be a major source for the formulation of strategies. Often companies use it in the decision making process to envision competitive strategies. Combining knowledge management with innovative efforts, updated information technology and knowledge development, could assist an organisation achieve a set of capabilities to increase its competitiveness (Carneiro, 2000).

In a dynamic business environment, the competitive advantage of firms is rooted in their efforts to develop or capitalise on knowledge development. Managers should ensure that there are opportunities to harness knowledge development for competitive
strategies, and possibilities based on innovation and competitiveness (Carneiro, 2000). In this necessary circumstance, firms could use their capabilities to generate radical changes in the processes and technologies, to become flexible, to adapt the resources to the strategic formulation (Page, 1993). As such, knowledge management is considered a key factor for the organisation's performance (Keen, 1991). The personnel or expertise need to be effectively motivated, to constantly deepen their levels of knowledge.

According to Goel and Rich (1997), innovative efforts, and the adoption of new procedures, and new technologies may increase competitiveness. Knowledge and information (derived from data) are essential for competitive push, to improve customer satisfaction, develop new products, services or processes, and provide quicker response. Firms are able to achieve excellence through these flexible capabilities (McFadden and Hoffer, 1994). Through efficient knowledge management, firms could better anticipate problems, experiment and innovate, as these opportunities facilitate firms to analyse and evaluate the environment, respond effectively, and contribute greater efficiency in achieving organisational objectives (Dutta and King, 1980).

2.12.2 Innovation and knowledge management

Carneiro (2000) states that new management philosophies are aware that information is the result of knowledge evolution, and that a solid network between intellectual effort and technological innovations is emerging. The investments in developing knowledge of human capital have also resulted in innovation (Carneiro, 2000). Other authors such as Harari (1994), Nonaka (1994) and West (1992) have established that organisations that stimulate and improve the knowledge of human capital, are more able and prepared to face rapid changes and innovate. This is because the skills and motivation level of human resources provide the means of creating suggestions, proposals and research activities to fabricate innovations (Carneiro, 2000).

Knowledge management then is about harnessing the intellectual and social capital of individuals, in order to improve organisational learning capabilities, recognising that knowledge, and not simply information, is the primary source of an organisation's innovative potential (Marshall, 1997; Castells, 1996). The objective of knowledge management can be to enhance exploitation or exploration (Levinthal and
March, 1993). The reason for exploiting is to reduce problems of reinventing the wheel, by using the existing knowledge more effectively. This may be important for innovation. Exploration through knowledge sharing, also allows the development of genuinely new approaches (Swan et. al., 1999). Innovation should be perceived as a complex process, involving a set of investments; and knowledge considered as a major sort of capital. Due to this, the success of innovation is unquestionably dependent on the development and management of knowledge, as well as the efforts of human capital.

2.12.3 Knowledge Innovation

According to Amidon (1999), knowledge management has become a well-known term. But the real challenge facing most companies is that of faster innovation. Creating the system within which ideas are created and applied, is more than management alone. Strategy and leadership come in, and evolve the concept of Knowledge Innovation. Knowledge Innovation is the creation, evolution, exchange and application of new ideas into marketable goods and services for the success of an organisation, vital for the economy, and advancing society as a whole (Amidon, 1999). Knowledge Innovation actualises the competence of innovation for the future, and addresses fundamental management dimensions in its process. Knowledge is therefore the core component of innovation, and needs nurturing and managing (Amidon, 1999). Knowledge Innovation is a unique term defined by Amidon (1999) to distinguish from knowledge and innovation approaches. Her core concepts to render it different are as constructed in the following table:
### Concepts of Knowledge Innovation

<table>
<thead>
<tr>
<th>Innovation value system (not value chain)</th>
<th>Value chain thinking is linear and static. However, the innovation value system is dynamic and shows all the interdependent relationships that are needed to be developed for successful innovation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic business network (not strategic business units)</td>
<td>Strategic business unit management tends to create isolated pockets of knowledge. But the strategic business network encourages the flow of knowledge between partners, customers, suppliers, research organisations and other stakeholders (including competitors) in the innovation process.</td>
</tr>
<tr>
<td>Collaborative advantage (not competitive advantage)</td>
<td>Competitive strategies create win-lose scenarios, often competing for a share of the same pie. Collaborative strategies on the other hand, encourage win-win situations through symbiotic relationships. Knowledge grows and the pie gets bigger for all.</td>
</tr>
<tr>
<td>Customer success (not satisfaction)</td>
<td>Customer satisfaction meets today’s articulated needs. A focus on the success of customers helps to identify future unarticulated needs that are the source of growth and future success.</td>
</tr>
</tbody>
</table>

Table 2.5 Concepts of Knowledge Innovation

*Adapted from Amidon (1999).*

#### 2.12.4 Knowledge management versus knowledge innovation

According to Amidon (1999), knowledge management practice is based on sharing information. Best practice is an example. But organisations are looking ahead, and developing the role of knowledge in innovation for future success. They have to look beyond Continuous Improvement and sharing existing knowledge. There is no doubt that knowledge management is effective and a necessary prerequisite, but knowledge innovation is one step further on the management performance trajectory that integrates knowledge management with innovation management (Amidon, 1999).

According to Roffe (1999), knowledge is central to innovation activities. This argument was also maintained by Leonard-Barton (1995). In Leonard-Barton’s view, knowledge is a core capability, and she considered mechanisms for importing and absorbing knowledge, transferring knowledge across the organisation, and developing new knowledge bases. She also introduced the notion of creative abrasion, where different knowledge bases are gathered through open discussion between individuals.
with different perspectives. If there is any conflict, and is successfully managed, the result can be new, creative and exciting ideas. Similarly, creativity breeds innovation (Gundry, Prather and Kickul 1994; Pascale, Carland and Carland 1997; Perry, 1995; Ramsey, 1997).

2.13 Creativity for innovation

The generation of ideas is a critical element of the innovation process, and creativity is the thinking process that helps generate these ideas. If creativity is enhanced, then during problem solving more alternatives, novel approaches, or unique solutions are likely to emerge. Amabile (1996) categorises specific environmental factors that affect the creativity in individuals. They are group climate; freedom; autonomy; supervisor support; and rewards. The environment has to be supportive. Management too needs to stimulate creativity in the employees, originate new ideas, and develop them into something of value.

Many authors have proposed various methods to foster the creative talents and thinking in employees in the organisation. For instance, Buzan and Buzan (1993) came up with the concept of mind mapping. Its radiating structure enables the rapid expansion and exploration of ideas to occur. It is well suited to creative thinking, because it utilises all the skills commonly associated with it, especially imagination, association of ideas, and flexibility. Majaro (1988) suggested techniques that can support in generating ideas such as brainstorming, metaphorical analogy, trigger sessions, wildest ideas session, morphological analysis, scenario writing and suggestion schemes. Similarly the fishbone diagram developed by Ishikawa (1990) is a technique to help a group to brainstorm, identify and list all the possible causes of a problem. The problem, sub-problems and causes resemble the bones of a fish when it is complete, and the whole process of analysis and discussion can be a useful trigger point for creative thinking as it focuses the mind fully on a problem. Moreover, experience has shown that during group discussions this method helps to keep the focus and brings each relevant factor into the open. The technique is commonly used in quality improvement groups or circles (QCC). Indeed, the work and benefits of small group improvement activities, or on Continuous Improvement in organisations, are pertinent to creativity, and assist in the Continuous Innovation process. In addition, McAdam and McClelland (2002) regard individuals as the building blocks of the organisation. Managers should
be aware that encouraging creativity at the individual level will ultimately improve creativity at the group level and benefit the organisation.

Amabile’s (1996) theory of creativity suggests that there are three components to individual creativity. They are namely expertise, creative-thinking skill, and task motivation. This is summarised in Table 2.6.

<table>
<thead>
<tr>
<th>Component</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expertise</td>
<td>The individual needs to possess relevant skills or knowledge in the problem area. This may be influenced by the education level and experience of the individual.</td>
</tr>
<tr>
<td>Creative-thinking skill</td>
<td>This refers to the ability to consider different perspectives with intellectual independence. It may be influenced by knowledge of the many, possible creativity enhancing techniques such as brainstorming.</td>
</tr>
<tr>
<td>Task motivation</td>
<td>Intrinsic motivation is needed for the task to motivate the individual, and for the individual to produce ideas. It is more conducive to the processing of divergent information than extrinsic drivers (rewards, goals, constraints). If a company attempts to add extrinsic to intrinsic motivation to assist creativity, the success will be determined by the person’s initial motivational state prior to the task, the type of extrinsic motivation and its timing.</td>
</tr>
</tbody>
</table>

Table 2.6 Components to individual creativity

2.13.1 Fostering an environment for creativity

The environment or climate in the organisation is one of the most difficult areas to develop or change (Roffe, 1999). It needs total commitment and involvement from senior management to start with. Roffe (1999) states that a climate open to creativity is characterised by certain features of management. Firstly, managers are open-minded to encourage flexibility and group involvement. The managers need to be perceptive in seeing things from the employees’ point of view, respecting everyone for their diversity. In addition, they are required to motivate the expression of ideas, encourage employees to find answers creatively, and give clear objectives and specific feedback.

Continuous organisational creativity can be promoted by managers and organisations through various fundamentals (Robinson and Stem, 1997). These are, firstly, alignment, whereby the focus and actions of all employees are directed toward
organisational goals. Secondly, self-initiated activity refers to responsible individuals and teams, who own problems and their solutions, so that intrinsic motivation is raised. Thirdly, it includes informal activities which occur in the absence of direct official support. There is, fourthly, an element of coincidence, where sometimes, fortunate accidents can result in discoveries through insights. The fifth point is the existence of diverse stimuli, important for providing fresh insight into existing or identifying new activity. Finally the last point is the internal communications of the company, both planned and unplanned which are important to provide clear lines of communication (Robinson and Stern, 1997).

2.14 Effective communication for innovation

Communication is defined as effective if it generates change in the receiver's behaviour that was intended by the information source (Rogers and Shoemaker, 1971; Rogers and Agarwala-Rogers, 1976). The intended change in receiver behaviour should, for the purpose of innovation, involve a cognitive change (a change in knowledge). The effectiveness of communication depends on the quality of the communication flows (Lievens and Moenaert, 2001). In addition, communication contributes to the reduction of innovative uncertainty (Zaltman, Duncan and Holbek, 1973; Fidler and Johnson, 1984; De Meyer, 1985; Allen, 1985; Moenaert and Souder, 1990; Souder and Moenaert, 1992).

Majaro (1988) stressed that the purpose of creating an effective communication system is to determine that a systematic channel catches and examines as many ideas as possible from employees. Similarly, Burns and Stalker (1994) stated the prerequisite for an innovative organisation, is to have a method of communicating ideas existing at all levels. Kanter (1984) also supported this idea, and stated that it is a characteristic of integrative organisations, where innovation thrives. In addition, she proposed several important elements necessary to reduce the segmentalism apparent in organisations: the encouragement of a culture of pride in the firm's own achievements; the reduction of layers in the hierarchy; and the improvement of lateral communication, and giving increased information about company plans. The organisational structure is therefore, a critical determinant of the communication system, and ultimately, innovation activities in particular (Lievens and Moenaert, 2001). Organisational structures that discourage the communication of ideas and flexibility impede innovation, since access to other
ideas and other innovators is very important. Communication and collaboration are well recognised factors in stimulating ideas, since individuals, groups, and organisations can learn from each other only if they communicate (Nonaka and Takeuchi, 1995).

2.14.1 Communication in cross-functional teams

Cross-functional communication, by means of internal communication or cross-functional teams, enables people to become involved in all parts of the organisation, and makes innovations useful to everyone (Roffe, 1999). There must be openness, sharing and knowledge transfer in ensuring that ideas are implemented into valuable organisational innovations. This will increase the quantity and quality of information, and help people to gain different perspectives for innovative ideas. Drucker (1992) also states the importance of cross-functional teams, and highlights the issue facing large inflexible organisations. Because of their size and traditional hierarchical structures, they might not have the advantage of smaller firms in terms of lateral communications, cross-functional teams, and task forces (Drucker, 1992). Drucker views successful innovations evident in cross-functional teams, with people from all departments, when they participate. Innovative organisations according to Quinn (1985) should reorganise to create many smaller divisions to allow creative teams to operate and encourage new ventures (Quinn, 1985).

2.15 Culture and climate for innovation

The adoption of innovation requires commitment, investment, R&D and resources in general. However, becoming innovative demands a preconditioned set of behaviours from the employees. Buckler (1997) contends that innovation is an environment, a culture that exists in the company and drives value creation. It requires an organisational culture that constantly guides the people to strive for innovation, and a climate that is conducive to creativity (Ahmed, 1998b). Management should encourage change to occur throughout the organisation, and back decisions with actions that create an environment comfortable enough for employees to innovate. Culture is a primary determinant of innovation. It has multiple elements, and needs to be matched with the appropriate organisational context (Ahmed, 1998b).
2.15.1 Organisational climate

According to Ahmed (1998b), the term climate historically originates from Kurt Lewin (1945) and Douglas McGregor (1960). Lewin (1945) indoctrinated leadership styles that create the social climate, and McGregor (1960) conceptualised his theories of people classified according to theory X and theory Y groups. They used the term to refer to social climate and organisational climate respectively. Climate here is implied through the organisation’s practices by its members, procedures, reward systems deployed, and these are indicatory of the way the business functions. It therefore epitomises the organisation’s true priorities (Ahmed, 1998b). According to Schneider, Gunnarson and Niles-Jolly (1996), in order for innovative capabilities to be sustained, firms should try to attain a fervent climate. There are different dimensions of climate in the organisation as follows:

2.15.1.1 Nature of interpersonal relationships and effective communication

The interpersonal relationships refer to the relations between the employees themselves, as well as with the management of the organisation. For instance, the relationships should be based on collaboration with reciprocity, in contrast to competitive feelings. Newly recruited members should feel valued and a sense of belonging to the organisation, and subsequently innovate (Schneider, Gunnarson and Niles-Jolly, 1996).

2.15.1.2 Nature of hierarchy

The decision making system should be democratic through consensus and participatory activities from employees at all levels. Allowing employees to work in teams or groups also helps inspire the spirit of comradeship and good working relations. There should be just treatment to all employees, regardless of their position in the organisation (Schneider, Gunnarson and Niles-Jolly, 1996).

2.15.1.3 Nature of work

Managers should make their subordinates want to do well, and appeal to their interests. This could be done by showing faith in employees’ abilities, and by giving them more challenging work. Often, flexible job definitions such as job rotation or enlargement relieves routine and mundane work. In this way, employees feel motivated and the pride for their jobs will be actualised. Management should also express
appreciation for work well done. All these factors would then contribute to a climate facilitating innovation.

2.15.1.4 Focus of support and rewards

In any organisation, the management should consider the aspects of performance that are to be appraised and rewarded. Employees should be able to get support for certain projects, action or behaviours, to feel that they are important in the organisation. In addition, the recruitment process will determine if employees are appropriately qualified and competent for the job (Schneider, Gunnarson and Niles-Jolly, 1996).

The parameters as highlighted paint a picture of the climate of an organisation. Employees formulate their meaning through the sources about the organisational environment in which they work, and comprehend the priorities accorded to certain goals that the organisation espouses. The concept of climate is closely allied to and reflects the culture of an organisation (Ahmed, 1998b).

2.15.2 Culture and innovation

Innovation also rests on culture - the values, rules, customs and incentives that govern the way people work, and the way organisations function. It is much more intricate than climate in the sense that it operates at a deeper level (Ahmed, 1998b). The concept of corporate culture has developed from anthropological attempts to understand whole societies. The term over time has come to be used for other social groupings, ranging from whole nations, corporations, department and even teams within businesses (Ahmed, 1998b).

But a culture of innovation paves the way for organisations to encourage people's talents, so they can contribute entirely, and it also serves to attract and retain employees that will help the organisation succeed in the future. As intellectual capital and customer focus become the direction of today's knowledge economy, it is insufficient to have the best or lowest-cost product, or even the largest market share. It is by breaking the organisation's old habits and establishing new ones, as well as creating an environment where new ideas result in action. It is necessary for firms to recognise and even reward experimentation and failures. With a culture of innovation,
firms will be able to create an enduring change and an increase to shareholder value (Brafman and Folmer, 1998).

There are numerous definitions of culture according to various authors. Essentially, it sums up to the institutionalised ways and the implicit beliefs, norms, values and premises which underline and govern behaviour (Ahmed, 1998b). Culture can be distinguished into explicit or implicit. Explicit culture represents the typical patterns of behaviour by the people, and the distinctive artefacts that they produce and live within. Implicit components of culture are the values, beliefs, norms and premises which underline and determine the observed patterns of behaviour (Ahmed, 1998b). It is imperative to discern both types because they accentuate that it is easier to manipulate the explicit aspects when trying to construct organisational change. A change in implicit culture would require modifying the set of values of people, and should be done through methods where values are altered unconsciously (Ahmed, 1998b).

The strength of a culture depends on two things; namely the pervasiveness of the norms, beliefs and behaviours in the explicit culture, and the match between the implicit and explicit aspects of culture. It is also important to consider the norms as suggested by O’Reilly (1989), who states that norms vary along two dimensions: the intensity (approval/disapproval of an expectation) and the crystallisation (prevalence of norms shared). There may be instances in the organisational culture, where values are held widely (crystallisation), but without intensity or vice-versa. It is only when there exists both intensity and crystallisation that there is a strong culture prevalent. This explains why it is difficult to change or develop existing culture (O’Reilly, 1989).

According to Denison and Mishra (1995), any theory of cultural effectiveness must incorporate a broad range of issues and phenomena extending from core assumptions, visible artefacts, and social structures to individual meaning. There is no universal theory of culture, as it is very difficult to measure and compare cultures across organisations.

On the other hand, works from authors such as Burns and Stalker (1961), Lawrence and Lorsh (1967), Peters and Waterman (1982), and Wilkins and Ouchi (1983) have attempted to espouse theories of culture and its effectiveness in
organisations. Their studies have produced evidence, that culture does indeed have some importance to organisational performance and effectiveness. Deshpande, Farley and Webster (1993) have consolidated numerous studies, and support the idea that culture does have a link to innovativeness. Similarly, Ekvall (1993) did a study to support the correlation between culture and innovation.

Hofstede (1980) conceived culture as a construct that displays itself in an organisation as a result of the organisation's location in a particular society (Wallace, Hunt and Richards; 1999). By analysing 88,000 survey respondents in 66 countries, Hofstede (1980) devised four dimensions of culture as follow:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individualism</td>
<td>the extent to which people are oriented towards self-interest versus an orientation towards the interests of a wider group of which they are a part.</td>
</tr>
<tr>
<td>Uncertainty avoidance</td>
<td>the extent to which people seek to minimise uncertainty versus the extent to which they are tolerant of ambiguity.</td>
</tr>
<tr>
<td>Power distance</td>
<td>the extent to which relationships between superior and subordinate are distant and formal versus close and informal.</td>
</tr>
<tr>
<td>Masculinity</td>
<td>the extent to which success is defined in terms of assertiveness, challenge and ambition, rather than in terms of caring and nurturing.</td>
</tr>
</tbody>
</table>

Table 2.7 The four dimensions of culture by Hofstede

In the area of innovation, culture comes down to shared attitudes, values and beliefs. It determines how well people encourage creativity, risk-taking, entrepreneurship, and networks to share knowledge and ideas. Culture is reflected in the behaviour of employees such as how priorities are pursued, how they integrate themselves, and relate to other organisations. Culture may exist at many levels - corporate or service organisation, sector, community, region, province or even country.

Culture reinforces the behaviour and strategies required to succeed in any given environment. However, it is important to realise that the environment prescribes culture
as well. If employees work in a business environment that favours, or is to innovation, then such behaviour will become prevalent. The more demanding the environment in certain respects, the more likely the organisation or individual is to respond innovatively (Buxton, 2000).

Competition creates a demanding environment, as demanding customers arrayed with a choice of suppliers tend to force companies to innovate. Each competitive environment tends to foster its own type of innovation culture. For example, a manufacturing company could consist of different corporate cultures than a service firm (Buxton, 2000). Also, firms that exist as monopolies, will have fewer impetus to innovate. Recognition of this fact has led to the termination of certain monopolies such as the telecommunication industry. This in turn, has evidently effectuated increases in productivity, performance and improvements in service to customers.

2.15.3 Sustaining a culture for innovation

The organisation needs to create an atmosphere that fosters innovation by reverting to its natural entrepreneurial state, and focusing on the primary factors that effect the cycle of creativity (Braffman and Folmer, 1998). In order to do this, certain critical factors have to be taken into account. These factors are examined briefly in this section.

2.15.3.1 Leadership

The team of senior personnel such as managers and executives, need to focus on the same goals and directions. They must embrace the vision for the future which is critical to an innovative organisation. The team must elicit the needs of both the organisation and the market, thus being able to lead by influential methods, rather than dominant authoritative means. More importantly, leadership is not always confined to higher level personnel, but should be embedded throughout the organisation through empowerment. Everyone should be sanctioned to lead and demonstrate potential qualities in the organisation (Braffman and Folmer, 1998).

2.15.3.2 Organisational structure

It is more effective to innovate when organisational structures are flat, without much hierarchy, including broad roles and effective teams in personnel. According to
Burnside (1990), the use of highly participative structures and cultures will increase innovation. He argues that organic structures are more effective than mechanistic structures. In the organic structure, there is freedom from rules, a lot of interaction, participation and informal relations, giving rise to less bureaucracy and red tape. There is more scope for communication between management and subordinates, enhancing participatory decision making, and airing views and suggestions by employees. The organisation becomes more flexible with respect to its changing needs (Burnside, 1990).

2.15.3.3 Competencies

Once the organisation embraces a culture of innovation, it will need to advocate and measure the innovative behaviours for developing a process in aligning remuneration, rewards and competencies. Consequently, it is strategic to construct performance targets, measurement mechanisms and reward systems so that the employees will be more zealous, motivated and willing to take risks, if they are appreciative of the potential rewards (Brafman and Folmer, 1998).

2.15.3.4 Customer intuition

A continual link with customers can assist in forecasting what customers will desire in the future, allowing the organisation to stay ahead in the industry, and reap the benefits of innovation. In addition to constant customer communication, the firm will require a process to channel frontline data throughout the organisation. All personnel should be made aware of customer focus in their work, and be constantly kept abreast of new developments with updated information (Brafman and Folmer, 1998).

Continuous Innovation occurs largely because senior management recognise the value of innovation, and manage their companies' value system and climate to support it (Quinn, 1985). A two and a half year international study of firms was undertaken to look at their innovation process. Quinn (1985) concluded that for successful innovative firms, the culture and corporate strategy are mobilised to support innovation and creativity. In addition, he found that managers take active roles in leading the innovation process. The major solution is for managers to eliminate risk-averse climates, and replace them with organisational cultures, in which innovation is expected, and failure is accepted. His study supported that management in innovative firms envisage long-term visions for their organisations which extend beyond economic
parameters. This has a practical impact in attracting quality people to the firm, and providing focus to their creative drives.

2.16 Organisational climate versus culture

There is a close and sometimes ambiguous relationship between organisational culture and climate (Schneider, 1985; Ryder and Southey, 1990). There is evidence that the two terms have frequently been used synonymously (Barker, 1994). Some authors such as Moran and Volkwein (1992) have contended that the terms culture and climate are distinctly different, as they have identifiable elements within themselves (Moran and Volkwein, 1992). Culture is widely understood to consist of a collection of fundamental values and belief systems (Pettigrew, 1979; Schein, 1985; Sackmann, 1991; Hatch, 1993). It is a more implicit concept, and operates at a deeper level. Organisational climate on the other hand, consists of more empirically accessible elements such as behavioural and attitudinal characteristics (Drexler, 1977; O’Driscoll and Evans, 1988; Moran and Volkwein, 1992). There is the contention that climate consists essentially of shared perceptions, whereas culture is made up of shared assumptions (Ashford, 1985). Similarly Moran and Volkwein (1992) suggested that climate consists of attitudes and values alone, whilst culture exists as a collection of basic assumptions in addition to attitudes and values. However, there is some literature that states the need to look at both climate and culture, to assist in devising constructs for innovation. Barker (1994) proposes that the sets of correlates are inter-related in some way, and are consequently worthy of empirical investigation in most studies (Wallace, Hunt and Richards, 1999).

2.17 Managing change for innovation

Major organisational changes for innovation can anticipate resistance, especially if proposed changes alter values and visions related to the existing order. Programs that satisfy one group often reduce satisfaction of other groups, because the survival of one set of values and visions may be at the expense of the other (Trader-Leigh, 2002). People respond to change in different ways. Human beings often settle into comfort zones, in terms of their working practices. If those practices are challenged, then resistance to change may result (Potter, 2001). Effective managers should be aware of this, by focusing on building confidence, competence and self-esteem, by giving the individual the opportunity to experience success at the new ways of working as soon as
possible. Potter (2001) gives an example of introducing new technology, particularly information and communication systems. It is crucial to introduce the individual to the new system in small, bite-sized chunks in which they can experience total success. These small steps then start to mount up to create a critical mass of positive experiences, and hence confidence in the new system.

Management should pay more attention to the human dimension when implementing change. They have to invest more time in communicating, training, and following up on the change system or process. It is important for management to seek and take into consideration the input from employees into procedures for implementing change. Hultman (1995) believes that most employees expect to have their views considered, and to be treated with respect. Otherwise this will result in mistrust and resentment, making change more difficult to implement (New and Singer, 1983). Leading an organisation through change involves constructively balancing human needs with those of the organisation (Spiker and Lesser, 1995; Ackerman, 1986). Because organisations consist ultimately of people, organisational change essentially involves personal change (Bond, 1995; Steinburg, 1992; Dunphy and Dick, 1989). Change requires the participation of people, who must first change themselves for organisational change to succeed (Evans, 1994).

The people aspect is critical. Introducing change is not just about changes in systems and processes. It is about people believing in change and wanting it to happen. Ford, Ford and McNamara (2002) write that everyone shares the same objective and initiative for successful change implementation. In addition, creativity breeds innovation (Gundry, Prather and Kickul, 1994; Pascale, Carland and Carland, 1997; Perry, 1995; Ramsey, 1997), and that bureaucratic, hierarchical organisations are less flexible, less amenable to change and less likely to empower staff (Jacob, 1995; Jeffane, 1995; Markovich, 1997; Milakovich, 1994/95). But management still has to consider aspects such as teamwork, organisational culture, and staff commitment important to managing change (Baba, 1995; Korsgaard, Schweiger and Sapienza, 1995; Mikalachki, 1994; Uhlfelder, 1994). Rather than focusing their attention and energy only on technical aspects, it is equally important for management to work with the human factors, to minimise resistance and aid the change process. Intervention strategies are needed to assist employees to identify and interpret their own perceptions of change,
and as a result, create greater personal awareness and understanding of the individual self. This personal growth and development is likely to alter an individual’s perceptions of organisational change, thereby reducing the level of resistance (Bovey and Hede, 2001).

Ford, Ford and McNamara (2002) propose three generic types of socially constructed realities that provoke resistance to change in the individual. Firstly, the employee may be complacent. This complacent background is constructed on the basis of historical success, and the employee establishes that current success will continue or be easily repeated if things are left the way they are (Hedberg, Nystrom and Starbuck, 1976; Johnson, 1988). In this regard, employees avoid making disruptive changes (Gutman, 1988). Secondly, another factor contributing to resistance, is the resigned background. Resigned backgrounds are constructed from historical failure and reflect employee’s pessimism (Reger et. al., 1994). The result of a change implementation is characterised by half-hearted actions, having no life or power in them, and reflecting a lack of motivation, and an apparent unwillingness to participate (Ford, Ford and McNamara, 2002). The third cause of resistance is the cynical background which is similar to the resigned background of pessimism. The individual constructs a reality of disappointment, and expects change to fail (Reichers, Wanous and Austin, 1997). A proposed suggestion to overcome these backgrounds or constructed realities is to ‘reframe’ the minds of employees (Dunbar, Garud and Raghuram, 1996). They have to realise their way of thinking, and take responsibility or re-interpret the reasoning behind negative behaviour. This acknowledgment and discovery can assist the employee to overcome constructed feelings, and open opportunities for new responses (Ford, Ford and McNamara, 2002).

Bechtel and Squires (2001) suggested tools and techniques to facilitate change. They are summarised as follows:
## Tools and techniques to facilitate change

<table>
<thead>
<tr>
<th><strong>Education</strong></th>
<th>Education or training is the best way to initially create awareness among management, supervisors and employees.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assigning project managers for the change</strong></td>
<td>The firm should deploy project managers solely dedicated to the management of change. These individuals are generally attached to one initiative, and attend much more in-depth training, helping them to identify pockets of resistance, understand the readiness for change, map the roles involved in the initiative, create change plans, and generally act as change consultants.</td>
</tr>
<tr>
<td><strong>Partnership with external consultants</strong></td>
<td>It is rare to find an organisation that has the resources to address change across an enterprise. Sometimes external consultants are required to facilitate. The organisation should ensure that roles, responsibilities and expectations are clarified for all, and that relationships are understood.</td>
</tr>
<tr>
<td><strong>Having a plan for change</strong></td>
<td>This is to ensure success of the initiative to managing change.</td>
</tr>
<tr>
<td><strong>Incorporating a holistic approach</strong></td>
<td>This approach considers various dimensions in the organisation. The key is to manage from a high level perspective. Including awareness of other change efforts or initiatives that are occurring across the enterprise or within groups, departments, divisions, etc. There must be coordination among change managers, to ensure that activities are appropriately blended, or introduced in a timely manner. This approach looks at areas such as addressing people, the vision, leadership development, communications, individual and team development, and culture.</td>
</tr>
<tr>
<td><strong>Evaluation of efforts</strong></td>
<td>Accepting change is not a simple task that can occur overnight. It takes a long time for employees to adjust and accept. Constant monitoring and evaluation is required. The lessons learnt could be extremely applicable to subsequent large change initiatives as well.</td>
</tr>
</tbody>
</table>

|Table 2.8 Tools and techniques to facilitate change|

*Adapted from Bechtel and Squires, 2001*

### 2.18 Competencies of individuals for innovation

There is no clear definition of the term ‘competency’ in the literature. Two main meanings of the term have been identified, one referring to the outputs, or results of training - that is, competent performance. The other definition referring to the inputs, or underlying attributes, required of a person to achieve competent performance. Each definition has been used to describe both individual and organisational competencies (Hoffmann, 1999). Other authors propose that the term competency has no widely accepted single definition (Strebler, Robinson and Heron, 1997; Jubb and Robotham, 2001).
1997). Strebler, Robinson and Heron (1997) suggested that two different meanings of the term competency have developed. Competencies may refer to behaviours that an individual needs to demonstrate, or that they are minimum standards of performance (Strebler, Robinson and Heron, 1997). The term 'competency' has been used to refer to the meaning expressed as behaviours, while the term 'competences' has been used to refer to the meaning expressed as standards. According to Hoffmann (1999), individuals' performances were described as competencies in order for them to be performed, observed, and assessed to obtain accreditation as competent.

Quinn (1985) interpreted in his study of innovative small companies that individuals should possess characteristics and certain factors (though not every case follows the same pattern) which are crucial to the success of innovative small companies. These characteristics are attached as Appendix 2B. Organisations need people with different kinds of skills to succeed in all steps of the innovation process: idea generators who create new insights; information gatekeepers linked with knowledge sources; product champions who advocate adoption of new practices; project managers who undertake the technical functions needed to maintain an innovative project on track; and leaders who actively encourage, sponsor and coach others to pursue innovation (Roberts, 1988). Competences are more important than knowledge and skills for successful performance. Bergenhenegouwen (1996) states that with knowledge and skill, many people can be equal. It is the individual's effort, enthusiasm motivation and underlying self-image that identify superior performance. By recognising the expertise and skills of employees, and also paying attention to the underlying motives and qualities of the employees, it is possible to achieve the maximum benefit from the organisation's capabilities. The organisation needs to coordinate and establish relationships between its objectives, the business strategy, the structure, work procedures and the capabilities, as well as the competences of the employees. Only then, can innovative activities take place.

2.18.1 Strategic problem solving

To be continuously innovative and improving work processes, employees need to be competent in problem solving and decision making issues. There has been considerable research undertaken seeking to explain the issue of both problem solving and decision making (Van de Ven, 1980; Volkema, 1988; Smith, 1989, 1992; Barnard,
1992; Evans, 1992, 1997; McFadzean and Money, 1994; McFadzean, 1996). O’Loughlin and McFadzean (1999) state that it is imperative for organisations to embrace a more holistic, as well as multi-disciplinary approach to problem solving. They have come up with several factors supporting this approach to effective problem solving in the organisation. One focus is on cognitive processing where individuals use to help them solve a problem or make a decision. Cognitive abilities are based on the individual’s own unique perceptions, experience as well as future expectations (O’Loughlin and McFadzean, 1999). It is important how they use information, process it and make decisions ultimately. Some authors believe that during information processing, the feedback or knowledge on past behaviours help people to learn, and thereby modify, change or maintain future plans or behaviour (Glazer, Steckel and Winer, 1992).

Secondly, individual traits or dispositions may at certain times influence problem solving performance. These refer to the motivation, abilities, temperament and style. Traits are the individual characteristics, which have been inherited or acquired, and are grounded in people affecting the way they think, feel or act (McKenna, 1996). Other authors also support this, and claim that traits explain individualistic behaviour, and their tendency to act or react in certain ways (Drever, 1964; McFadzean and Money, 1994). The third factor is reasoned action perspective. This focuses on the relationship between the intended behaviour during problem solving, and the actual behaviour being observed (O’Loughlin and McFadzean, 1999). Smith (1992) and Swan (1995) have explained that a person’s intentions are determined by their own attitudes, as well as potential expectations of outcomes. It defines an attitude, which is expressed as a belief about the consequences of behaviour, or in other words, the relationship between action and behaviour.

Another factor which organisations use is decision theory. It is a process by which management chooses a solution to the problem from a range of alternatives using various analyses. For example, for structured problems that are characterised as being well defined, the method for evaluating options is usually quantitative analysis. Depending on the potential decision outcomes, individuals may use quantitative techniques such as regression analysis, financial modelling, spreadsheets, statistical simulation and optimisation methods (O’Loughlin and McFadzean, 1999).
organisational traits (i.e. its physical attributes) affect problem solving. The organisation is believed to possess structures and procedures that both direct and constrain the problem solving process (McFadzean and Money, 1994). In addition, Vancouver (1996) believes that the organisation structure has some effect on employees’ psychological characteristics. There must be socio-technical systems that enable the development of efficient and effective problem solving techniques, and management should embrace and encourage interpersonal behaviour within the organisation (O’Loughlin and McFadzean, 1999).

Lastly, an important characteristic is group problem solving. It has become common practice for problem solving to be conducted by groups or teams. Research on group dynamics by Nemeth (1997) has shown that when managed correctly, groups exhibit the potential to both outperform and be more creative than individuals. Teamworking improves productivity, and builds more flexibility into a business, because it allows organisations to react better to environmental pressures (Conti and Kleiner, 1997). Teamworking is also designed to help companies deal with internal problems, by allowing team members to study and address the problems. Teams have become essential elements in problem solving, and in helping businesses move forward into the future (Sashkin and Sashkin, 1994). In conclusion, problem solving should be a continuous and interactive process, rather than an intermittent exercise, involving all employees at all levels with management support. It is a vital competency of employees that contribute ultimately to the innovativeness of the organisation.

2.18.2 Empowerment

In the organisation, empowerment equips employees with the resources to make decisions, and take the initiative in situations, which directly affect their lives, as well as their internal and external customers (Pietenpol and Gitlow, 1996). Firstly, management needs to provide training and skills required by employees to make decisions that previously were in the domain of their supervisors. Secondly, there must be the security needed to make decisions without fear of reprisal from their supervisors (Pietenpol and Gitlow, 1996). Empowerment is the glue by which the elements of customer focus, quality process and products, continuous improvements, self-managing teams, quality measurement, and utilisation of the total workforce abilities are held together. Self-managing teams are one of the major keys in the innovative organisation.
to solving complex problems, increasing productivity and heightening creativity (Ripley and Ripley, 1992). As a result of empowerment, employees possess the competency to provide value to the customer by ensuring creativity, to create and improve processes, products, and services continuously (Pietenpol and Gitlow, 1996). This competency is made possible when employees acquire sufficient training, information on the organisation’s goals and performance objectives, and the authority to make decisions which affect the organisation’s performance.

Ahanotu (1998) contends that empowerment cannot exist without knowledgeable workers, and that empowerment is not complete until participation in processes of innovation occurs. The ultimate expression of this potential is through innovation. Dertouzos, Lester and Solow (1990) list several benefits of active knowledge development amongst employees at the lower levels in the organisation. In a research of production workers, it was concluded that as a result of empowerment, the employees can organise their own work better, rely less on technical specialists for handling production contingencies, and increase the capability of the entire production system (Ahanotu, 1998). Employees are given as much freedom as possible to communicate, share information and knowledge, and learn in an organisation of self-managed teams. As stated by Brown and Duguid (1991), an empowered organisation provides conduits of knowledge and innovation. As a result of empowerment, employees can achieve the following:

- an increase in pride in their work and joy in the outcome,
- an increase in their sense of ownership for the processes in which they work,
- an improvement in their understanding of customers’ needs and wants,
- an increase in their creative potential for work, and
- an exciting challenge to their abilities to improve and innovate the processes in which they work.

(Pietenpol and Gitlow, 1996)

2.18.3 Skills flexibility

Skills flexibility is one of labour’s responses to rapid changes in work demands. From an organisational perspective, a flexible firm is one whose workers can be redeployed easily to various tasks (Atkinson, 1984, 1987). Multi-skilled employees can respond more easily to changing conditions at work, utilising various skills at different
times when needed (Rosenblatt and Inbal, 1999). It is widely agreed that organisations need to have multi-skilled employees to cope better with environmental changes that entail fluctuations in work demands. This labour flexibility is an integral part of flexible organisations (Piore and Sable, 1984; Wood, 1989). Cordery (1989), McCune (1994), and Akhlaghi and Mahony (1997) have written about the benefits of multi-skilling. With proper training, education and support, employees can undertake a wider range of tasks, making the company more effective and efficient. It is an essential aspect of modern human resources management, granting increased labour flexibility, reduced labour costs and increased productivity (Cordery, 1989).

2.19 Conclusion

This chapter has reviewed and highlighted topics and themes relevant for innovation to occur in firms. Firstly, it has explained what innovation is, the types of innovation that occur and models used. The aim of this study explores organisational innovation and the factors that contribute to its effectiveness. The CIMA model proves most relevant to this study, and needs to be adopted to some degree. It is a dynamic model incorporating various factors, all of which will be used to research organisations. As explained in the introductory chapter, the research sub-questions explores components from this model such as capabilities, performances, behaviours and contingencies. Secondly, the literature review was divided into various sections on learning, knowledge management, creativity, communication, culture and climate, managing change, individual competencies, empowerment and skills flexibility. These formed themes relevant to the factors of capabilities, behaviours and competencies of the model. These themes provide some insight to investigating the organisational capabilities, competencies and behaviours of people. Chapter Four will explain in more detail how all these concepts from this chapter as well as in the next chapter converge to form a theoretical framework setting the direction for the study, and in answering the six research sub-questions.
CHAPTER THREE

LITERATURE REVIEW – INNOVATION IN SERVICES

~ We ought not be over anxious to encourage innovation, in case of doubtful improvement, for an old system must ever have two advantages over a new one; it is established and it is understood. (Colton, C.C.) ~

3.1 Overview of the service sector

The traditional view regarding services as ‘passive consumers of technology’, and contributing to other sectors of the economy is no longer valid (Hipp, 1999; p. 163). Perceptions have been bound by old ways of thinking. Even Howells (2000) wrote that academics and policymakers, who have recognised the role of services in the economy, still tend to view them as “providing a supporting, infrastructural role, ‘serving’ the rest of the economy” (Howells, 2000; p.5). Services are currently of increasing importance in terms of the economic and technological perspective (Alic, 1994).

A number of key services hold an increasingly dynamic and pivotal role in knowledge-based economies (Miles, 1993). They are the Knowledge Intensive Business Services (KIBS) (OECD, 1996; Alic, 1997). Certain types of KIBS are taking a more proactive and leading role in the economy such as telecommunication, internet and web-based services, e-commerce, and finance to name a few. The service sector has definitely changed through the emergence of new types of entrants, and use of strongly associated information and communication technologies (ICT). Such firms have brought in original, innovative and unique activities which have not been evident in the last few decades (Howells, 2000). People should change their perceptions and view the emerging importance of services in today’s dynamic global economy.

3.2 Definition of services

It is important to recognise the distinction between service industries and service activities. Service industries are those sectors grouped using International Standard Industrial Classification (ISIC) and national classification. Service activities and functions however, can be undertaken by both service and manufacturing firms, and include such activities as marketing, R&D, accounting and transport. The term services can cover both these aspects, but the distinction remains important for the purpose of this study.
3.3 Importance of the service sector

Services make an increasing contribution to the economic growth of many developed and developing countries and account for about 60-70% of GDP. Growth and innovation is therefore crucial to economic performance (Pilat, 2000). The drivers for innovation in services may be similar to that of manufacturing, but their roles are different. Innovation and technological change is partly due to R&D, and more dependent on acquired technology, organisational change and human capital for the service sector (Pilat, 2000). Empirical research by the OECD (1997) shows that services contain some of the best-paid and most high-skilled jobs in the economy, although there are many low-skilled jobs (Pilat, 2000). This implies that there is a need for highly proficient and qualified personnel in contributing to the economy coming from services.

3.4 Myths of service innovation

The notion of innovation is embedded in manufacturing-based archetypes. This paradigm is often seen in frequently used metrics, to measure innovation associated with technologies and physical artefacts, centred on R&D or patented activities (Gallouj and Weinstein, 1997). As opposed to this, there are untapped measures to comprehend non-technological innovation involving “less tangible, disembodied changes, associated with new ways of doing things, or in novel organisational forms” as typical in service firms (Howells, 2000; p.6). Even Hauknes (1999) reports that our present understanding of innovation is primarily an understanding of manufacturing innovation. Furthermore, services are seen to be facilitators to manufacturing firms, or as good imitators by adopting innovative ideas from manufacturing firms, and applying them to services. Services are often seen as passive reactors to innovation, appearing in manufacturing firms, and are often viewed as innovation laggards (Miles, 1993).

A collaborative European research project (SI4S) was undertaken on service innovation, involving a considerable research union in nine European countries. From this, Hauknes (1999) reported that service sectors are widely diversified in their economic roles, and that they account for about two-thirds of employment in the European economies. Yet, these sectors have not received considerable attention in innovation literatures. Similarly, national industrial and innovation policies, as well as
infrastructure had under-emphasised this sector, merely focusing on manufacturing competitiveness and technological innovations.

Howells (2000) also stressed that we should change our perceptions about service innovation, and argued that service firms are progressing in innovation, as reflected in measures like R&D spending and patenting activities. A shift in thinking is required. There are significant and wide-ranging innovation activities in services. The growth of several service sectors, development of new services, and increased internationalisation, and deregulation of service sectors, suggest that these processes are increasing in scope and intensity (Hauknes, 1996). It is therefore necessary to widen our scope of innovation, from the manufacturing sectors, to include other types of innovation processes – for instance, non-technological innovations are increasingly important, and have strong links to technological change. Innovation does occur in service sectors to a considerable degree, and may be comprised of non-technological aspects.

3.5 Why services innovate

Why services innovate is evident from earlier works of authors such as Miles (1993), and Gallouj and Weinstein (1997), who suggested service firms are laggards and inactive in innovation, as illustrated in the previous section. But recently, other authors assert the opposite. For instance, Howells (2000) claimed that customers and competition are the main driving forces for innovation in service industries. Empirical studies have shown that innovation is widespread in services. Service firms are now undertaking attempts to innovate.

Service firms innovate because they want to improve the cost efficiency and the quality of service production and products, and to exploit new service concepts. This has been empirically confirmed in the changes in nature and structure of competition in the service sector (Hauknes, 1999). Examples include productivity improvements in various sectors such as transportation, communications, wholesale and retail trade, finance and business (Pilat, 2000). Service firms need to achieve and maintain customer satisfaction. Embarking on a more thoughtful way to satisfy customer retention goals takes an investment of time, talent and a pre-determined focus (Kassing, 2002). Some firms recourse to innovative measures in being competitive.
3.6 **Nature of innovation in services**

Innovation in the service sector, as with manufacturing is sometimes described in terms of technological innovation or non-technological (soft) innovation. Technological innovation is the type that often leads to new products of some form. Soft innovation focuses on the organisational issues and processes towards the direction of growth. It improves management practices, streamlines organisational structures, customises services, networking, improves distribution, advances procurement, and financing (Howells, 2000). Most service innovations are non-technological, and involve small and incremental changes in processes and procedures (similar to Continuous Improvement) such that they do not often require much formal R&D (Pilat, 2000).

3.7 **Service innovation versus manufacturing innovation**

3.7.1 *Reverse product cycle*

According to empirical evidence from Barras (1986), innovation in services has often been related to the reverse product cycle. It explains that in the first stage of the cycle, firms adopt new technology to improve the existing efficiency of the process. At the second stage, the new process results in improved quality and delivery of the service. But in the third stage, it becomes evident that the new technology provides the basis for an entirely new service. This makes the innovation in services distinct from manufacturing in at least one aspect (Barras, 1986).

Innovation surveys, as reported by Barkin, Nahirny and Van Metre (1998), suggest that services innovate for the same reasons as manufacturing (increasing market share, improving service quality and expanding product/service range), but there is less regulation and standards to conform to for services. This is because of their intangible nature. Furthermore, in services generally, costs for material inputs and energy are less important than labour costs, given the personal contact with the customer (Pilat, 2000).

3.8 **Forces shaping growth and innovation in services**

3.8.1 *Networking and R&D*

According to innovation surveys conducted by the OECD in 1999, service firms in general “rely to a limited extent on universities and research laboratories for the
knowledge they require” when compared to manufacturing firms (Pilat, 2000; p.20). This is because service firms are mainly interested in the development, marketing and customer orientation for new ideas. As they do not develop their own technologies, R&D would be less relevant. Universities often focus on industrial production processes and technologies (Pilat, 2000). However, there are exceptions with university research in the fields of banking, health and logistical services. For example, innovation in health services is closely linked to university research, and progress in software research is applied to banks and logistics. Considering that service firms also have indirect links to manufacturing firms, they rely on their innovative capabilities. They may be major customers of specialised equipment from manufacturers, especially in the areas of air, maritime, and rail transport; telecommunication; and retailing (Pilat, 2000).

Networking and cooperation have become more prevalent owing to the increased use of external knowledge and cost sharing. Strategic alliances, purchasing groups, and retail franchises are increasing in market share, particularly in trade, financial services and business services, with a view to innovation (OECD, 2000). Knowledge Intensive Businesses (KIBS) also assist in innovation networks by the dissemination of technology and innovative concepts to other firms, by providing consultants, training, R&D and computing services (Den Hertog and Bilderbeek, 1998).

In addition, the National Institute of Standards and Technology (NIST) in the United States has empirically ascertained through a study that firms engaging in research joint ventures are more competitive, and they invest a larger amount in Information and Communication Technologies (ICT) than other firms (NIST, 1998).

3.8.2 Investment in fixed capital for information and communication technologies (ICT)

It is reported that the potential for service innovation is limited by firms’ stock of fixed capital (NIST, 1998). For instance public utilities, transport and telecommunication have large stocks of capital investment in infrastructure which may limit their capability for innovation. This is because it limits the scope of alternative technological avenues, as it is too costly for the transition. The OECD (1999) has also
exemplified the case where France had a late adoption of the internet, because many buildings were unsuitable and inflexible to the change.

Broersma and McGuckin (1999) maintain that firms investing in ICT, together with human capital and organisational change, had higher productivity and economic performances, as this aggregates networking and cooperation for innovation. Furthermore, with the introduction of electronic commerce, through low-cost communication networks (satellite, cable, telephone, electricity grids), firms find an increase in the tradability of services that enables globalisation (Pilat, 2000).

3.8.3 Human capital

In the service industry, many firms are labour intensive, and their services rely on knowledge and concentrated expertise. Innovation depends on the people – their skills, experience, creativity, resourcefulness, strategic thinking, communication abilities and knowledge. Tacit knowledge, especially would enable development of new services and innovative endeavours (Nonaka and Takeuchi, 1995). This was earlier illustrated in Section 2.12 on knowledge management. Investment in human capital, through continuous training and development, as well as the unfolding of a learning organisation ensures efficient service performance in the firm conducive for innovative activities.

3.8.4 Organisational change

It is sometimes necessary to consider the structure and management of the organisation when implementing new ideas or practices in the firm. One has to determine the capacity of the firm, and the efficient use of personnel in the service sector. A survey conducted by the OECD (1998) has concluded that a suitable organisation structure would make it feasible to manage innovation, especially in the effective use of modern technologies (OECD, 1998). Similarly, other studies also depict that the management of information technology in service firms is largely affected by the construction of the organisation (Van Biema and Greenwald, 1997). New processes may often require considerable organisational change (Hauknes, 1996).
3.8.5 Intellectual property rights

On introducing new ideas, concepts and methods, firms would have to ensure that intellectual property rights (IPR) protect their inventions. This would make it worthwhile for their invested efforts and returns on the activity. By pioneering the new innovation, firms have the privilege to be the first to market their product, idea or service. Having IPR is a form of security to patent against imitation by other firms, and as a safeguard that their customers will not switch to competitors.

In the service industry, patents protect software and information services that are rather limited, when compared to manufacturing which covers a wider range such as technological advances in products and manufacturing processes. Furthermore, specific characteristics of IPR may allow for diffusion of innovation in services. Patents give IPR protection in exchange for information about the innovation in the patent that allows knowledge to be diffused (Anderson and Howells, 1998). Trademarks, copyright and trade secrets are more common techniques used in service industries (Pilat, 2000). This is because competitors may only know a little about the new services or processes, and this may strengthen the returns on innovation. Since services are progressing with innovation and exposed to increased competition, it is necessary to consider if the IPR administration in services is adequately tailored for innovation and diffusion, and whether they should be adopted (Pilat, 2000).

3.8.6 Competition and regulatory framework

Competition in international markets for services has been increasing over the years. This is exemplified by sanctions to lift trade barriers in many countries, and electronic commerce rapidly flourishing. As a result of such moves, service industries feel the impact and strain, and therefore need to turn towards innovation.

Internationalisation has impacted on innovation. Markets such as retailing, telecommunication and banking are seemingly saturated domestically, and have accessed knowledge, innovative concepts, services, idea and new technologies. It can be observed that more foreign direct investments in the form of joint ventures, mergers and acquisitions are the conduit for internationalisation. This is one method of innovation (Stiglitz, 1999). However some countries still face regulatory restrictions that have inhibited their infrastructure, networks and information availability for
innovation. Governments should contemplate their role in sustaining the economy, and provision for an environment conducive for growth and innovation.

Public sector services such as healthcare, telecommunication and education have deliberately allowed market forces to proceed, as we see the privatisation of these services in many countries. With more competition and a greater need to meet consumer needs, this permits efficient services, higher productivity and innovative activities to materialise (Pilat, 2000).

3.9 **Barriers to innovation in services**

There are many factors that prevent firms from engaging in innovation. It is important to analyse such impediments as they determine the dynamics of competitiveness in service industries. In addition, regulatory issues will have an effect on innovation for different countries. Since it is governed by the political system, various countries will confront different regulatory settings. It may encourage or discourage innovation (Preissl, 1998). For example, by imposing certain conditions, firms have difficulty in accessing markets or engaging in new activities. On the other hand, regulation may also encourage innovation through environment protection issues and organisational solutions.

Apart from that, firms of different sizes also encounter different barriers. For instance, small and medium enterprises (SME) may have difficulty in adopting IT-based systems, as compared to large multinational corporations (MNC). It may not be worthwhile or feasible to invest, due to the lack of financial resources and R&D facilities available. Today’s highly globalised markets are more competitive, and firms are under pressure to innovate, and to overcome obstacles and barriers. They would have to source the required capital and human resources, taking into account the nature of services, IT and quality requirements.

3.9.1 *Barriers – the services perspective*

The innovation process in services has been analysed through many empirical studies such as the Australian Centre for Innovation and International Competitiveness in 1993, and more recently, the ‘SI4S’ project under the ‘STEP’ Group in 1998. [The Studies in Technology, Innovation and Economic Policy (STEP) Group conducted a
project called Services in Innovation, Innovation in Services (SI4S). The research project was funded by the Targeted Socio-Economic Research (TSER) programme of the European Commission (DGXII) under the Fourth Framework Programme.] Barriers have been identified that provide important insights overall. It is important to note that impediments to service innovation vary according to different aspects. It is not easy to generalise barriers to services.

3.9.2 Empirical studies – SI4S project

In the SI4S Project conducted across European countries, it was found that barriers differ among various service industries due to their heterogeneous nature. The differences among industries are linked to market conditions and their specific activities (Preissl, 1998). It was identified in Europe that the harmonisation of regulation in the EU context enhances innovation in some countries through more liberal regimes; while in other countries by compelling new conditions, innovation is hampered (Preissl, 1998).

There are many different categorisation of barriers to service innovation in the literature and various empirical findings. These can be classified into factors as follow: political factors, financial constraints, technology problems, risk of marketability and human factors. Each of these will be discussed in detail following:

3.9.3 Political factors

The political factors cover a range, from regulatory issues and legislation to administrative measures. The regulatory framework of a country may sometimes impose hindrances to innovation. High tariffs may prevent MNCs from setting up operations in a country. Often smaller firms would rely on or emulate ideas from such large corporations, as they bring in expertise, technological and innovation know-how. For some services rules are set up to prevent outsiders from operating in a market, to maintain the small number of suppliers and ensure satisfactory profits for the industry. Similarly, taxation imposed on the country may reduce incentives for firms to innovate, as well as labour regulation that may increase costs.

Regulation that reserves certain activities for government agencies also impedes innovation in some sectors. For example, the public pension system in Singapore
(Central Provident Fund) tend to dominate smaller private insurance companies, and weaken the possibility of supply funds for innovation. Many retired people in Singapore would rather rely on this government system than invest in insurance firms for old age pension. Apparently by privatising the provision of many infrastructure facilities to the country, there is scope for development and innovative possibilities. The evidence for this can be seen in the telecommunication, transportation, financial and health sectors.

It was mentioned in the STEP Group studies that innovation policies tend to concentrate more on manufacturing, with support programmes given such as monetary funding. Some services are unable to reap the benefits of government support, as their innovations do not meet the eligibility requirements. In addition, the R&D for services is normally conducted in non-traditional ways. R&D is not feasible for them, as it proves too costly and as a result, many are not interested in innovating (Preissl, 1998).

Similarly, patents do not play a significant role in services. It is evident that patent laws were designed for manufacturing, as most service innovations are not patentable (Preissl, 1998). Service innovation has to seek recourse to other forms of protection such as copyright laws, registered trademarks, and protection of information against imitation by competitors. Various levels of government enforce the regulations, codes, standards and guidelines for businesses. These are not uniform among countries, and differ considerably, due to regional, geographic, political and environmental conditions. The sheer number of regulations and standards impedes innovation, by preventing the use of processes, products, or technologies that do not meet the exacting nature of the standards (CENET, 2000). An empirical case published is environmental laws and regulations which have inhibited technological innovation in the United States. Swift (2000) highlighted through case studies how some United States regulation put laws into practice, and have narrowed technological choices, adding unnecessary costs, and failed to prevent pollution (Swift, 2000).

3.9.4 Financial constraints

Much of the literature states that majority of services do not want to innovate because of financial pressure. Preissl (1998) reported that a service innovation study called ZEW/ISI was conducted in Germany in 1996. The study found that over fifty
percent of firms surveyed found a lack of equity capital as the main barrier to innovation. Financial institutions and banks typically service large companies, by rendering loans with respect to venture capital and manufacturing innovation (Preissl, 1998). Smaller firms have difficulty guaranteeing loans with their limited assets.

Projects with long development times may require large loans, and the liquidity throughout the service innovation is crucial, and cannot be managed easily by small companies. These firms may fear that the costs of innovation might end up higher than the expected returns. The idea that development costs for service innovation can be a profitable investment is still under-developed. It has also been reported in the literature that large amounts of capital or financing are required for innovation projects to occur.

Looking on a larger scale, technology development and commercialisation is a time-consuming, resource-intensive endeavour. Governments may have constraints on the national budget to invest in an innovative infrastructure. Many firms find it too costly to take risks on a new process or technology without government support.

3.9.5 Technology problems

In many cases, innovative technology in services is produced and supplied by large multinational companies which refine and adapt services for the needs of the market. The main mode of technology application stems from IT. Various forms of IT have been introduced in services, ranging from interactive video terminals, Electronic Data Interchange (EDI), Customer Information Systems (CIS), Automated Warehousing and distribution systems, Point of Sale (POS) scanning to Electronic Funds Transfer at Point of Sale (EFTPOS).

The full effect of these technological changes is yet to be fully accepted in all sectors of the economy. Small-sized firms have difficulty in finding technology, or equipment for their limited scale of operations. Secondly, management has often seen technological advances as the responsibility of the computing and information systems professionals, and not as a principal business issue (Australian Centre for Innovation and International Competitiveness, 1993). This lack of understanding, and the implications of technological change have somewhat slowed the pace of change and
served as a barrier to innovation. Similarly, the firms’ unwillingness, or inability to invest in innovative technology hampers this diffusion of technology.

The quality, price and speed of technology development have to be considered by firms wishing to embark on innovative services. It may be too costly, or software applications may be outdated in a short period of time. There has to be constant updating of innovative opportunities.

The infrastructure in the economy has to support the technological capabilities of firms and consumers. There might be a lack of broad technology standards to support IT applications such as EDI and ATM networks to interface with each other (Australian Centre for Innovation and International Competitiveness, 1993). Similarly, with the growing usage of the internet, the lack of a widely deployed advanced broadband Integrated Services Digital Network (ISDN) infrastructure cannot provide the capacity to carry a large number of integrative services, linking all homes and businesses.

In the STEP Group report, it was found that many service firms lack competence in the productive use of technology. Issues were raised as to the immature IT systems that could not be used straight away for the company’s purposes, or sometimes the right technology did not seem available on the market, and was too costly to have it individually made. Similarly, another concern expressed was the lack of qualification in people to exploit IT for innovative purposes (Preissl, 1998).

3.9.6 Risk of marketability

Upon innovating, firms face the risk of marketing the services. Customers or clients may be reluctant to accept the new services, and this often slows down the activity. They may be rather conservative in considering the new service, or find it more expensive than before. Since the implementation of service innovations can only be successful with the cooperation of the customer or client, it is important for them to be participatory (Sundbo and Gallouj, 1998). Similarly, service companies that adopt new ideas from foreign markets may find that managers are not able to adjust to new forms of management. This affects the marketability of services.
The current state of the economy determines the absorptive capacities of the market. As reported in the S14S studies, a recession causes significant lags in the modernisation for the economy, and slows down the development of competencies for innovation (Preissl, 1998). Innovative services would not be worthwhile to the market since it is costly at the time to invest, and customers may be unyielding about accepting it. The market for infrastructure and ancillary services is highly dependent on the strength of the global economy. During periods of sluggish growth, companies are not willing to take risks. The variable and cyclical demand for infrastructure does not promote long-term investment in innovation (CENET, 2000).

3.9.7 Human factors

The requirement for planning and implementation of innovation goes beyond just everyday business skills. Management and personnel need to be adequately proficient and competent in their work fields and fervent about innovation. It is important to gain the necessary knowledge about technical and market developments before embarking on innovation, as this often poses a barrier.

Management faces difficulties in this area, due to the lack of experience in innovation, and the lack of knowledge about possibilities to improve services. Apart from management, the employees may be inadequately qualified, or resistant to embarking on change. Insufficient internal expertise in applying information technology is often a barrier (Staudt et. al., 1996). Correspondingly, employees often lack management thinking (Preissl, 1998). Internal barriers within the organisation also give rise to impediments, as departments may want to keep their current mode of operations for fear of competition from dynamic developments in areas other than their own (Preissl, 1998). To ensure effective implementation, there must be commitment from all employees – management as well as subordinates.

Deficits in innovation management can be interpreted as barriers to innovation. As many services comprise small and medium firms, they are likely to have less resources for innovation. The deficits are apparent in strategic planning. Managers have to consider innovation geared towards the changing market, instead of towards the reproduction of existing patterns. Often a case of myopia develops as managers stay in the system for too long a period maintaining traditional ways of thinking, and develop a
resistance to changes or innovative ideas (Stark, 2000). Stark (2000) also found that service firms may need to cooperate and network with other firms for successful innovation. It is difficult and may serve as an obstacle to many small firms that lack the networking abilities.

3.10 The logistics industry

3.10.1 Description of logistics

Historically, the concept of logistics originated from military use. It related to the movement and coordination of troops, armament and munitions to the required location (Slack et. al., 1999). In the business sense, it refers to the total flow of goods downstream from the plant to the customers. Logistics is an extension of physical distribution management, and usually pertains to the management of materials and information stream from a business, down through a distribution channel, to the end customers. It basically concerns the physical distribution of finished products (Slack et. al., 1999), and can include raw materials as well. Logistics represents a growing segment of the economy, and it plays a critical role in international trade (Singapore Trade Development Board, 2001). The traditional view of logistics was undoubtedly the provision to industrial firms with time and space utilities. Warehousing and transport were the organisational functions delegated to the creation of these utilities. Today, the term integrated logistics underlines the mutual completion of procurement, production planning and distribution, managing the physical flow and the flow of information in order to carry out a unitary process (Caputo and Mininno, 1998).

Logistics is essentially a social-economic system and a systemic process. The systemic perspective embraces both the logic and culture streams of thought. It is simultaneously dealing with issues of technological applications and the appreciation of human behavior in system applications within organisations (Nanyang Technological University, 2001). Transportation, inventory and communications activities began even before there was active international trade. Organisations today face the issue of providing goods and services by integrating all logistics activities collectively. It has only been in recent years that the importance of coordinating these activities to bring about substantial savings has been realised. On that account, management thinking has somewhat changed to making logistics a vital area of concern (Ballou, 1987).
3.10.2 *Activities of logistics – primary and supporting*

Logistics includes a range of activities related to the movement, storage and tracking of goods and services. These activities can be classified as primary or secondary, depending upon the direct impact of the activity on the key objectives of cost and service. Table 3.1 lists the key primary and secondary activities of logistics and provides a brief description of each.
<table>
<thead>
<tr>
<th><strong>Key primary and supporting activities of the logistics industry</strong></th>
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<td><strong>Primary</strong></td>
<td><strong>Secondary</strong></td>
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| **Transportation** (by ship, rail, road or air) - can absorb up to seventy percent of logistics costs. Specific issues here include:  
  - Container movements.  
  - General, rail and express interstate transport.  
  - National and regional parcel delivery.  
  - Priority and air express services.  
  - Break bulk and multiple consignment deliveries. | **Warehousing** - refers to the space management of inventory. It involves issues such as a site selection, space determination, stock layout, stock retrieval, dock design and warehousing configuration. Specific aspects here include security, handling and storage. |
| **Inventory management** - maintenance of inventory is necessary since sometimes it is not possible for the immediate delivery to customers. The appropriate approach to the control of inventory levels should be carefully developed around the particular type of demand pattern that a product displays. | **Materials handling** - concerns the movement of the product at the stocking point. For instance, the transfer of goods from the receiving point at the warehouse to the storage location; and from the storage location to the delivery point. The warehouse configuration, layout, and loading all have an important bearing on product handling efficiency. |
| **Order processing** - triggers product movement and service delivery. Tasks include order entry, order handling, credit checking, order status reporting, and invoicing. | **Protective packaging** - should be designed to ensure minimised damage during transportation, storage and handling. Although packaging design has many objectives to meet, firms seek packages that will minimise the cost of product handling and maximise cost utilisation. |
| **Acquisition** - concerns the selection of supply-source locations, quantities to be acquired, timing of purchases, and the form in which buying decisions have geographical and time dimensions that affect logistics costs. | **Product scheduling** - refers to the distribution of the products in the manufacturing of aggregate quantities. |
| **Information management** - all the equipment, procedures and people that create an information flow useful to the daily operations, planning and control of the organisation’s logistics activities. Cost and performance information in logistics is essential for good planning and control. |  |

Table 3.1 Key primary and supporting activities of the logistics industry

*Adapted from Ballou, 1987*
3.11 Importance of logistics

Logistics is apparent in all firms to some degree depending on the nature of business and industry. For many consumer products firms, food firms, chemical firms and others alike, special attention needs to be given to logistics, as large logistics costs are incurred and service needs are important. For instance, extractive industries are characterised by firms that produce basic raw materials for use in other industries such as lumbering, mining and agriculture. They would be involved in securing a wide variety of goods, large capital equipment, and supplies for production in their acquisition. Their finished products are typically limited in diversity, and are shipped in bulk. Their logistics are concentrated in purchasing and traffic equipment. Secondly, manufacturing industries are characterised by firms that purchase a large variety of low unit value items, with the purpose of transforming them into finished products of higher unit value. There are substantial logistics activities in both supply side and the distribution side. Thirdly, service industries are mainly concentrated on the supply side of logistics activities. Firms convert products into intangible services. They purchase supplies, which require materials management with no physical distribution as the result. An example would be a hospital. Fourthly, marketing industries are characterised by firms that purchase goods mainly for resale without any substantial changes to the product form. They are the distributors and retailers. Products are sold in diverse combinations and in smaller quantities. As a result, logistics is centred both on materials management and physical distribution activities.

As organisations globalise to gain access to new markets and achieve higher production and sourcing efficiencies, logistics play an important role in moving materials and products throughout supply chains. Intense competition has also required logistics providers to consider their services in terms of cost, quality, features and value-added to their customers (Sum and Teo, 1999). The scope and role of logistics have changed dramatically over the years. It used to be a supportive role to primary functions such as marketing and manufacturing. But now, it has expanded to cover warehousing and transportation activities to cover purchasing, distribution, inventory management, packaging, manufacturing, and even customer service (Titone, 1996; Bowersox and Closs, 1996). More importantly, logistics has evolved from a passive, cost absorbing function, to become a critical factor of competitive advantage (Bowersox and Closs, 1996; Bowersox and Daugherty, 1995; Christopher, 1993). According to
Bowersox and Closs (1996), firms with world-class logistical competency can gain competitive advantage by providing customers with superior service.

In Bovet (1991), logistics has predominantly proven its importance in enabling companies to going global to access foreign markets. Organisations can realise greater production, sourcing efficiencies and tap technological competencies beyond their geographic borders (Bovet, 1991; Fawcett, Birou and Taylor, 1993). With the minimisation of trade barriers now, and the advent of advanced information technologies, new opportunities and global markets have become available for companies. They would have to rely on logistics to move their products and materials to meet new production requirements and customer needs.

There is generally a great deal of literature on strategies and operational characteristics of logistics providers. However, most of them focus on the management of the logistics function from the users’ or manufacturing perspective (Bardi, Raghunathan and Bagchi, 1994; Hill, 1996; La Londe and Masters, 1994; Fawcett and Clinton, 1996; Richardson, 1995). It implies that such providers adopt narrow views, and focus on specific areas such as Information Technology (Cuthbertson, 1995), warehousing (Olson, 1996), and benchmarking (Cooke, 1996; Stank, Rogers and Daugherty 1994).

3.12 Outsourcing of logistics

According to Christopher (1993), the outsourcing of logistics activities to specialised companies can assist to increase efficiency and effectiveness in general. It is an option for the company to concentrate on their core competencies (Troyer and Cooper, 1995). They can achieve their expertise, whilst realising their limitations or gaps in their logistics operations by outsourcing (Buxbaum, 1994). Companies are also better able to trade internationally in this manner (Byrne, 1993; Rao, Young and Novick, 1993) by focusing more on their expertise or specialised areas. The outsourcing of logistics activities to specialised logistics service providers can help increase the efficiency and effectiveness of a company’s logistics function (Vowles, 1995; Christopher, 1993). It is also an option for firms that perceive the reality of gaps between what they want to achieve with their logistics operations and what they can achieve with their in-house expertise (Buxbaum, 1994).
A lot of the distribution and transportation functions have been outsourced to specialised companies, as firms cannot allocate resources towards the design and implementation of an integrated transport monitoring system. They also have to consider organising a geographically centralised distribution system, taking into account the size of the country, physical location, access routes and many other factors. Similarly, decisions have to be made regarding make versus buy versus partnership in distributing commodities. The main factor for outsourcing stems from cost efficiency. Other benefits include reduction in capital investment in facilities, equipment and information technology (Richardson, 1992; Fantasia, 1993; Lacity, Wilcoks and Feeney, 1995), improved customer service and delivery (Richardson, 1995; Byrne, 1993) and reduction in the complexity of logistics operations (Bradley, 1995).

3.13 Logistics in Singapore

Singapore’s market relies heavily on regional and international trade with its free-market economy. Owing to its strategic location, amidst surrounding islands and countries, Singapore has played the role as an entrepot center, with the world’s busiest port of over 600 shipping lines (Singapore Trade Development Board, 2001). Being at the crossroads of the world’s shipping lanes and air transport, Singapore represents the ‘heart’ of Southeast Asia and has seen a great increase in foreign investment cashing in on the country’s excellent infrastructure, technological advantage and international marketing network (Wong, 1990). A major portion of trade involves the distribution and trans-shipment of finished products, components, sub-assemblies and raw materials. Over the years, Singapore emerged as an ‘advanced developing country’ with a solid industrial and economic base, comparable to many developed nations (Razzaque and Sirat, 2001). The logistics industry is crucial in supporting the trading sector and establishing the distribution and trans-shipment hub for the country (Singapore Trade Development Board, 2001). Apart from that, the manufacturing sector also depends on logistics to move their products, materials and supplies to various locations internationally (Sum and Teo, 1999).

The subsystems of logistics in Singapore have progressed historically from just transportation and cargo storage, to higher value-added systems. Operations include light assembly, distribution management of finished products for manufacturing,
comprehensive service provision in packaging, and delivery and management of supply chains (Singapore Trade Development Board, 2001). The government of Singapore has identified the growing importance of logistics, as rising affluence continues to attract increased goods and services. Expectations for rapid growth in the logistics industry in the new millennium have resulted in the initiation of a Logistics 2000 plan (International Enterprise Singapore, 2001).

There is heavy emphasis on logistics in Singapore, due to its strategic location in Southeast Asia. The government has a strategic vision for Singapore to be positioned as a total logistics hub, with leading edge capabilities in terminal facilities and logistics management competency. Logistics is a big business in Singapore, contributing to about 7 per cent of the nation's GDP (Singapore Trade Development Board, 2001). Over the next decade, the vision is for Singapore to develop as a Premier Integrated Transport and Logistics Hub, with leading edge capabilities in terminal facilities and logistics management competency (Singapore Trade Development Board, 2001).

One of the key initiatives that Singapore has undertaken to raise the competitiveness of the logistics sector is the Logistics Enhancement and Applications Programme (LEAP). Since its launch in 1997, a total of 16 projects covering Manpower Development, Business Process Enhancement, Technology Capability Development and Infrastructure Development have been conceived (Singapore Trade Development Board, 2001). These efforts have reaped favourable outcomes. Over 5,000 world-class multinational companies (MNC), including close to fifty per cent of the Fortune 500 companies, have established operations in Singapore. Out of these, a number have outsourced their regional logistics operations to both the home-grown and foreign logistics specialists, whose service offerings comprise increasingly sophisticated supply chain management solutions, ranging from freight transportation and materials management, to integrated and value-added logistics services. These players can testify to Singapore's claim as the springboard to connect the global client to the Asia-Pacific region (Singapore Trade Development Board, 2001).

3.14 Logistics in Australia

Australia is the fourth largest economy in the Asia Pacific region, and relies increasingly on service industries. Australia is no longer a resource-based economy,
and has not been for the past 10 years. The shift towards a knowledge-based economy can be seen through Australia's rapid expansion of service industries, and an increase in IT skills (Australia Department of Foreign Affairs and Trade, 2001).

Australia is a land rich in natural resources which has contributed to its economic growth, especially in the sectors of agriculture and manufacturing. Being the world's smallest continent however, it is the sixth largest country in the world (CIA World Factbook, 2000). With an area of 7.7 million square kilometres, the Australian population is highly centralised in the southeast of the continent, with 40 per cent living in the cities of Melbourne and Sydney. The balance of the population is dispersed across the country, creating pockets of habitation in need of transport service (Dapiran et. al., 1996). This allows for the regions to exploit its geographical advantage, to produce and distribute products to other less populated regions within the country, giving rise to a very active logistics industry. Its exports and imports have been steadily rising over the years, implying that the logistics industry is growing, as well as employment figures are increasing in the transport and storage sector (Australian Bureau of Statistics, 2000).

In addition, the level of interest in logistics in Australia has increased substantially. There are an increasing number of firms locating in Australia, to be used as a base of operations to enter Asian and international markets. Australia offers a good location because many of the markets of Southeast Asia remain small, while places such as Singapore and Hong Kong are extremely expensive. Australia offers several benefits as it lies within the time zones of Asia, and offers Europeans and Americans a familiar lifestyle and similar financial, political and legal systems (Millen et. al., 1997).

3.15 The need for innovation in logistics

Innovation in product or process development is often considered to be an element of flexibility (Parthasarthy and Sethi, 1992). In the logistics industry, it is widely accepted that the distribution method and time of delivery determine competitiveness for a company. According to Harmon (1993), what majority of customers want now are timely delivery, value for price, performance and conformance. He mentioned, “...logistics operations are rich in opportunities for improvements...” (Harmon, 1993; p.25). To attain excellence in performance, organisations will have to
change. For as Levitt has written, “Nothing so characterises the successful organisations so much as the willingness to abandon what has been long successful” (Levitt, 1991; p.67). Organisations have to consider factors and capabilities required to measure themselves against, and to inaugurate innovative strategies.

According to Chapman, Soosay and Kandampully (2002), the new global economy consists of quantum advances in science, technology, and communication and continues to meet the increasingly sophisticated demands of its customers. This suggests that new technology and innovative business practices are evident. Moreover, logistics have today transcended a traditional role in ‘transportation’ to a role in serving customers’ strategic needs to gain a competitive advantage. Innovation is imperative for logistic firms serving the market in the new economy (Chapman, Soosay and Kandampully, 2002).

Today’s turbulent competitive environment mandates that logistics firms must have agility to survive and excel (Olavarrieta and Ellinger, 1997). Acknowledging the dramatic changes in the economy, many authors have indicated the importance of logistics as a source of competitive advantage in the service sector (Achrol, 1991; Day, 1994; Porter, 1985; Stalk, Evans and Shulman, 1992; Webster, 1992). The strategic role of logistics today should receive considerable attention as it has considerable influence, and contributes to service superiority (Bowersox, Mentzer and Speh, 1995; Innis and La Londe, 1994).

### 3.16 Capabilities and innovation in logistics

When firms make a unique effort to strategically position themselves to gain competitive advantage, they will have to align their capabilities. It is necessary to redefine what behaviours constitute best logistics practice, and review the range of capabilities associated (Bowersox, Closs and Stank 1999; p. 18). According to Knox (2002), the successful innovative organisation nurtures and embeds the distinctive behaviours and organisational capabilities, which deliver innovative solutions ahead of competitors. The contribution of the many elements, which characterise the innovative organisation, depends on how well they interact and reinforce each other.
Firstly, a capability is the knowledge and achievement essential to developing logistical inclination. It relates to why work is being performed as contrasted to how it is being performed. It reflects the value of the work’s performance, applying integrative principles that allow multiple processes to be synchronised (Bowersox, Closs and Stank 1999). At the Michigan State University in North America, doctoral students conducted research studies observing and measuring capabilities of logistics firms in the supply chain. It was discovered that selected firms have a higher overall level of capability achievement than their less accomplished competitors (Bowersox, Closs and Stank 1999). Some examples of such capabilities include the ability to identify and accommodate the logistics needs of specific customers, the ability to work with supply chain partners, and the ability to share benefits and risks. They were able to construct a framework and assessment process which acted as a tool to guide managers in developing action plans for improving logistical performances. This framework consisted of twenty-five capabilities symbolising logistics integration in a supply chain context. The capabilities can be tabled as follows:
<table>
<thead>
<tr>
<th>Core Area</th>
<th>Capability</th>
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<tbody>
<tr>
<td>Customer integration</td>
<td>1. Segment focus</td>
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<td></td>
<td>2. Relevancy</td>
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<td></td>
<td>3. Responsiveness</td>
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<td>4. Flexibility</td>
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<td>Internal integration</td>
<td>5. Cross-functional unification</td>
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<td>6. Standardisation</td>
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<td>7. Simplification</td>
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<td>8. Compliance</td>
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<td></td>
<td>9. Structural adaptation</td>
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<tr>
<td>Materials/service supplier integration</td>
<td>10. Strategic alignment</td>
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<td>11. Operational fusion</td>
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<td>12. Financial linkage</td>
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<td>13. Supplier management</td>
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<tr>
<td>Technology and planning integration</td>
<td>14. Information management</td>
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<td></td>
<td>15. Internal communications</td>
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<td></td>
<td>16. Connectivity</td>
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<td></td>
<td>17. Collaborative forecasting and planning</td>
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<tr>
<td>Measurement integration</td>
<td>18. Functional assessment</td>
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<td></td>
<td>19. Activity-based and total cost methods</td>
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<td>20. Comprehensive metrics</td>
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<td></td>
<td>21. Financial impact</td>
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<tr>
<td>Relationship integration</td>
<td>22. Role specificity</td>
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<td>23. Guidelines</td>
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<td>24. Information sharing</td>
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<td></td>
<td>25. Gain/risk sharing</td>
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</table>

Table 3.2 Capabilities in the supply chain

Adapted from Bowersox, Closs and Stank (1999)

In addition, other authors have also written about capabilities needed in logistics. Some of them are briefly highlighted in the following:

3.16.1 Innovation in logistics using information technology

It is evident that many logistics firms, in order to improve their market standing, will have to keep pace with the information age. It has been argued and currently well accepted that the correct implementation of ICT can be a significant source of competitive advantage to firms (Porter and Millar, 1985). This is particularly so for the logistics industry because of its dependency on information for efficient operations. Logistics IT refers to the hardware, software, and network investment and design, to facilitate processing and exchange (Closs and Xu, 2000). In the following manner, it also includes related components such as satellite transmissions, Electronic Data
Interchange, barcoding, systems for order entry, order processing, vehicle routing and scheduling, and inventory replenishments.

Various authors have supported the benefits of ICT in increasing the leverage of innovation in logistics. Langley et. al. (1988) discussed ICT’s application as an effective means to enhance the firms’ strategic significance and operational effectiveness. They were of the view that managers should look at the overall business needs first, before considering or selecting ICT hardware or software. For instance, it was discovered in France that the bottlenecks were previously occurring at the shipping ports. As a result, an Information and Communication Technology (ICT) system was deployed to monitor and control the flow of inventory. ICT systems have proven to assist tremendously with logistics planning and control. Langley et. al. (1988) established that computer technology had become increasingly linked to the planning, implementation, and control of traditional inventory activities such as product receipt, storage, order picking, and shipping. They also discussed the strategic value and effectiveness of logistics IT.

Similarly, Kerr (1989) stressed how logistics IT can contribute to the overall strategy for the firm. In addition, Closs, Goldsby and Clinton (1997) offered some empirical evidence that firms innovating using IT capabilities influence overall logistics competency. LaLonde and Auker (1973) detected that such technology was shifting from being an enabler of operational and material handling functions, to being an enabler of decision making and activity-planning functions within the supply chain’s transportation and distribution area. Stock (1990) also found that many firms were able to reduce warehousing costs and gain competitive advantage, by routinely using information technology in their warehousing operations (Rabinovich et. al., 1999).

However other authors contend that the most effective logistics systems may not necessarily be the most automated, or have the most sophisticated information systems and computer networks (Cunningham, 1996). Similarly, Bigoness and Perreault (1981) earlier stated that the adoption of technology does not equate to the firm’s tendency towards innovation.
3.16.2 Design and organisation of the supply chain

It is important to have an appropriate organisational design for business logistics. In order for unrestrained innovative efforts to occur, firms need to develop their supply capabilities, and the challenges for organisational learning. As stated by Chapman, Soosay and Kandampully (2002), firms have been forced to restructure both internal and external relationships to respond flexibly, innovatively, and rapidly to shifting and splintering market demand. International experience offers a host of examples of how manufacturers have successfully restructured to improve their international competitiveness (Kaplinsky, 1994; Gereffi, 1996; Schmitz, 1993; Schonberger, 1982, 1996; Piore and Sabel, 1984). This recognition has created a major increase in importance of the value chain, inherently linked to the idea of relationship networks.

Through this efficient supply chain network, firms will then be able to meet dynamic situations. For instance, in the utilities market in the United Kingdom, many firms have joined in partnerships down the supply chain. This is also evident with the Toyota supplier system in Japan. Such an inter-company network system can allow for innovation to occur, especially with a globalised environment. Szeto (2000) writes that inter-organisational networks with resource supplies, and knowledge formation through repeated collaboration, can enhance innovation capacity. Firms could also “achieve financial information, latest technology and marketing intelligence, which supplement the collective innovation activities within the network” (Szeto, 2000; p.158).

The structure of networks has been examined by various authors such as Ghosai and Bartlett (1990); Jarillo (1998); Jarillo and Ricart (1987); Miles and Snow (1986, 1992); Powell (1990); Saxenian (1991); Snow, Miles and Coleman (1992); Storper and Harrison (1991); and Thorelli (1986). Logistics integration links logistics activities to other functional areas within the firm and to the logistics activities of other firms. They all support the idea that it leads to competitive scope, competitive advantage and better performance (Stock, Greis and Kasarda 1999). This can be applied to the prevalence of logistics services throughout the supply chain, and reinforces the need for networks. Logistics firms should develop and maintain long-term strategic alliances with partners to improve performance in the areas of product handling, product tracking, information flow technology, and other product and process advancements. These, in turn, enhance
customer satisfaction and firm performance (Epatko, 1994; Schilling and Hill, 1998; Vonderembse and Tracey, 1999; Shin, Collier and Wilson, 2000). Logistics firms can develop their innovative capabilities and meet the challenges for organisational learning only through adequate supportive organisational structures.

### 3.16.3 Managing customer-supplier relationship

Closely related to the previous point on networks within the supply chain, there must be coordination between the intra-organisational supplier and customers for service parts. For instance, many firms today through the understanding of new management and quality techniques have engaged in Just-In-Time, MRP techniques, or fabricated a Total Quality Management environment incorporating the involvement from their suppliers and customers as well. It is this relationship that forms an economic perspective of cost transactions. Many firms are able to benefit from the established associations with one another. For instance, supplier involvement in the packaging or storage design has proved to be beneficial in logistics (University of Padova, 2001).

Logistics firms have to perceive the importance of relationship, facilitating decision making, by bringing together the pertinent parties internal and external to the organisation (Cooper and Ellram, 1993). Managers should develop and maintain long-term strategic alliances with these suppliers (Anderson and Lec, 1999; Manheim, 1999). Research suggests that managing supplier involvement can lead to better supplier performance, improved manufacturing, and product and process advancements that in turn, enhance customer satisfaction and firm performance (Epatko, 1994; Schilling and Hill, 1998; Vonderembse and Tracey, 1999; Shin, Collier and Wilson, 2000).

Similarly, the customers too have their significance in the supply chain. They are the heart of any enterprise, and firms need to constantly learn and relearn as will be dictated by the customer's choice and requirements. Logistics organisations will have to move from a bureaucratic mode to a responsive mode to deliver value to the customers, and this necessitates being flexible, lean and yet able to create new customers (Mohanty, 1999). An innovative logistics company understands the context of customer power, and envisions the space of supplier-customer relationships. The challenge for
organisations in today’s economy is to establish and maintain customer satisfaction and loyalty (Scott, 2001).

Research by Tracey and Tan (2001) also proves that supply chain management is an evolving process, and needs to examine the relationships between supplier selection (in the areas of quality, delivery reliability, product performance and unit price), customer satisfaction (in the areas of competitive pricing, product quality, product variety, and delivery service), and the overall firm performance (Tracey and Tan, 2001).

3.16.4 Organisational and managerial aspects

Management plays an important role in logistics. With new paradigms emerging such as flatter or cross-functional structures, empowerment and delegation, there is a concern as to how management can deal with situations in dynamic markets. Quality management in logistics is common in countries such as Australia and the United States. They have to confront the challenges of global competition, and focus more on the needs of customers to enhance quality and service. But the organisation has to look beyond customer satisfaction, not only to stay competitive, but also to become innovative.

For example, with the merge between countries in the European Union (EU), there are prospective business strategies towards the emergence of geostrategic logistics. Organisations have to consider managing global logistics, different coordination policies, and managing in multinational environments, taking into account a focus on customer satisfaction, as well as assessing and undertaking opportunities for innovation (Poist, Scheraga and Semeijn, 2001).

3.16.5 Inventory management

Managing inventory levels is a common concern for logistics organisations. By measuring the demand nature of inventories, companies are able to optimise the storage capacity. In a dynamic demand situation, firms often find it more cost effective to outsource this feature. Currently, with the adoption of state of the art technology, logistics companies are able to engage in intelligent planning and scheduling of inventory. In manufacturing companies, efficient production planning also assists in
effective inventory management. On that account, it is crucial to analyse if inventory to the company is an asset or a liability (University of Padova, 2001). For instance, Ballou (2000) researched a generalised formula (turnover curve) developed in previous research that mimics practical inventory control, and used it to audit the inventory control performance of inventories in the aggregate and at multiple stocking points. He found that the same turnover curve can be used to estimate the impact of changing the inventory control procedures, or to set new targets for inventory levels (Ballou, 2000).

3.16.6 Procurement strategies

Many firms have scheduled procurement strategies to minimise manufacturing and logistics costs. The procurement of materials or goods should be in line with the firm’s capabilities to handle production, storage or distribution. In addition, some firms also engage in global purchasing as their linkages expand and internationalise. For example, vertical integration decisions are made with the procurement strategies in Europe’s paper industries (University of Padova, 2001).

The emphasis on supply chain integration and joint process improvement has changed the way companies approach procurement. Companies are shifting inventory back up the supply chain, and increasingly seeking integrated supply chain solutions, rather than individual products. Information and communication technologies are also helping to increase the leverage of procurement organisations. Technology is allowing companies to track purchases across their entire enterprise and consolidate purchases. Procurement practices are instituting sophisticated new buying processes and changing the relationships firms have with their suppliers (McGinnis and McCarty, 1998).

3.16.7 Optimisation of storage and maintenance approaches

In the warehouses or Distribution Centres, it is important to optimise the storage and maintenance of inventories. The design of picking systems for instance, can save time and costs if planned appropriately. Many logistics firms today deploy automated storage and retrieval systems for order picking. This assists in alleviating overscheduling and maintenance of the inventories (University of Padova, 2001). The general warehousing concept includes the storage and retrieval operations, the organisational aspects, the mechanisation equipment for materials handling, media for material storage, and the building itself which provides the necessary environment to
protect the goods. It is the physical processes of material handling and stocking that concern the physical storage and retrieval of materials, and also the processing of information needed about the goods stored. This is information-oriented, and requires the use of efficient media to store and handle data about the movement of goods. It is important to have control over the inventory (Gunasekaran, Marri and Menci, 1999). To achieve efficiency, a focus on the correct evaluation, identification, classification and quantification, retrieval, and security of goods, would provide a clear and accurate view (Chorafas, 1974).

3.16.8 Performance measurement

In addition, firms can achieve a strategy for process improvement through benchmarking. This strategy can increase the knowledge about the supply chain management process, and enable industrial partners to learn from best practice (Andersen et. al., 1999). Supplier relationships have recently adopted a changing role with the assistance and guidance in the performance assessment or benchmarking within the supply chain network, as evident in some industries. It is important to develop appropriate performance measures for the management of customer-supplier relationships. In Finland, there is benchmarking in the logistics performance of municipalities (University of Padova, 2001). Van Hock (2001) also states that measurement systems contribute significantly to the expansion of alliances in supply chains. Leveraging the supply chain requires innovation in measurement and control (Van Hock, 2001). Mentzer and Firman (1994) noted the importance of logistics control systems. Measurement and control of logistics performance entail four broad aspects: information systems to gather and report performance measures; good performance measures; variance analysis; and corrective action.

Performance measures should include aspects on the effectiveness, equity, productivity and profitability of the firm. Effectiveness is how well a company achieves its goals in terms operations and services provided. Equity is an aspect that can be related to customer service. Productivity is a measure of output and input. It measures how much was produced with given resources, taking into account the delivery time and costs. The measurement of this dimension is often referred to as cost-benefit analysis. Lastly, profitability is the revenues received minus the costs incurred (Mentzer and Firman, 1994).
3.16.9 Environmental logistics

International trade is highly regulated with international standards and laws. ISO 14000 on environmental protection is a growing issue, and many firms are now taking this aspect into account. In logistics, it is important to analyse the suppliers' role in environmental management such as packaging manufacturers, the environmental information systems, and the supply chains with regard to their environmental impacts. For those reasons, an integrated assessment is needed for the potential of ecologically designed logistics.

The role of the government also affects the operations of logistics (Stock, 1992). Firstly, they set various mandates and policies such as vehicle emission standards, noise control, and recycling requirements. They also set stringent standards on source reduction, material reuse, and waste recycling. Secondly, they support research and provide investment and regulatory incentives for businesses to develop new environmental technologies. Thirdly, since the government is often the single largest buyer of goods and services in many countries it can use its power to buy 'green', consequently providing monetary incentives for government contractors (Stock, 1992).

The role of logistics managers is important because their decisions on how and where resources are used can potentially have a major impact on the environment (Wu and Dunn, 1995). Many traditional trade-off decisions need to be re-evaluated. Logistics managers should make environmentally responsible decisions which are coherent with corporate goals and objectives.

3.17 Continuous Innovation in logistics

The concept of Continuous Innovation was discussed in Chapter One. It is a broad approach taking into account incremental and radical improvements in various aspects. This notion implies an ongoing process and encompasses operating and improving existing, as well as developing and putting into use new, configurations of products, market approaches, processes, technologies and competencies, organisation and management systems (Boer, 2002a). Boer (2002b) notes that in addition to this, successful companies have to combine both operational effectiveness and strategic flexibility. Firms can be operationally effective, by satisfying today's customers needs,
using exploitation capabilities, whilst at the same time, be strategically flexible in
meeting future customers needs, using exploration capabilities. He further contends the
need for a balance between the two. Continuous Innovation generates sustainable
growth, based upon the capabilities and attitudes of people within the organisation. It
depends on a culture that encourages entrepreneurship, and processes which enable
creativity (Knox, 2002).

Moreover in the logistics sector, firms should remain competitive and employ
this concept of Continuous Innovation. There is no doubt that products, services,
processes, technology, market approaches, systems and technology should be
intermingled to a suitable configuration to meet existing and future needs of logistics.

3.18 Conclusion

In general, there is substantial amount of literature on innovation. Several issues
have been raised in this chapter which show the importance of innovation in the
business environment. These issues are pertinent to justify the principal area of this
research, and they will be highlighted and elaborated in the following chapter. For
instance, learning, knowledge management, and technology are some important factors
that have considerable effect on innovation. In addition, there is also a necessity to
comprehend the capabilities required for effective innovation in organisations. This
study focuses on how logistics firms today can engage in innovative efforts. The next
chapter will elucidate the need to converge such information to sustain a better
understanding about how such firms innovate. This is in line with the central research
question and the research sub-questions. The themes that have developed from Chapters
Two and Three are relevant to considering the process of innovation within logistics
firms and what their considerations are.
CHAPTER FOUR
THEORETICAL FRAMEWORK

~ We dissect nature along lines laid down by our native language. Language is not simply a reporting device for experience but a defining framework for it. (Benjamin Whorf) ~

4.1 Introduction - rationale for the development of a theoretical framework

The previous two chapters identified issues that are pertinent to this research. They gave an overall picture as to why and how organisations innovate, and illustrated the various factors that underpin this research. Based on that review, this chapter gives an overall framework for the research, and a justification of the central research question as laid out in Chapter One.

There are several key issues on innovation that can be identified and considered desirable for further research. From these main themes, a Venn diagram is constructed to give a diagrammatic illustration on how they fit in relation to this study. Following this is a section identifying the shortcomings and gaps in the literature surrounding this topic. This underpins the justification of the research, and a framework that sets out the guiding direction of this study.

4.2 Key issues

4.2.1 Innovation

There is considerable and increasing literature on innovation, giving great attention to its importance in the business environment. The concept of innovation is valued in all organisations to create and sustain competitive advantage. Firms need to innovate in order to stay ahead in the market. The business place is encountering internationalisation of technology-driven competition, globalisation of manufacturing, shorter product life-cycles, increasingly sophisticated customers needs, and a greater integration of technologies. These challenges have compelled organisations to develop innovative methods and strategies.

The literature on innovation is the background for this research. There have been many views and definitions of innovation put forward by a wide range of authors throughout the last four decades. There have been widely differing views as to what
constitutes innovation. In the 1960s and 1970s, innovation was regarded as an introduction of change and the generation of new ideas. Towards the 1980s and 1990s, the concept included conditions such as profitability of the company, competitiveness of the economy and customer satisfaction. This expansion of the concept of innovation in many ways explains the global increase of research in the last twenty years. As discussed in the previous chapter, some models of innovation suggest that firms perform better with incremental innovation as they already have the capabilities in place. Radical innovation on the other hand, has been argued as being better suited for new entrants into the market.

In addition, recent studies have introduced the concept of Continuous Innovation involving both radical and incremental improvements (Boer, 2002a). This study aims to focus mainly on Continuous Innovation, and how processes in logistics can be improved.

4.2.2 Learning

Learning is a very critical concept, and relates closely to innovation. It was highlighted by various authors that sharing and transferring knowledge could enhance learning. It is through this learning that individuals gain knowledge, disseminate and apply it throughout the organisation, and create a culture embracing constant change. Innovation is seen as a learning process that sustains competitive advantage (Caffyn et al., 2000). The literature review depicted various works on organisational learning—the cumulative learning of individuals, resulting in synergistic efforts to betterment. To be successful in innovative efforts, there is a need for a major change in behaviours, attitudes and organisational culture, in order for widespread learning to occur. In other words, the learning behaviours will demonstrate a change in the organisation, as they become embedded and shape the structures and culture of the organisation (Sloan and Hyland, 2000). Only then can effective innovation take place. This study incorporates some aspects of the learning competencies of individuals that mould into behaviours within the organisation and demonstrate innovative capabilities, as depicted in the theoretical framework and model constructed.
4.2.3 Knowledge management in innovation

Closely linked to the concept of learning is knowledge management. Knowledge is a valuable resource essential for the progress of organisations. Acquiring knowledge is a process that deals with the development, storage, retrieval and dissemination of information and expertise, to assist, support and improve the business performance (Gupta, Iyer and Aronson, 2000). Knowledge is an asset in the human attributes, and viewed as an important tool by management, since it takes into account the value of creativity. This enables the transformation of one form of knowledge to the next level where a new perceived value is created, and this effectuates the start of innovation (Carneiro, 2000). It can therefore be enhanced and efficiently used to benefit the organisation.

More focus and consideration should be given to the intellectual capital of organisations and innovative strategies, as the human attributes can serve as invaluable sources of business competitiveness. It was argued that knowledge is essentially the primary source and core component of any organisation's innovative potential. For knowledge management, a set of organisational capabilities could be achieved if properly managed and combined with innovative efforts, updated technology and knowledge development (Carneiro, 2000). The investments in developing knowledge and human capital have resulted in innovation, because by stimulating and improving information, people are more motivated to improve, create suggestions and are able to confront rapid changes through the sharing of knowledge. The direct linkage of knowledge management to innovation is supported in by many authors (e.g. Marshall, 1997; Castells, 1996; Harari, 1994; Nonaka, 1991; West, 1992). In view of this, knowledge has been incorporated in this study, investigating the extent of diffusion, upgrading and accumulation of knowledge in the organisation.

4.2.4 Capabilities

Organisations have to assess carefully their existing capabilities before engaging in innovative activities. Incremental innovation may prove beneficial since the company already has much of the required knowledge in place. The literature review has identified various competencies and capabilities, giving illustration how they assist organisations in their innovative efforts. As a result of these capabilities, Grant (1991) has emphasised that strategies for innovation should be formulated, after observing the
firms' capabilities, strengths and weaknesses which are critical in changing conditions. In addition, Hamel and Prahalad's (1994) notion of core competencies also points towards organisational capabilities that assist in achieving a competitive advantage and innovative efforts.

The literature highlights the diverse views on the capabilities needed for innovation in organisations. There were different models, identifying general principles and criteria for understanding and managing innovation. Some authors insist a macro view is necessary, accentuating the environment and industry market, whilst others are limited to a more internal perspective of the organisation. This study however, will restrict the study of capabilities to the firm-based view plus relevant external linkages. Logistics firms have many linkages and their operations depend on partners in the supply chain. For them to be innovative, some of the capabilities relate to external suppliers and customers. Based upon the various concepts and views of authors, the study has identified and collated several capabilities. They will be investigated in more detail for Continuous Innovation to occur in organisations.

4.2.5 Importance of service innovation

Several authors in the literature have argued that people need to change their perceptions about the service sector, traditionally seen as a supporting role in the economy. Service is of increasing importance, and innovation in services is crucial to economic performance. The drivers for innovation in services may be similar to that of manufacturing, but their roles are different. People need to change their perceptions of services, because the industry has become dynamic, innovative and pivotal to the economic growth. Service firms are in fact becoming more innovative, with their significant and extensive range of activities. The literature has also identified the importance of various factors affecting innovation in services, and why such firms are turning towards improvement.

Logistics services are important service functions and a growing industry as organisations face issues of providing goods and services to customers. This is because of the proliferation of trade activities internationally, firms achieving higher production, and the sourcing of efficiencies for that. The significance of integrating transportation, inventory and communications indicates that logistics plays an important role in moving
materials and products throughout supply chains. In order to be more competitive, logistics organisations contemplate various conditions and innovative strategies. The literature on logistics services is insufficient, and lacks emphasis on innovation in the processes involved. This study has identified relevant issues pertaining to the process innovation, involving small incremental as well as radical changes, i.e. Continuous Innovation for logistics services.

4.3 Focus of research

Based on the various issues from literature identified, the focus of research is illustrated graphically through a Venn diagram depicted in Figure 4.1. The study converges towards aspects of innovation in logistics services, taking into account the various concepts portrayed. The focus consequently, is encapsulated in the overlapping areas as depicted in Figure 4.1. This has identified the variables relevant in ascertaining innovation in logistics services. Due to the wide range of activities and numerous processes involved in logistics, the research will confine its studies and investigations to Distribution Centres with warehousing and distribution operations.
4.4 Shortcomings of the literature

Several models have been identified and described in the literature review in Chapter Two. These models of innovation are a broad and exhaustive illustration of innovation. Technology seems to be evident and important in most of the models, as one of the precursors for innovation. In fact, a few authors such as Tushman and Rosenkopf (1992) and Foster (1986) describe innovation as capitalising on
technological methods and advancements. Similarly, many authors rate knowledge as a critical factor for innovation. Firms need the construction of a feasible strategic knowledge system, inferring that managers have to organise and motivate employees to develop knowledge levels to benefit the organisation. In examining the models, they have identified a lot of elements that are common such as learning, technology, knowledge and capabilities for innovation. However, these models do not fully represent the requirements needed for innovation.

More scope and information are needed to give a deeper understanding to innovation as a whole. Innovation is more than just the introduction of one or a few concepts such as knowledge, culture, new technology, new products or services. Organisations have to function within systems and with processes in place encompassing a combination of factors. To improve in operations, there has to be competencies, behaviours and capabilities embedded in the people and structure, and an organisational climate conducive for innovation. There is a deficiency in the literature in this area with very little written on other capabilities required for innovation. It is evident from the models of innovation that technology plays a pivotal role in innovation, but more research is needed in other areas apart from technology. Firms maintain other capabilities in supporting their innovation strategies, and there is a need to consider other factors holistically that comport with each other such as the organisation structure, strategy, culture, climate, knowledge management, learning behaviours, management and leadership. These have been reviewed in the literature in isolated sections, and there exists very little empirical research on them in synergy or combination.

Furthermore, the service industry has received little attention in the literature with regards to innovation. Many authors tended to emphasise more on manufacturing and new product development. There is a lack of research and studies on the non-technological aspects and processes that predominate in service industries. There are new ways of doing things for instance that may render service activities more inclined towards innovation. Services are in fact innovating with less tangible, disembodied changes. The significance of such wide-ranging innovative activities is paramount, and more research and empirical studies need to be conducted. This study has identified gaps in the literature on innovation in services and, as a result, will investigate how
service firms can innovate through continuous or incremental changes in their processes and procedures encompassing a range of factors. Logistics services is selected as the basis for the research because it is a growing industry in the service economy.

There is some literature on the general strategies and operational characteristics of logistics providers. However, most of it focus on the management of logistics function from the users’ or manufacturing perspective. This was illustrated through the works from Bardi, Raghunathan and Bagchi (1994); Hill (1996); LaLonde and Masters (1994); Fawcett and Clinton (1996); and Richardson (1995). In addition, many authors embrace a narrow scope and only focus on limited or specific areas in logistics. For example Cuthbertson (1995) concentrated on Information Technology for innovation in logistics; Olson (1996) concentrated on warehousing; and Cooke (1996) focused on benchmarking for logistics. Research emphasis and empirical studies done in logistics innovation are very limited and narrow in scope. In actual fact, logistics entails many processes in its operations and requires a wider view.

4.5 Shortcomings of the CIMA model

The literature review in the Chapter Two described the CIMA model and the rationale for its conception. The study looks at innovation with ideas and concepts derived from it. As elucidated in that chapter, the CIMA model was designed to study Continuous Innovation in new product development from the manufacturing perspective. The direct application to services or logistics in this manner, posed some limitations. It is lacking in important aspects necessary to investigate how firms innovate. It is considered that in the European-Australian research, the CIMA model did not pay sufficient attention to the specific activities needed to develop capabilities for innovation. This is because only a set of eight categories of behaviours were pre-identified, and queried if firms achieved those behaviours or not. The CIMA model was exploratory, and sought to identify or test the presence of generic behaviours. It lacked the investigation and measures, as to how those behaviours were carried out. Such bearing of actions actually depicts the individual competencies, leading to behaviours which then build into organisational capabilities. In other words, competencies develop behaviours that ultimately mould into capabilities. The CIMA model only concentrated on the behavioural level, and did not focus on the deeper aspects of competencies which are the core components that operationalise behaviour.
Nevertheless, the CIMA model is useful to some extent by providing the concepts, as well as some of the variables which can be utilised as a guide in implementing this study. The variables are pertinent in identifying actions which foster and sustain innovative activities. This was previously explained in the literature review. These variables were applied to some extent in the processes for warehousing and distribution. The study has focused on specific firm-based capabilities, individual competencies that lead to behaviours, and contingencies required, enhancing improvements. It investigated the factors or drivers causing firms to improve and innovate. Contingencies can be considered as both external and internal variables to the company. External variables are related to the environment in which the company is operating, whilst the internal variables relate to the company's characteristics. They also affect innovative efforts of the company and have been investigated.

All these variables when analysed on a bigger picture, then led to some insight as to how firms innovate. Considering variables such as capabilities, competencies, and contingencies from the CIMA Model, a distinctive framework for innovation applicable to this study has been constructed in Figure 4.2.
4.6 Framework for the study

![Diagram of Continuous Innovation]

Figure 4.2 Framework for innovation

The most important aspects of this study will be the capabilities and competencies, because they are the focus of meaningful change management, conducive for Continuous Innovation to occur. Capabilities constitute behaviours that can be learned, implemented and measured. Behaviours are made up of competencies inherent in employees of the organisation.

The study draws together the CIMA model with work done by various authors in the literature review such as the specific capabilities required for logistics innovation. This will enable the research to identify from case studies the specific behaviours required in logistics services, and by analysing these behaviours put forward a set of competencies that employees need to stimulate learning and innovation.

4.7 Central research question

Based on the direction and main emphasis of this study, there are several issues that emerge from the discussion. The central research question that has been identified is:
How do organisations with logistics operations providing warehousing and distribution services improve through Continuous Innovation; and what are the drivers and performance measures of this process?

Innovation today is considered critical in logistics and distribution in order to compete effectively. A large number of organisations in the supply chain feel the need to keep up with changes, new ways of doing businesses, and engage in innovative practices. Accordingly, this study gave subsequent distinction as to the different methods and techniques deployed, and the various issues encountered in innovation. Furthermore, the research has studied organisations in two countries, and made some comparisons between them, to highlight the perspectives and illustration of the concepts applied. It seems apparent that innovative strategies and practices may vary in different countries. The differences in climate, culture, and government regulation from the literature review suggest that there may be different strategies and practices between countries pertaining to Continuous Innovation. As a result, the analysis in subsequent chapters has identified, evaluated, and contrasted some of those factors.

Singapore was chosen as a country for comparison because of its similar population level to Sydney, Australia. Moreover, it is a modern society that is expanding in its entrepot trade. Although it is classified by the Organisation for Economic Cooperation and Development (OECD) as a developing nation, Singapore is an advanced economy in terms of the facilities, structure, trade linkages and financial system, and would serve as an appropriate model of comparison with Sydney. There is heavy emphasis on logistics in Singapore due to its strategic location in Southeast Asia. With the vision of striving as a total logistics hub in the near future, and with leading edge capabilities in terminal facilities and logistics management competency, Singapore has a lot of potential in this industry. As mentioned in the literature review, logistics contributes seven per cent to Singapore’s Gross Domestic Product (Singapore Trade Development Board, 2001). An international perspective would seem highly useful in this study and give valuable insight in the analysis to further assist organisations to improve their innovative capabilities.

In considering the central research question, it aims to explore how such firms improve through Continuous Innovation. There is also a need to investigate further the process of innovation and what the considerations are. In doing so, an understanding is
required of the internal processes, systems and objectives. There is a need to investigate the firm's impetus for improving and the underlying organisational capabilities. Correspondingly, a deeper level of understanding is required into the employee or individual position. As such, the behaviours and competencies need to be investigated. The central research question has been divided into the following six sub-questions that together lead to an answer to the central question.

i. *What are the main drivers of innovation in the selected Distribution Centres providing warehousing and distribution services?*

ii. *What capabilities do the selected Distribution Centres have to be innovative?*

iii. *What behaviours are indicative of these capabilities in the selected Distribution Centres?*

iv. *What competencies are evident in individuals to operationalise the behaviours and capabilities for innovation?*

v. *What are the performance measures adopted by the selected firms to sustain Continuous Innovation?*

vi. *What links do firm contingencies have with the drivers, performance measures, capabilities, behaviours and competencies?*

### 4.8 Conclusion

This chapter gave the overall setting and the guiding framework for the research. It has identified several key issues for further investigation. It reinforces this intent by identifying the inadequacy of the literature, in the sense that more scope and information is needed. A more profound and deeper consideration is rendered necessary for innovation in logistics. Most authors tend to look at individual or a few important factors of service innovation in isolation, and secondly, they lacked empirical evidence for a rigorous establishment of theory. It is believed that organisations have to function within systems and with processes in place, encompassing a myriad or combination of factors. This study, as a result, distinguished the need to draw together more information about the realities, conditions and empirical findings, to foster an understanding about how such firms innovate and what their considerations are. With this bearing, the justification and rationale for the central research question have been laid out. In addition a modified model was constructed to steer the direction of this study.
CHAPTER FIVE

METHODOLOGY

~ The dogmas of the quiet past sleep quietly beneath the turbulence of the present, and those who bestir that turbulence. The thinkers of today, the pioneers of tomorrow create new methodologies that affect us all. (Peggy Ertmer) ~

5.1 Background to the methodology

5.1.1 Introduction

A research methodology needs to be grounded in a framework that encourages good research. There are important issues to consider when selecting the methodology. It has to be appropriate to address the research question or issues. There are four issues affecting any methodology decision that have to be taken into consideration. These are the nature of the research question, the skills of the researcher, the costs involved, and the time required to complete the research (Remenyi et. al., 1998; p.45). For a higher degree research especially in the management discipline, an empirical approach involving the collection and analysis of primary data is by far, the most commonly adopted approach (Remenyi et. al., 1998).

In addition, Cooper and Schindler (1995) stressed the importance of thorough planning and described the characteristics of a good research as follows:

1. The purpose of the research should be clearly defined.
2. The research should be sufficiently detailed to permit other researchers to repeat the methodology.
3. The research should be thoroughly planned.
4. High ethical standards should apply.
5. Limitations of the research should be frankly revealed.
6. The amount of analysis undertaken should be adequate for the decision maker’s needs.
7. Findings should be presented in a clear unambiguous way.
8. Conclusions should be justified.

(Cooper and Schindler, 1995; p.15-18)

These characteristics have been incorporated and addressed in the later sections of this chapter.
5.1.2 Qualitative research

The aim of qualitative research is to portray the reality of the area under investigation, and to enhance understanding of the situation, and the meanings and values attributed to this by individuals. It does not necessarily involve the quantification of facts (Rose 1994). Qualitative methods emphasise the value of individual experiences and views, as encountered in real-life situations. The nature of qualitative enquiry means that volumes of rich, deep data are produced, often from a variety of sources. While not seeking to reduce data to statistical evidence, research using qualitative data nevertheless requires systematic analysis. Given the volume of data produced, the practicalities of analysing, coordinating and ordering data into a form, from which conclusions can be drawn and recommendations made, can appear overwhelming. In the qualitative research paradigm, a variety of data analysis procedures are commonly used (Hewitt-Taylor, 2001).

The research reported in this study was conducted on organisations, employing qualitative methods of collecting and analysing empirical data to a large extent, with some descriptive statistics as supplementary information. A qualitative approach according to Bygrave (1989), encourages the development of practical and theoretical understanding, as well as the generation of new and alternative theories or concepts. Such an approach was appropriate for this study. Bygrave (1989, p.23) also asserted "at the beginning of a paradigm, inspired induction (or more likely enlightened speculations) applied to exploratory, empirical research may be more useful than deductive reasoning from them". He recommends that the "emphasis in an emerging paradigm should be on empirical observations with exploratory, or preferably grounded research, rather than testing hypotheses deduced from flimsy terms" (Bygrave, 1989; p.23). His view supported the purpose of this study, where investigation on how organisations with logistics innovate can formulate new concepts. This study was in line with the grounded theory approach using concepts from social science field research. It was an iterative process, and focused on the richness of empirical data that could generate theory.
5.1.3 Exploratory research

This study was exploratory in nature, as there has been little reported empirical research conducted on innovation in logistics or Distribution Centres. According to Yin (1994), the research must identify some situations in which all research strategies might be relevant. The “how” and “what” questions are asked about a contemporary set of events, over which the investigator has little or no control (Yin, 1994; p. 21). Yin also asserted that exploratory studies are primarily useful for the generation of hypotheses centred on the phenomena under investigation, while a hypothesis testing approach is appropriate for explanatory research. It was also anticipated that the research would result in the emergence of further theory and hypotheses, to guide future research in the area.

In applying Yin’s concepts to this study, it proposed to investigate ‘how’ innovation occurred in the selected logistics firms, and ‘what’ factors affected it. This has legitimate reasons for not having propositions, but rather using research questions instead. This existing condition in strategy led to the adoption of an exploratory study. It gains some originality and new knowledge, consequently adding to the body of literature. The aim was to find out the factors or variables needed for successful Continuous Innovation in the selected firms. These factors being the units of analysis, were carefully constructed drawing on the plethora of literature and initial field studies. After the factors were carefully considered and defined in the research questions, the data collection strategy was designed accordingly. The research into the relationship between the factors was essentially exploratory, in the sense that the main objective was the refinement of a research model to facilitate further research (Kervin, 1992). To this end, the process made extensive use of a literature search, and the information gathering stage could be viewed as a preliminary investigation, both identified by Emory and Cooper (1991) as core methods of conducting such research. The justification for the adoption of the exploratory approach for this particular study, lay in the nature of the subject area and the set of interacting variables that influence innovation.

5.1.4 Case study methodology

A case study is an objective, in-depth examination of contemporary phenomena, where the investigator has little control over events (Yin, 1989). It involves gathering substantial data from within an organisation to develop the clearest possible picture of
the phenomenon. Data could come from primary sources such as direct observation and interviews with people involved, or secondary sources such as documents, records or reports. Case study research generally focuses on conditions, using historical data mainly to comprehend or substantiate the information gathered about the ongoing situation. The researcher has little or no capability for manipulating events. According to Yin (1989), the case study’s purpose may be strictly to describe a situation, but more often it is to understand how or why events occur. As adopted in this study, data came from primary sources by direct interviews with managers in the selected organisations, with the main intention being to comprehend how innovation occurred within.

According to Mitchell (1983), a case study may be characterised as a detailed examination of an event (or series of related events) which the analyst believes exhibits the operation of some identified general theoretical principle. A very important advantage of the case material lies in the richness of its detailed understanding of reality. Zonabend (1992) stated that case study research is done by giving special attention to complexities in observation, reconstruction, and analyses of the cases under study, and the research is done in such a way that it incorporates the views of the ‘actors’ in the case under study.

This research using the case study method, has focused on providing explanations, and has used detailed description to resolve the underlying central research question and its six research sub-questions. It was an empirical approach adopted that aimed to develop understanding of ‘real world’ events. Similarly, according to Robson (2002), case study is a “strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence” (Robson, 2002; p. 52). McCutcheon and Meredith (1993, p. 239) also noted that “the gap between what academics were assuming and the real conditions of operations led to growing disparities between OM [Operations Management] research’s perspective, advice and workable solutions for managers”. Field-based research was viewed as a prime method of “gathering better information about the realities of operations systems, and to develop better more complete theories about them” (McCutcheon and Meredith, 1993; p.239). Valsiner (1986) highlighted “the study of individual cases has always been the major (albeit
often unrecognised) strategy in the advancement of knowledge about human beings” (Valsiner, 1986; p.11).

Case study is commonly considered in methodology texts as a kind of ‘soft option’, possibly admissible as an exploratory precursor to more ‘hard-nosed’ experiment or survey, or as a complement to such approaches, but of dubious value by itself (Robson, 1993; p.56). There is no doubt that there have been some criticisms from authors on case study being true research such as Campbell and Stanley (1963), and Nisbet and Watt (1980). For instance, to qualify for ‘true research’, it has to rely on ‘skills of numeracy and statistical analysis’ (Nisbet and Watt, 1980; p. 8).

There is a necessity to dislodge the notion that ‘true research’ depends on the skills of numeracy and statistical analysis. This argument can be counter-claimed by the works of other authors investigating the scientific nature for case study. Chalmers (1982), on researching ‘What is this thing called science?’ presented his views that:

- Ultimately, there is no fully proven scientific knowledge,
- There is no foolproof or automatic method for deriving scientific theories from the ‘facts’ of experience,
- Science is based on many other things as well as what we can see, hear, etc.,
- The person of the scientist and her or his opinions, prejudices, etc. loom large in science, and
- Objectivity cannot be guaranteed.

(Robson, 2002; p. 58)

Chalmers (1982) stressed the ‘realist’ aspect that the whole point of the activity, why the theory is developed, is to attempt to come to grips with some aspect of the world. Case study research does not appear to present any special difficulties on this view of science. Robson (2002) stated that the study of the particular which is central to case study, is not excluded in principle. They are the aims and intentions of the study, and the specific methods used that have to concern us (Robson, 2002; p.59). Similarly, Carr and Kemmis (1986) concluded that what distinguishes scientific knowledge is not so much its logical status, as the fact that it is the outcome of a process of enquiry which is governed by critical norms and standards of rationality (Carr and Kemmis, 1986; p. 121).
5.1.5 Multiple case studies

According to Robson (1993), there is a very common misconception that people tend to view multiple case studies for the purpose of gathering a “sample” of cases, so that generalisations to some population might be made (Robson, 1993; p.161). Yin (1989) made this useful analogy that carrying out multiple case studies is more like doing multiple experiments. These may be attempts at replication of an initial case, or to build upon and complement the first case. This method is concerned with analytical generalisation. Case study outcomes are likely to be multifaceted and difficult to capture adequately within a simple theory.

This study consisted of multiple qualitative case studies. The method was chosen, given that no research has been reported on innovation in Distribution Centres or firms with logistics services. The factors impact innovation in such firms, and case study research "is an empirical inquiry. This allowed for a contemporary phenomenon to be investigated within its real life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994; p. 58). Also, given that the research questions focused essentially on how Distribution Centres innovate, it was congruent with Yin's (1994) recommendation that such research when requiring no control over behavioral events, should be carried out with case studies.

The ten organisations examined were regarded as units with strong interrelationships between internal functions and aspects deployed within. A multiple case study approach allowed the researcher to test the congruency or fit of the ‘real world’ to the factors identified. Such a measure helped to ensure the reliability of cross-organisation and cross-site comparisons between Singapore and Australia, as well as of analysis; since all interviewees given that they occupy similar position levels (managerial), should have access to a similar range and nature of information in their respective organisations.

The use of multiple sites could also contribute to the reliability and consequent generalisability of the findings (Brannick and Roche, 1997). Yin (1994) supported the use of multiple cases with the argument that the evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust. Similarly, Miles and Huberman (1984) found that multiple cases provide
greater explanatory power and stability than a single case. This is because by comparing sites or cases, one can establish the range of generality of a finding or explanation and at the same time pin down the conditions under which that finding will occur. The major unit of analysis in this study was the organisation such that the responses sought from managers tapped into organisational issues, rather than addressed those of the individual managers or employees. This approach is also reinforced by Yin (1993).

5.1.6 Quasi-judicial approach to case study

The data were collected based on the quasi-judicial approach as outlined by Bromley (1986). He modelled the approach on jurisprudence – the science of law. This approach covers a set of basic rules and procedural steps, as to how a case study should be carried out from start to finish. However, more attention is paid to structuring and conceptualising the analysis of qualitative data. Bromley (1986) used the conception of a systematic procedure which uses rational argument to interpret empirical evidence.

According to Robson (1993), the quasi-judicial approach does not produce tight prescriptions for analysis, but rather concerns evidence and argument. Nevertheless, the quasi-judicial approach was used in this study, as it provided a useful orientation and framework for dealing with qualitative case study. The steps in this approach are as follows:

1. State the initial problems and issues as clearly as possible.
2. Collect background information to provide a context in terms of which the problems and issues are to be understood.
3. Put forward prima facie explanations and solutions to the problems and issues.
4. Use these explanations to guide the search for additional evidence. If they do not fit the available evidence, work out alternative explanations.
5. Continue the search for sufficient evidence to eliminate as many of the suggested explanations as possible, in the hope that one will account for all the available evidence and be contradicted by none of it. Evidence may be direct or indirect; but must be admissible, relevant and obtained from competent and credible sources.

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6. Closely examine the sources of evidence, as well as the evidence itself. All items should be checked for consistency and accuracy. This is analogous to legal cross-examination in the case of personal testimony.

7. Enquire critically into the internal coherence, logic and external validity of the network of argument, claiming to settle the issues and solve the problems.

8. Select the most likely interpretation compatible with the evidence.

9. Formulating an acceptable explanation usually carries an implication for action, which has to be worked out.

10. Prepare an account in the form of a report. It should contribute to ‘case law’ by virtue of the general principles employed in explaining the specific case. (Bromley, 1986; p.26)

In summary, the methodology of this study utilised techniques based on grounded theory research. It was exploratory in nature and the empirical approach was adopted to collect and analyse primary data. A practical comprehension could be achieved from multiple case studies using selected organisations, and from there generate new theories if possible. In addition, the research was carried out in accordance to the steps delineated by Bromley (1986). In the beginning, the initial problem or research question was formulated pertaining to how firms with logistics operations innovate. This was investigated through three site visits and field studies in Distribution Centres. By obtaining first-hand knowledge through pilot interviews and observation, the central research question as initially proposed in Chapter One, and the theoretical framework was clearly defined. From there specific research questions were developed for the main interviews.

5.2 Administration of instruments

5.2.1 Data sets

Two separate data sets have been collected during the research in terms of location. The first of these consisted of five Distribution Centres that were defined through field visits in Sydney, Australia during the months August to November 2001. The second comprised another five Distribution Centres investigated in Singapore from December 2001 to February 2002. There were two intense periods of data collection during those six months – conducting field visits, semi-structured interviews, feedback to the organisations and continued interaction with them.
5.2.2 Researcher as instrument

Due to the qualitative research approach adopted and the exploratory nature of this study, the data were collected first-hand. Shaw (1999) in writing about qualitative research paradigms, which view social reality as constructed by humans, maintained that if it is to be understood, researchers cannot remain distant from and uninvolved in the social phenomenon in which they are interested. Instead, they must adopt a role such as "researcher as instrument for data collection", which allows them to get close enough to social subjects to be able to discover, interpret and understand participants' perspectives of social reality (Shaw, 1999; p. 65). For this study the author chose self-collection of data to develop a grounded understanding of process innovation in the Distribution Centres, and to meet the aims and objectives of the study.

The qualitative approach and exploratory nature also influenced the data collection methods. Research conducted within the qualitative paradigm is characterised by its commitment to collecting data from the context in which social phenomena naturally occur, and to generating an understanding which is grounded in the perspectives of the research participants (Bryman, 1988; Lofland, 1971; Marshall and Rossman, 1995; Miles and Huberman, 1984). This meant that the methods used in qualitative research allowed the researcher to enter into the social world, and to have an empathetic understanding of employees' competencies, behaviours and capabilities in the organisations under investigation. Consequently, the data were collected from participants in their natural working environment at the organisation. This method allowed the capture of data rich in detail about the research problem, and gave the flexibility to explore additional issues raised by interview participants.

5.2.3 Purposive sampling

In this methodology, the researcher opted for the principle of selection through purposive sampling. The ten cases or organisations chosen for data collection were based on the researcher's judgement as to typicality or interest. In this instance, they were all Distribution Centres with logistics operations, dealing with warehousing and distribution services. These organisations were chosen to meet the specific needs of the research. This approach is common to case studies (Robson, 1993).
5.2.4 Gaining entry

Gaining entry to the organisations or Distribution Centres for this study was fairly difficult. Most senior managers were busy, competitive professionals who guard their productive time in their firm. At times, they travelled overseas or interstate, and the plan to overcome this crucial difficulty involved influential referrals and contacts with the organisations. The interviews were arranged a month in advance, followed by a telephone call reminder a week before the scheduled visit. There was also a need to demonstrate ethical standards in this research, and to maintain anonymity of these organisations in the final transcript. Being in a highly competitive industry, many of the managers were concerned about jeopardising their trade secrets, confidential information or strategies. This involved enrolling the interest of the organisations to agree to share information with the researcher for academic purposes. It was also assured that the organisations interviewed came from an array of industries such as of consumer goods, timberware, motor vehicles, raw materials, electronics components. In this sense, there was no direct threat or competitive analysis of the individual firm. It was thoroughly explained that the broad aim was to research innovative activities in the organisations’ processes.

5.3 Overview of data collection methods

5.3.1 Background and contextual data

Field studies were conducted as initial tests prior to formulating the details of the pre-interview surveys and the semi-structured interview guides. A simple study was carried out on three Distribution Centres in Sydney, Australia that dealt with warehousing and distribution from November 2000 to July 2001. During the visits to those organisations, guided walkabouts were conducted and observations made on the operations and functions at the Distribution Centre. This was to give a general feel and outlook on the operations, environment, and employees at work. The main purpose was to provide a familiarity with the setting to later assist in designing the data collection tool for the research. The preliminary visits to the three organisations definitely helped in refining the data collection plans with respect to the content of the data and the procedures to be followed. Interviews were also conducted with the operations manager in each organisation, to gain an understanding of the operations, processes and systems in place for the Distribution Centre to operate. Field research was conducted as a preliminary study to incorporate different theoretical perspectives, and to explore the
relationship between the variety of methods. This was carried out through observation, open-ended unstructured interviews and the collection of documentary evidence such as corporate brochures and organisation charts.

5.3.2 Pre-survey questionnaire

For the initial data collection, a pre-interview survey questionnaire was sent to the firm, along with a letter that set out the purpose of the research. This was subsequent to the telephone conversation with the general manager agreeing to participate in the study. The survey questions given beforehand served to sensitise the organisation to the direction that the research was to take, and obtain valuable feedback from the managers to the design of the questions. This questionnaire encompassed short answers or multiple-choice type questions as to the company background and some operations of the business. The sixteen-page questionnaire also included a section on the contingencies of the firm, as well as some of the capabilities, behaviours and competencies. The questions were either prompted with answers to be ticked against, or the respondent had to fill in straightforward short answers. The purpose of the questionnaire was to limit the interview time and to keep only semi-structured and open-ended questions for the actual interview. A copy of this pre-interview questionnaire is attached as Appendix 5A.

5.3.3 Semi-structured interviews

Case study employs some kind of formal interview to complement observation of the operations. Field experiment using direct observation incorporates a post-intervention less formal interview, to help incorporate the firm’s perspective into the findings. The interview is a flexible and adaptable way of finding things out (Robson, 1993; p.229). Face-to-face interviews offered the researcher the possibility of modifying the line of enquiry, following up with interesting responses, and investigating underlying motives in a way that postal and other self-administered questionnaires could not. This ‘soft’ technique had the potential of providing rich and highly illuminating material.

Semi-structured interviews are where a set of questions has been worked out in advance. The researcher was free to modify their order, based upon perception of what seemed most appropriate in the context of the conversation at the time. The researcher
could change the way they are worded, give explanations, and leave out particular questions that seemed inappropriate with a particular interviewee, or include additional ones. In this way, the researcher as the interviewer, had a general area of interest and concern, but allowed the conversation to develop within this area. Powney and Watts (1987) supported this approach, stating that they are respondent interviews. There is greater freedom in the sequencing of questions in their exact wording, and in the amount of time and attention given to different topics.

5.3.4 Open-ended questions

Cohen and Manion (1989) listed the advantages of open-ended questions. They are flexible in the sense that they allow researchers to probe, so that they may go into more depth if they choose. Similarly, they may clear up any misunderstandings, or enable the researcher to test the limits of a respondent’s knowledge. This form of interview encourages cooperation and rapport building, allowing the researcher to make a truer assessment of what the respondent really believes. Open-ended situations can also result in unexpected or unanticipated answers, which may suggest hitherto unthought-of relationships or hypotheses (Cohen and Manion, 1989; p.313).

In this study, most data were gathered through semi-structured interviews to yield qualitative data. Semi-structured interviews were conducted at each firm with the managers separately most of the time. There were some open-ended questions in addition, seeking manager’s views and comments on certain issues and topics. A protocol was used as the guide for these interviews. The interview questions were generic for all managers. It was intended to interview three managers in each firm, namely the General or Planning Manager, Operations or Warehouse Manager and a Human Resource Manager, to give a wider perspective of the operations.

The first section of the semi-structured interview guide looked at the general factors triggering the organisation to want to innovate or improve. Questions were developed on the motives behind the strategies and programmes for Continuous Innovation. The next section includes questions with regard to the organisational capabilities, behaviours and competencies in successful innovative efforts. In this section, questions highlighted customer satisfaction, and targeted how the organisation was able to identify, meet customer needs and maintain satisfaction. Other capabilities
include how internal operations were integrated for efficient operations, how well the organisation collaborated with partners in the supply chain, how they managed technology and change within the organisation as well as monitored performance. The third section covers the competencies of employees. Questions were developed on team-based approaches, role of management, opportunities for development and how knowledge was diffused. The training and development, empowerment, teamwork and creativity issues were also covered in this section. Lastly, measures of outcomes or performance measures were included to see how the firms were able to develop and maintain measurement systems to facilitate strategies and processes. A copy of the interview guide is attached as Appendix 5B.

However, not all interviews were carried out as initially planned. Firstly, the researcher had difficulty securing interviews with the identified managers. They were either too busy, and were replaced by other willing managers, or in two cases the firm did not have a Human Resource manager. The other managers included a Quality Assessor, IT manager, Production manager and Administration manager. Secondly, in some instances, firms were unable to secure separate interviews for each manager at the last minute, and instead had to conduct a combined interview with all the managers present. Three out of the ten organisations requested for this due to time constraints, and felt that they were able to give better feedback as a group. Thirdly, two of the organisations could not procure three managers to be interviewed. The general managers of those organisations agreed to represent them, and answer the questions on their behalf. They assured that there was no necessity to interview all three managers. Only one manager was interviewed for two of the organisations. The researcher is fully conscious that this may change the organisational response considerably. Any reinforcement or rejection of responses by one or more manager will modify answers, and therefore provide different outcomes.

Interviews varied from 60 to 100 minutes. Most of the interviews were audio-taped and transcribed. The tape recording of interviews allowed for written, as well as mental notes of any analysis made during interviews. This also permitted the identification of particular responses to probe further during that interview, or at a later date. Sample transcripts for an organisation in Singapore and Australia are attached as Appendix 5C and 5D respectively. Each participant was asked if they objected to
having the interview recorded. Only managers in two of the organisations objected, and for those two, the collected data consisted of notes taken down and written up immediately after those interviews. Notes concerning the context of the interviews and any observations were also kept. After transcription, the respondents reviewed their answers, and where they thought appropriate, provided clarification and amendments via telephone. A feedback report on the interviews was then subsequently provided to each firm for verification to sustain reliability and validity.

5.3.5 Pilot case study

Prior to conducting the interviews with the organisations, a pilot case study was carried out to test the validity and reliability of the questions. The researcher was unsure about the responses obtainable, and therefore felt that the pilot case study could serve as a guide. An organisation in Sydney agreed to participate in the study as the pilot case. The general manager was contacted and given the aim and objectives of the study. He agreed and arranged for another two managers of the organisation to participate in the interviews. After interviewing the firm, feedback was obtained pertaining to the nature of the questions asked, so as to help the researcher to further refine the questions. Some of the questions lacked clarity and were too general. Other questions were not applicable given the size and nature of the organisation. A few of the survey questions had to be modified for better and easier understanding. These will be further elaborated in the next chapter in Section 6.3. The managers gave feedback that they were in no way intimidated, and that the questions did not probe too deeply into sensitive issues of the operations and processes. With the positive feedback, the researcher was able to proceed with the study of the ten organisations.

5.3.6 Observation

The degree to which a period of observation is structured largely depends on the stage of the research project. In the early stages of research, before the development of working hypotheses, observation tends to be unstructured (or ad-libitum) in an attempt to identify variables to investigate more scientifically (i.e. in a more structured fashion). Altman (1974) suggested the unstructured recording of behaviour as "typical field notes", with the researcher "recording as much as he can, or whatever is most readily observed..." (Altman, 1974; p.235). Section 5.3.1 explained the rationale behind preliminary visits to the three organisations conducted at the beginning of the study.
Guided walkabouts allowed for observation of operations in logistics services. The researcher was able to grasp more meaningful insight on the work functions, behaviour and communication of employees within firms.

5.3.7 Literature analysis

In analysing the literature by various authors, several themes of importance have emerged and been highlighted in Chapter Four. A model was constructed based on techniques for grounded theory research and conclusions which can be drawn from the literature. That espoused a setting or framework in which innovation occurs. The new model was used as a guide for the purpose of this study. Drivers or conditions causing innovation, organisational capabilities, behaviours, competencies, contingencies and performance measures were factors used, and they helped to form the various variables affecting innovation to which the data were collected and categorised under. To examine and validate these variables, ten Distribution Centres (inclusive of the Pilot Case) were selected and studied.

5.4 Units of analysis

5.4.1 Data interpretation

The general analytic strategy is one where case descriptions are developed. According to Yin (1994), each individual case should be considered as a single experiment, and their analysis must follow cross-experiment, rather than within-experiment design and logic. In applying this strategy to the research, each of the individual cases was discussed, and their results analysed. This was then followed by a cross-site analysis. The cross-site analysis consisted of the analysis of each single question such that the results obtained from the interviews of each of the organisations can be compared and contrasted with those of other organisations. By adopting this method, a general level of congruency or dissent toward each of the variables for innovation, by means of the interview responses was established.

Data collection and analyses are interwoven in qualitative research. Some authors suggested that they should proceed together and concept development should be examined in subsequent encounters with the study participants (Belgrave and Smith, 1995; MacKenzie, 1994). Data should also be analysed as promptly as possible after collection, so that qualitative elements of the encounter recorded in the data, can be
recalled as accurately as possible (Carey, 1995). In this study, the data collected in the research was combined with the recording of additional notes in a research journal, ensured that qualitative data analyses were as rich and detailed as possible. The process of data analysis commenced even before completing the fieldwork, with preliminary analysis performed within a week of the events recorded.

Analysis of qualitative data is a complex process which typically requires multiple readings of transcribed material to code and identify themes. The focus of the analysis process is to elicit meaning from the data (LeCompte and Preissle, 1993). Rather than conceptualising this process as a discrete stage of the research process, it was written that qualitative researchers often describe the analysis as a process that begins with the first interview, and evolves in multiple stages throughout the research process (Kvale, 1996). Unlike quantitative research, qualitative studies do not necessarily gain power with increased sample size. Typically, researchers strive for saturation (Glaser and Strauss, 1967), or completeness (Rubin and Rubin, 1995) of the data, which require enough cases to clearly identify and substantiate the analysis results. Researchers cannot predetermine the exact number of cases that are needed to achieve saturation based on statistics, and instead must assess the requisite number throughout the analysis process. In this study, limiting the number of cases to ten, with data rich in information and context was sufficient to substantiate the findings and conclusions.

5.4.2 Inductive analysis

Data analysis was inductive, as the study sought to promote an understanding of individual perceptions, not support a preconceived theory. As soon as the process of collecting data began, there were simultaneous analyses and interpretation of the perspectives of those interviewed and observed. It was ongoing and therefore inductive. Lofland (1971, p. 121) explained this when undertaking qualitative research that "during the observation or interviewing phase, one is at the same time trying to make some kind of abstract sense ... of the raw reality one is encountering." This is a befitting description of the overlapping activities of data collection, analysis and interpretation, which occurred during this exploratory study of firms. This early and ongoing analysis was necessary for a number of reasons. By overlapping the phases of data collection and analysis, it allowed to "adjust observation strategies, shift some emphasis towards those experiences which bore upon the development of understanding, and generally, exercise
control over emerging ideas by virtually simultaneously 'checking' or 'testing' these ideas," with the collection of further data (Marshall and Rossman, 1995; p. 103).

Immediately after the in-depth interviews and observations were transcribed and recorded, any analysis made was typed onto the transcript or written into the field notes. This second stage in inductive analysis involved reading and re-reading the transcripts and field notes made so far. It served two related purposes. The first was to familiarise with the data (Easterby-Smith, Thorpe and Lowe, 1991), and the second was to start the process of structuring and organising the data into meaningful units. The familiarity created by reading and re-reading transcripts and field notes heightened the awareness of the "patterns, themes and categories" (Patton, 1987, p. 150) of meanings existing in the data, and focused the attention on these. The purpose of running the data open at this stage in analysis, was to take the data apart, and then piece them together in a number of ways, each of which was potentially important to understanding the research problem (Strauss and Corbin, 1990).

5.4.3 Descriptive statistics

A certain amount of the data collected could be analysed quantitatively. These included the background of the companies, profile of interviewees, sections on contingencies and performance measures of the survey questionnaire. Some parts of the analysis and findings were quasi-statistical and could be presented using graphs, charts and tables. At this level, comparative statistics were essential for reliable conclusions to be made without undue effort. These were the basic descriptive measures which try to summarise data (Janes, 1999).

According to Stansfield (1995), descriptive statistical methods are frequently employed to research both in the form of tabular reports with accompanying narratives. Despite the prevalence of their use, both descriptive and graphical methods have substantial limitations when unaccompanied by comparative statistics to investigate the significance of the data being considered (Stansfield, 1995). Descriptive statistics have the advantage that in their more basic forms they are familiar and intelligible to the general reader. It was useful for this study because it showed the features of the data, and assisted in making tentative assertions from them. Descriptive statistics played an
important role because they were used for exploratory analysis, and for summarising data for further analysis.

5.4.4 Software analysis

A computerised tool was used to assist reduce the volume of work involved in this qualitative study. All qualitative data analysis methods involve coding data into themes, then categories, to form conclusions (Jasper, 1994). This study used constant comparative analysis (Benton, 1991; Morgan, 1993). The process of interpretation was as follows. All collected data were entered or referred to in a Qualitative Systems Research software programme called QSR NVivo (Richards and Richards, 1991). This international software package aided the analysis of qualitative data, through the identification and collection of comments and opinions on related topics or issues from the research. This software was chosen because of the volume of data handled, and the need to accommodate very rich and complex coding structures or subjects (Rouse and Dick, 1994). The qualitative semi-structured interview questions as used in the case studies, employed a cascading technique to extract the desired information.

NVivo can be divided into two main components – a document subsystem and an index subsystem. The document subsystem allowed the researcher to store text documents with associated data on-line. Interview transcriptions became on-line records within this programme whilst factors, notes and the like were stored as off-line documents. The index subsystem provided the coding capabilities required by exploratory studies, and allowed the researcher to specify the units of analysis such as lines, sentences or paragraphs. The software automatically broke the text documents down into the specified units. Then, the researcher was able to add codes to the particular unit of analysis, which can have an unlimited number of nodes. These nodes were represented as a tree structure.

For this study, the data were coded and then fitted into categories set out in the theoretical framework. The software was used to store, reference and collate all data. It was also used to generate interpretations once recorded. The format had to be suitable for entry into NVivo. This will be elaborated in Chapter Seven in the analysis. Index trees allowed seeing the underlying coding structure. An example would be the comments on the interview transcripts pertaining to capabilities were coded to a node
called *Capabilities*. Coding linked the text to the source document, transcripts and the individual organisation. At the same time, the original comments were preserved and could be easily accessed in the document system. When the database had been set up, a wide range of data searches was made easily available.

For this study, the questions asked were uniform throughout, and a structure had already been built. It was feasible to code data straight off from the question structure. From there, the responses were set as a branch off, and the nodes created from key terms and issues. In addition, the literature review was built in as a set in the tree structure to help in the later analysis. The findings from the analysis could be linked to the literature in this way. This software programme was powerful and efficient. It provided the frequencies and relationships of data, but it was the researcher who created the questions that permitted the necessary interpretation. By using this software, the researcher could find all the data or references using a search tool and discover the interpretations that lead to data. It was important to recognise that these interpretations were considered as data also. Often, the respondents provided information that excluded the need to specifically ask subsequent questions from the survey. During the course of the interviews, special care was taken to avoid leading answers. Despite changing the order in which questions were asked, the numbering was still retained because it formed part of the coding which was used by the software to categorise the responses. It was discovered that by using this software, the initial coding can be very time-consuming, but once it has been done, the retrieval and combining of information was far superior to manual methods and were far more flexible (Rouse and Dick, 1994).

The NVivo software provided an effective support for qualitative research without removing any of the essential creative aspects. It was well suited for a grounded theory approach and rendered support for the organising, analysis and report of data (Rouse and Dick, 1994). Additional notes or memos provided summaries of numerous raw data. This software also provided a range of mechanisms for classifying, combining and displaying the data in different ways.

### 5.4.5 Presenting the findings

This final phase involved presenting the findings that emerged from the process described above to each of the managers that were interviewed. These were conveyed
to them in the form of a report. The findings ensured that the understanding that had emerged from the analysis so far was a valid representation of the perspectives of the managers. It was necessary to present this understanding to them. In this way, research findings were given ‘social validity’ (Adam and Schvaneveldt, 1985). All the managers interviewed confirmed that the understanding of innovation in the firm presented to them was plausible, as it was a reflection of the perceptions they had.

In relation to the above, by presenting the understanding of the research problem to each of the participating managers, feedback was received and, in view of any comments made, a re-evaluation of the understanding could be made if necessary. By creating a situation in which research findings could be discussed with each of the managers, meaningful and insightful themes in the data could be correctly identified, and the relationships between categories and the understanding which had emerged were validated.

Additionally, it was important to maintain relationships with respondents and fulfil any promises made. Each manager involved was to be given a copy of the research findings. Discussions held with participants at this stage established that the study had been successful in acquiring an understanding of the impact which innovation in the organisation occurred, was representative of the perspectives of participants.

5.4.6 What did the researcher look for?

Researchers can never be truly objective or totally free of subjective values, as stated by Weber (1949). In social sciences methodology, the idea of objectivity has been drilled into researchers, so that some think it is inexplicably possible. A researcher can, and should make all reasonable and thorough efforts to ensure that what is reported is consistent “according to usual academic standards of reasonableness and objectivity” (Parker, 1997; p.39). Researchers look for data that are rich, and interpret these accordingly. However this needs to be tempered by the assertion that the researcher remained discursively conscious of the necessity to recognise the unexpected.

The bulk of the analysis was on organisational capabilities, the supporting behaviours, and individual competencies which made it conducive for Continuous Innovation to occur. Other external factors were also considered and as such,
relationships between the various aspects and variables were analysed for Continuous Innovation to occur. Human resource aspects such as workforce flexibility, training and development and empowerment were examined, as they affect the innovation capacity. This study was carried out in attempt to examine the entire organisation, covering functional departments as well such as planning, operations, administration and human resource. Furthermore, with the emphasis on the organisation of activities, the operations level of the organisation was looked at.

5.4.7 Construct validity

The study has identified three types of variables in the study: dependent, independent and external variables. Based on the model conceptualised for conducting the study, the main dependent variable was the performance measures the Continuous Innovation process (as the aim of the study was to find out how firms innovate). Secondly, the various factors affecting innovation were the independent variables. They directly impacted the outcome of the innovation. These referred to the drivers of innovation, organisational capabilities, supporting behaviours, as well as the competencies of individuals. A separate variable external to the actual innovation process, and impacting the organisation at a particular point in time, has been labelled as contingencies. All these are illustrated in Figure 5.1.
5.4.8 Underlying assumption

The basic assumption of this model was that innovation is a process. From this stemmed the other factors or variables. Innovation in an organisation depends on forces that cause it. These forces are the drivers, which push the individuals in the organisation to improve and possess the desired competencies. Individual competencies form collective behaviours, and ultimately form organisational capabilities. If there are drivers and capabilities, then these interactively will lead to innovation. They cannot affect innovation alone. For instance, only a driver by itself is insufficient to lead to innovation. A driver is a force propelling firms to desire to innovate such as the push from suppliers to automate or invest in technology. The push alone cannot create innovation. The firm needs to have some form of action or process to make this happen. They need a capability such as the ability to channel funds or resources to automate in the example mentioned. Similarly, in order for an organisational capability to be triggered or identified, there has to be some drivers or a foundation of individual competencies. The employees have to exhibit and apply competencies that show the behaviour. Only then can this form a capability in the organisation. Contingencies
affect innovation, but only as external influences on the innovation process at some point in time.

### Capabilities and supporting behaviours for Continuous Innovation

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<tr>
<th>CAPABILITIES</th>
<th>SUPPORTING BEHAVIOURS</th>
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<tr>
<td>Satisfying customers (A)</td>
<td>- Maintaining customer satisfaction (A1)</td>
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<td>- Collecting information to anticipate future needs of customers (A2)</td>
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<td>- Identifying new and different ways to satisfy customers (A3)</td>
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<td>- Being flexible and adaptive to unique requests (A4)</td>
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<td>- Accommodating unexpected situations (A5)</td>
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<td>- Forecasting future demand (A6)</td>
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<td>- Ensuring appropriate levels of safety stock (A7)</td>
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<td>- Customising services for customers (A8)</td>
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<tr>
<td>Integrating internal operations (B)</td>
<td>- Streamlining the vision and mission of the organisation (B1)</td>
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<td></td>
<td>- Imposing standardised policies and procedures (B2)</td>
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<td>- Having cross-functional unification across departments (B3)</td>
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<td>- Streamlining operations and managing efficiency (B4)</td>
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<tr>
<td></td>
<td>- Receiving and despatching goods (B4.1)</td>
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<td>- Controlling Defective/Damaged Goods (B4.2)</td>
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<td>- Controlling Stock (B4.3)</td>
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<td>- Provision for growth and expansion (B5)</td>
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<td>- Restructuring the organisation (B6)</td>
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<td>Collaborating with partners in the supply chain (C)</td>
<td>- Maintaining standardized operations (C1)</td>
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<td>- Joint planning with customers and suppliers (C2)</td>
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<td>- Sharing information with customers and suppliers (C3)</td>
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<td>- Sharing processes with customers and suppliers (C4)</td>
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<td>- Joint investing with customers and suppliers (C5)</td>
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<td></td>
<td>- Synchronising and interfacing with customers and suppliers (C6)</td>
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<td>Managing technology (D)</td>
<td>- Automating in operations (D1)</td>
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<td>- Maintaining information and communication systems (D2)</td>
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<td>Managing change (E)</td>
<td>- Perceiving change (E1)</td>
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<td>- Minimising resistance to change (E3)</td>
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<td>Reviewing performance (F)</td>
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<td>- Assessing Productivity (F3.5)</td>
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Table 5.1 Capabilities and supporting behaviours for Continuous Innovation
Based on the literature, several capabilities have been identified as pertinent for this model. In addition, they had to be supported by certain behaviours as illustrated in Table 5.1. The literature has also identified various competencies in individuals that were investigated in the case studies. These competencies are depicted in Figure 5.2 following:

![Diagram of competencies for continuous innovation]

**Figure 5.2 Competencies of individuals for Continuous Innovation**

### 5.4.9 Delimitations

The method is chiefly built upon case studies, from which rich qualitative data were gathered. These are sufficiently robust for theory to be built and tested. The data were collected from Distribution Centres in Sydney and Singapore at specified periods of time which delimits any claims based on those observations to those times and firms. In this study, it is recognised that the view gained is that from those ten diverse firms with dissimilarities in operations. This view might be contested at different levels or operations.

In view of this, Zimmerman and Szenberg (2000) have pointed out the difficulties and obstacles that may be faced when doing international qualitative research. Many researchers have issued warnings about using various methods across
different cultures and were especially wary of qualitative approaches. Zimmerman and Szenberg (2000) performed studies since 1989 on data collection in various countries. They state that problems may be encountered on three different levels:

- relations with the in-country research firm,
- reactions of respondents, and
- interpretations of data.

To clarify the three points stated above, it was indicated that that the major problems apparent include motivation of the local firm and developing clear understanding of objectives and methods, the need for excellent translation, difficulty of gaining responses, participants are unfamiliar with the process, or simply do not trust the researcher, and the difficulty of obtaining data compatibility. It was also stated that in many Asian cultures, respondents might be unwilling to offer an individual opinion that might differ from the group. As a basic goal of analysis, researchers want to be able to correctly state the real meaning of the research findings, and this is often their most difficult problem (Zimmerman and Szenberg, 2000).

In this study, the researcher was discursively conscious of these delimitations in the methodology, interpretations and conclusions, and this consciousness formed part of the method. Secondly, the researcher recognised the pitfalls of the methods used, and as such, conducted the data collection to the best ability. It was important to establish an excellent working relationship with all personnel involved in the organisations. This required clear communication and a great deal of patience. In improving results from respondents, the researcher needed to adopt techniques to suit each culture, and to immerse in the local business environment to improve understanding. This can be elucidated through the fact that the researcher is Singaporean, and could identify with the context and terminology used by the managers in Singapore. Some of them spoke with colloquialism and used slang words, which the researcher had to interpret discursively for this study.

5.5 Critical assessment of rigour in the methodology

5.5.1 Detailed interviews

The interviewees or managers in all the organisations confirmed analyses derived from the data and felt them to be accurate, suggesting that the research had a
reasonable degree of internal validity. However, the external validity of the findings was relatively low since only ten organisations were studied. The researcher was aware of the shortcomings of this, and did not intend to generalise the findings to be applicable to the whole logistics industry. This is reason for conducting an exploratory study, giving only an introductory insight for further research in future.

Even so, given the exploratory nature of the research, a detailed examination of ten firms was deemed to be more rational than to look at a larger number of organisations. Similarly, Mintzberg (1979) supported this view, and felt that small samples should be encouraged, rather than to have less valid data that were statistically significant. Due to resource constraints, the time frame available, and the choice between a survey across the whole population under investigation, or to use a limited number of in-depth case studies, the researcher has opted for this approach. This idea can also be justified by Gill and Johnsons' (1991) view:

"...We felt we would be more likely to produce valid findings in a relatively under-researched area if data were taken in depth from a few cases. It was not possible, given the level of resourcing, to pursue an ideal strategy and do both."

(Gill and Johnson, 1991; p.150)

5.5.2 Purposive data sampling

Rather than aspiring to statistical generalisability or 'representativeness,' qualitative research usually aims to reflect the diversity within a given population (Kozel, 1992; p.31-44). In the past, qualitative research often relied on convenience samples, particularly when the group of interest was difficult to access. Purposive or theoretical sampling however, offers researchers a degree of control, rather than being at the mercy of any selection bias inherent in pre-existing groups (Mays and Pope, 1995). With purposive sampling, researchers deliberately seek to include 'outliers' conventionally discounted in quantitative approaches (Barbour, 1999). It allows for such deviant cases to illuminate by comparison, those processes and relations that routinely come into play, thereby enabling "the exception to prove the rule"(Frankland and Bloor, 1999; p. 144).
Barbour (2001) however cautioned that purposive sampling in effect, involves hybrids, but may retain elements of random or convenience sampling, and which are unlikely to yield the spread of respondents required. When they are provided at all, details of sampling are often dealt with in the methods section of papers, and are disregarded in the analysis section, which often consists of little more than a description of undifferentiated themes that emerged during data analysis (Barbour, 2001; p.1116). In this study, the researcher was aware of Barbour's (2001) caution pertaining to purposive sampling as highlighted. In considering this, the researcher was guided by the structured nature of the investigation process to avoid misdirection of the research theme. Ten organisations were selected, and the all data collected were considered and analysed.

5.5.3 Techniques based on grounded theory

In its purest form the grounded theory approach to data analysis alleges that all explanations or theories are derived from the datum itself rather than from the researcher's prior theoretical viewpoint (Glaser and Strauss, 1967). According to many researchers who invoke the concept of grounded theory, coding categories reflect the content of data collected, rather than the questions on the interview protocol, and often uses concepts or vocabulary borrowed from respondents (Barbour, 2001). However in this case, the researcher has used techniques based on grounded theory research, and has attempted to relate the analyses back to the interview questions, avoiding much of the terminology and theories from respondents bearing any resemblance to current disciplinary concerns and debates.

Bryman and Burgess (1994) criticised the use of grounded theory as a convenient method rather than as a helpful description of the strategy used in analysis. Similarly, Melia (1997) claimed that most researchers use a pragmatic variant, whereby they can achieve added value by identifying new themes from the data, alongside those that could have been anticipated from the outset. In the absence of an attempt to systematically analyse the commonalities and contradictions reflected in the data, many researchers produce an artificially neat and tidy account that is descriptive, rather than analytical, and which militates against formulating in-depth analyses (Bryman and Burgess, 1994). In this case, the researcher has identified the pressure of such
circumstances, and explained the theory that emerged from the data in relation to how theoretical insights have previously been built up.

5.5.4 Multiple coding

Multiple coding concerns the same issue as the quantitative equivalent of 'inter-rater reliability' and is a response to the charge of subjectivity, sometimes levelled at the process of qualitative data analysis. Although multiple coding does not usually demand complete replication of results, it does involve the cross-checking of coding strategies and interpretation of data. The greatest potential of multiple coding lies in its capacity to furnish alternative interpretations, and in alerting researchers to all potentially competing explanations. Armstrong, Gosling and Weinman (1997) stated that there may be varied interpretations by different researchers, given the complexity of qualitative data, and the range of disciplinary backgrounds and interests of qualitative researchers explained this. Similarly, Mauthner, Party and Backett-Milburn (1998) have shown how researchers' original interpretations may shift when they revisit previously collected data.

In this study, the researcher was aware of both propositions put forth by Armstrong, Gosling and Weinman (1997); and Mauthner, Party and Backett-Milburn (1998). By revisiting their views and considering the research, it was felt that there would be some advantage in adopting multiple coding, because there was a lot of potential in the analysis of data. In addition, all aspects were conducted with thoroughness, both in interrogating the data at hand, and in providing an account of how the analysis was developed. The researcher carried this out conscientiously, in a systematic, repeatable process, to ensure that the analysis was rendered openly and honestly.

5.5.5 Triangulation

Data collecting is an iterative process. Triangulation is an indispensable tool in real world enquiry especially where the analysis of qualitative data is conducted. The trustworthiness of the data is always a worry (Robson, 1993; p.383). But by using several methods of collecting data, it gives the opportunity to 'get a fix' on data from different perspectives. If for example, the observations are consistent with the surveys and the literature, then one's confidence in the data improves. Moreover, triangulation
may suggest new cumulative data. This is another technique that researchers use to establish reliability and validity. It involves using multiple data-collection techniques, and/or multiple data sources to provide a cross-check of the findings (LeCompte and Preissle, 1993). The important benefit of using more than one method is in the “reduction of inappropriate certainty” (Robson, 1993; p. 290). It improves the quality of data and in consequence, the accuracy of findings.

The current heavy reliance on triangulation is its perceived value in demonstrating rigour (Robson, 1993). Triangulation addresses the issue of internal validity by using more than one method of data collection to answer a research question. Each of the methods deployed above has its strengths and weaknesses as highlighted. An advantage of using multiple methods is that the particular limitation of one method may be compensated for by the strength of another method (Caffyn, 1998). For instance, when using observation methods, and there are doubts as to the accuracy of data, the researcher relied on interview data, as they appear to have high internal validity.

However, it was observed that the researcher should be aware that sometimes triangulation may be difficult to perform properly. The data collected using different methods come in different forms and may be incompatible for direct comparison. This is especially true for different types of qualitative data (as well as for the more obvious differences between qualitative and quantitative data). Barbour (2001) has stated that the production of similar findings from different methods merely provides corroboration or reassurance. But the absence of similar findings does not however, provide grounds for refutation. This is because different methods used in qualitative research furnish parallel datasets, each affording only a partial view of the whole picture. Triangulation relies on the notion of a fixed point, or superior explanation, against which other interpretations can be measured. Qualitative research however, is usually carried out from a ‘relativist perspective, which acknowledges the existence of multiple views of equal validity’ (Barbour, 2001; p.1116).

In the beginning, this research was carried out through observational studies during initial field visits. The researcher conducted a pilot case study, and also derived concepts from a review of literature. In addition, the study used respondent triangulation. Collecting data from other sources checked the inferences drawn from
data. In this case, different managers from the same organisation were interviewed, with each giving their own perspectives on how the firm innovates. More specifically, respondent triangulation provided the comparison of data relating to the same issues and circumstances in the organisation, but derived from different sources.

5.5.6 Respondent validation

Respondent validation involves cross-checking interim research findings with respondents, and can assist in refining explanations. Mays and Pope (2000) pointed out that researchers seek to provide an overview, whereas respondents have individual concerns, and these can apparently result in a discrepant explanation. It was forewarned that sometimes researchers choose to disregard their own interpretations, and to accept those of respondents at face value, leading to collusion (Atkinson, 1997). The researcher has refined the explanations, keeping in mind the respondents' individual perspectives. This was done through reading the drafts, and rewriting the transcripts several times to reconcile the issue on respondent validation. Draft observations of the study were also checked during a second meeting with the interviewees ensuring respondent validation.

5.5.7 Ethical consideration and approval

Within many disciplines, be it education, management, behavioural sciences, medical sciences, nursing, anthropology, and many others, there is the apparent use of human subjects in research. This raises the question of ethical standards which should be conducted with careful scrutiny. The principles of ethical propriety at the base of most guidelines resolve into the unmistakable consideration leading to “...fairness, honesty, openness of intent, disclosure of methods, the ends for which the research is executed, a respect for the integrity of the individual, the obligation of the researcher to guarantee unequivocally individual privacy, and an informed willingness on the part of the subject to participate voluntarily in the research activity...” (Leedy, 1997; p. 116).

All research in essence, should fulfil the commitments and guidelines applicable. It should be conducted in circumstances where total disclosure of the main aims and purposes of the research are carried out. The University of Western Sydney sets out its own ethical considerations for all researchers to abide. There was a requirement under the ‘Human Subjects’ category relevant for this research for the ethical considerations to
be heeded. This was rendered through an approval by the Human Research Ethics Review Committee at the university before undertaking this research. Approval was granted in March 2001. The approval is attached as Appendix 5E.

The researcher was aware of the list of ethical issues when conducting this research, as stipulated by the university. Various managers from Sydney, Australia and Singapore were involved during the data collection. The researcher had to maintain scientific objectivity throughout, recognising the limitations of the managers' competence and knowledge, and did not attempt to engage in research beyond such competence. Every manager was given the right of dignity and privacy such as the refusal to be audio taped. The researcher respected their decisions and views in such circumstances. It was also drawn to their attention that the prerogative to obtain information was professionally for academic and research purpose. Similarly, sensitive issues were treated in the strictest confidentiality by the researcher. Finally, the findings of this research have been presented in an accurate and truthful fashion, without deliberate distortion from the data collected.

5.6 Conclusion
This chapter has explained the research philosophy underlying this study, which caused the researcher to take a preliminary approach utilising the techniques based on grounded theory research. It is exploratory in nature. It has described the research strategy and shown how, following the preliminary investigation, the practicalities and benefits led to the application of the various methods. It also clarified that limiting the number of case studies to ten was more than offset by the ability to conduct the case research in greater depth, and the ability to use additional methods. A critical review of the rigour in methodology has shown that although all the methods have certain limitations, their degree of validity and reliability is such that, taken together, it should be possible to build a credible picture of how firms with logistics operations in warehousing and distribution can continuously innovate. The results and findings derived by using these methods are reported in the next three chapters.
CHAPTER SIX

DESCRIPTIVE FINDINGS

~ It is pleasant to see great works in their seminal state pregnant with latent possibilities of excellence; nor could there be any more delightful entertainment than to trace their gradual growth and expansion, and to observe how they sometimes suddenly advanced by accidental hints, and sometimes slowly improved by steady meditation. Milton (1751) ~

6.1 Introduction

Chapter Five described the research strategy followed in this study, and explained the reasons for adopting such an approach. It gave practical details of how the research activities were carried out, and critically reviewed the main methods used in terms of reliability and validity. This chapter firstly reports the findings from the preliminary interviews and field studies within three Distribution Centres. It gives an in-depth description of the functions and operations present in those firms, and some of the major issues faced. It is important to present the detailed reports at this stage because subsequently, they can then explore the implications for research, and how these investigations led to the construction of the research instrument. Secondly, the presentation of the ten case studies provides a general overview of each company, before analysing the profile components. It goes on further to analyse the profile of interviewees, and gives a comparative picture of the organisations, through an examination of factors such as their functions, size, location, turnover and products.

6.2 Preliminary interviews and field studies

The nature of this research activity was exploratory, with the specific objectives of:

- learning the functions, systems and processes apparent in warehousing and distribution,

- exploring the scope and extent of innovation in Distribution Centres dealing with warehousing and distribution, and

- helping to shape the research instrument to be used for the case studies.

There was a need to study in depth the operations, functions and issues pertinent to Distribution Centres. As described in the previous chapter, guided walkabouts were
conducted. Observations were also made on the operations and functions at the Distribution Centres. These were conducted with the Operations manager for each. The purpose was to give a general feel and outlook of the operations, environment and employees at work. The preliminary visits to these Distribution Centres definitely helped in refining the data collection plans, with respect to the content of the data, and the procedures to be followed.

A descriptive report is presented in this chapter on the three firms because it was felt that based on the literature alone, there was insufficient information on logistics services and issues apparent in the Distribution Centres. Information and findings written in articles and reports were lacking, and those found did not provide a sound basis for further investigation. A clearer picture, from a practical perspective was required, with first-hand interviews and actual investigation in the firms.

Companies X and Y are independent from the actual ten case studies, and served as background information and concerns faced in logistics services. Company Z agreed to be the pilot case study for this study. Based on this trial and feedback from interviewees, the survey instrument was developed, and interviews conducted, thanks much to their cooperation, feedback and assistance. This pilot case study then served to be Firm A of the ten organisations in-depth case study research.

6.2.1 Company X

Company X is a large discount supermarket chain, a subsidiary of a large multinational corporation. It provides for 13.6% of the supermarket industry in Australia, and 23.7% in New South Wales. Currently, the organisation has been making substantial losses since 1994 (except for 1997) due to fierce competition, distribution costs, and the establishment of its new ‘fresh food’ strategy from 1996.

The Distribution Centre stores dry grocery replenishment which caters to the 136 supermarkets in the state of New South Wales. It has the objectives of being efficient and cost effective. The company strives to achieve Continuous Improvement in being in line with its vision and values. The employees are constantly reminded about the theme of ‘getting better all the time through improved systems, new
technology, innovative work practices, effective team work and an unrelenting focus on cost reduction' (General Manager, Company X).

6.2.1.1 Description of operations

Company X owns its Distribution Centres in Australia, of which there are four for dry grocery replenishments, four for perishable items, and two for produce stock. The Distribution Centres are based in each state, and handles its own operation to supply to its state-based stores in New South Wales, Queensland, South Australia and Victoria respectively. The Company X National Supply Chain handles all the ordering of products from the New South Wales office which is the national office. The stock is ordered by various means from the supply chain using Electronic Data Interchange (EDI), Autofax and an in-house information technology (IT) system. Upon the receipt of a stock order by the supplier, the Distribution Centre would then have the responsibilities of receiving, storing, assembling and distributing them to the supermarkets. The orders are generated using the following information on a particular item: current sales, lead time of supply by the supplier, current stock on hand, a safety built component and any other promotional activity.

The transformation process can be described in the following fashion. The major inputs into the operation of the Distribution Centre are the facilities, people, IT systems and physical stock, whilst the outputs come in the form of assembled and repacked stock to the supermarkets. The Distribution Centre receives stock from suppliers in pallets, and they are put in a holding area next to the receiving dock. They are picked up by forklifts and stored into 6-7 level storage racks in the Distribution Centre. When there is a demand for the items, the Distribution Centre assembles the various required cartons onto a separate pallet and packs them for delivery to the 136 supermarkets throughout New South Wales using contracted transport companies. They are loaded into trailers by electric pallet jacks at the despatch docks.
6.2.1.2 Key operations system

![Process flow chart in Company X](image)

Figure 6.1 Process flow chart in Company X

**Receiving**- This is initiated when a purchase order (PO) is issued to the supplier with the following details:

- Items ordered
- Description
- Size
- Number of cartons
- Quantity in each carton
- Due date of delivery to the Distribution Centre
- Address of the Distribution Centre

The supplier would then phone the Distribution Centre for a booking to deliver the stock. This is checked against the system via the LAN line to verify the description and quantity of orders. The gatehouse would also know of the schedule of supply trucks arriving. Once they arrive, the time is logged, and the trucks are sent to the receiving office. The invoice and goods are checked against that on the system, and keyed into a Warehouse Management System (Triceps), and a pallet label would then be printed to identify each pallet for storage. The Key Performance Indicator (KPI) for receiving would be the truck turnaround times, received pallets per hour and receiving errors.

**Storage**- Once the pallets arrive at the receiving dock, they are unloaded via forklifts and placed in a holding area, waiting to be picked and located in reserve slots. At a later time, they are then placed in storage racks. The capacity of the holding area is 3,000 pallets, whilst the reserve slots can hold up to 48,000 pallets. There are also additional areas used to stow away extra stock. These areas are based on the nature of the items. For instance, the pallets of 2-litre and 1.25-litre Coca-Cola pet bottles are
stored in big block stacks, because of the volume supplied to the stores. They are stored 3-pallets high on top of each other. On the other hand, potting mix is stored outside in the open area, because of its nature, the smell and its flat package bags. If they were put on storage racks, the stock damage would be too costly.

Storage of high-cube pallets would have to be considered, as there is limited number of slots. The 7th level, being the uppermost in the storage racks, has no height restriction. Goods with high-cube forms such as cereal, paper rolls and nappies are placed there. Once this level is full, the Distribution Centre will have to either stop receiving any more high-cube items, or find alternative storage space. This causes out-of-stock, or extra costs for the business.

Forklift allocation and maintenance also come under this area. The machine and labour for the forklifts are scheduled directly from this area to all other areas, and there is limited machinery. If there is a breakdown, some parts of the operation suffer. The spare forklifts are only used in urgent cases, but these are not high-reach forklifts to access the higher levels. High-reach forklifts are only used in the aisles. This can be alleviated through allocating the lower-reach forklifts to only limited height of reach. This can be implemented by changing the configuration of the warehouse management system for that particular forklift to be directed as per the requirement.

Whenever there is a breakdown with the forklifts, the receiving area suffers because team leaders allocating the machinery would normally fill their areas of responsibility first, before considering the other areas. This leads to conflict within team leaders from other areas of the operation. The main responsibility of the storage area is to let pallets down from the racks to fulfil assembly requirements for delivery. The Key Performance Indicator here would be the number of pallets let down per hour. Putting stock up into the racks from the receiving dock is not a priority. The demand, or the information on which pallets are to replenish into the slots, is directed based on invoicing to the stores, and the demand of items. This alternatively sends signals to the forklifts dedicated in those zones to perform duties based on priorities. This is done through Radio Frequency (RF).
Distribution - Included in the distribution, is the picking of items and delivering them to the supermarkets, as per the delivery schedules required. Each time a customer purchases an item from a supermarket, it is scanned, and automatically stored into the computer memory. At the end of each day’s trading, the total amount of items sold is sent to the host system or mainframe computer in the main office, located in Sydney city. The scanning and ordering process at the point of sale is referred to as In Store Processing (ISP). The host system then configures the items sold into full cartons. At 3 a.m. every day, the host system transmits a download which is a set of invoices for each supermarket, to the warehouse inventory system. The mainframe computer system also has an inbuilt system which allows it to check for possible errors. The system sends a warning to check an invoice if it detects any items that may have been ordered in excessive quantities. Following this, the invoice is then scanned for possible problems by a leading hand. The invoice is then ready to be released and printed out. These invoices are released according to a fixed schedule. Once released, it is then broken down into individual orders for individual supermarkets. These orders are to be picked by the assemblers at the Distribution Centre.

The assemblers are given a certain amount of time to complete any particular order. Then it is returned to the despatch office so that the order may be invoiced. If any cartons are unable to be assembled, they are deleted and automatically re-entered into the inventory system, causing a backlog. This backlog will be shown in that particular supermarket’s next transmission.

Despatch - The next stage is to organise the right truck for that market’s particular delivery. Once this has been identified, the assembled pallets are loaded into trailers via the despatch dock, through the use of an electric pallet jack. A consignment note is then raised and passed to the transport company. A Chep Card containing the transaction of the number of wooden pallets being despatched from the Distribution Centre is attached to the consignment note. The transport company will then have the responsibility to deliver the load within the given time frame. The delivery of loads follows a fixed schedule. However, there is some room for extra deliveries to be slotted in wherever deemed necessary. The next step is to inform the supermarket that the delivery has left the Distribution Centre, and the expected time to receive the load. The supermarket is also informed of the number of pallets that have been despatched.
Within the despatch process itself, there are many other processes that affect it. However they are controlled by external factors. The most significant of these is the daily transmission of the number of cartons required to be assembled for the following day from the Company X computer room. The make up of the transmission affects every process within the Distribution Centre, and more importantly, the despatch process. Other boundaries to the process include the contracted transport carriers. The markets have a great influence on the despatch process, and they are situated outside the boundary. The assemblers influence despatch a great deal, yet are outside the boundaries.

6.2.1.3 Issues of concern

Double handling process - The Distribution Centre currently faces the problem of double handling, with the concept of the holding area at the receiving dock. The pallets are unloaded off the supply trailers/trucks and placed there for a while, before they are then transported again to their respective storage racks. This takes up a lot of time, as compared to immediate placement for storage at the racks. The holding area could be freed for subsequent unloading. Secondly, the current concept of "first in first out" for stock would impede the quick and efficient flow of stock, since it requires extra handling of placing the new stock on high racks, and removing the old stock from them to the lower racks. This is timely and costly.

Congestion and capacity problem - Pallets are placed at the holding area when unloaded from the receiving dock. If there is a delay, or if there is no storage space in the racks, the pallets could remain there for a few days. This congests the receiving dock. Furthermore, forklifts would subsequently have difficulty in locating the specific pallets.

Special goods - Pallets containing stock such as potting mix are kept out in the open due to the product nature. Being exposed to rain and heat, the pallet labels fade over time, or are damaged by weather conditions. This poses difficulty in identifying, or locating the right or specific pallets when they are required.
*Shelf planning for stocks* - The fast-moving stock should be placed on lower racks for quicker access and easier transporting by forklifts. This is evident with the Coca-Cola 2-litre and 1.25-litre pet bottle pallets which are currently stacked on the floor. However, other quick-turnover or fast-moving items should be regarded in this respect, and stacked more conveniently for efficiency.

*Product-line range problem* - The Company X Distribution Centre and head office are currently situated at two different locations. This inhibits the interaction with management and other employees. For instance, the various product managers make decisions regarding the product lines to be adopted, and they deal directly with suppliers. The Distribution Centre has no control or management over the range of products delivered. There may be several brands of the same product which may seem inefficient to store. Some slow-moving stock, as a result of being less competitive, may be left on the racks for long periods of time. The Distribution Centre should therefore feedback to the head office about the excessive costs of warehousing such brands and issue of expiry dates for them.

Secondly, some of the products distributed in the Distribution Centre may seem unnecessary, or incompetent for Company X to adopt. They should be left to other specialised retail stores. Examples of these are stationery, plastic chairs, batteries and non-grocery items. It was elaborated that some of these products are utilised for internal purposes (such as printer cartridges) among the various supermarkets or the head office. It is inefficient for the Distribution Centre to stack small quantities, and create ‘pigeon holes’ within the racks for these items. They have to be opened from the carton and handled as loose items. This is difficult to account for, and is not cost effective. To prevent mistakes of accidentally delivering the whole carton instead, a special picking area is cordoned off from the storage area to help the employees to identify with such products.

*Separate picking areas for special types of stock* - As mentioned in the section above, some of these products include valuable items such as cigarettes, shavers, printer cartridges, batteries and stationery. Another separate picking area is air-conditioned to control the temperature and humidity for goods such as chocolates, beer, shampoos,
creams and other toiletries. Furthermore, an aisle has been set aside to cater for high volume, or special seasonal goods such as Christmas-time use stock.

*Damaged/lost stock* - The Distribution Centre identifies an estimated value of damaged stock of some A$3,000 per week. Due to mishandling, the packaging or the product itself could be damaged. The Distribution Centre then decides if it should be given away to discount stores to sell at a low price, or if they could be donated to charity. This aspect should be monitored, and the company could minimise their estimated losses of some A$156,000 per year. Sometimes stock is ‘lost in the system’ when employees do not scan or key in the pallets they have placed on the racks. This is very costly, as it could take months before they are found, and the products could be beyond their expiry date for consumption by that time.

*Usage of forklifts* - All movement of pallets are via forklifts in the Distribution Centre. As observed, there are not many high-reach forklifts as compared to low-reach forklifts. For breakdowns, only emergency low-reach forklifts are provided. All high reach forklifts are fully utilised and allocated in each isle. There may be a delay in the distribution process because of this. Furthermore, the Distribution Centre does not adopt, or wish to invest in a conveyor belt system because it is too costly. This could slacken operations as compared to their competitors.

*Restructuring plans for the Distribution Centre* - Company X is undergoing a restructuring process and has decided to subcontract some of its fast-moving stocks to a national transport company (paid on a carton rate basis). A national Distribution Centre will be built for this purpose at another location, and there are plans to increase its product range of 12,000 lines. However, there will be a reduction in the inventory by 25% with this new approach to achieve overall improvement in their operation process. This also is in line with the Just In Time (JIT) concept.

*Industrial relations issue* - With the subcontracting to a national transport company for the distribution, it implies that less labour is required at the Distribution Centre. The employees at the Distribution Centre however, are resistant to this change, and have aroused an industrial relations issue about the decision. Arbitration with the Union and management is currently in process to encounter this problem.
**Move to export markets** - Company X is currently at its pilot (trial) stage of exporting its budget generic brand name products to overseas markets such as Singapore, in order to gain a larger market share. However, since all of its transportation is subcontracted out, they may face high costs in exporting.

Company X has been facing operating losses from its operations. It was evident from the move to subcontract all transportation to external companies in 1998. The market share is slowly declining with current competition from other supermarket chains, as well as new entrants to the market. As a result, a new strategy will have to be adopted to maximise its operations to its fullest potential. The Distribution Centre should be reorganised in terms of its layout, storage capacity and handling process, in order for the distribution to be efficient. With a clear vision and careful planning, it is possible for Company X to recover and excel in the supermarket industry once again.

### 6.2.2 Company Y

Company Y is primarily involved with the importing, assembly, packaging and distribution of consumer products. Approximately 70% of the imported products are already assembled, and the remaining requires assembly on site. Customers of Company Y are predominantly wholesalers and retailers. 30% of the products are exported to the Pacific Rim with the remaining 70% distributed throughout Australia. The products are of three main types: personal products, retail wares and home wares.

Products are imported mainly from China, whilst Company Y receives some imports from Taiwan, India, Germany and the United Kingdom. The goods that arrive at Company Y’s receiving section are in pallets. They are moved by forklifts to be stacked almost immediately. A buffer inventory is used to protect the company should there be delays. This may be because of industrial action, shipping time, festive celebrations in import countries (such as Chinese New Year where most businesses are closed for a month in China and Taiwan), or even if the sales suddenly expand. The inventory time varies. However, some products are held for up to six weeks, while other products are held for one week.
Once goods have been checked and sorted, they are transported onto the factory floor, using the same forklift employees and equipment. The factory uses a cell layout for batch assembly and package. Both systemised equipment and manual labour are used in the process – providing a quick and efficient throughput of products. When the products have been assembled and packaged, they are transported to the despatch section. This requires the advice of employees to the Distribution Centre that orders are ready to be moved. The Distribution Centre forklift drivers transport the goods from the factory floor into the despatch warehouse section. Orders that have been scanned into computers are called up, so that final products can be picked and packed onto pallets, prior to handover to the distribution team for delivery.

6.2.2.1 Operations

The high volume of products that are imported, assembled and packaged at the factory has resulted in a high repeatability of tasks. As a result, Company Y has opted to specialise certain tasks, and systemise processes, to ensure efficiency in production and operating costs. Whilst the volume of products distributed from Company Y is high with a diverse range, these products are defined and standardised, not subject to any modification to cater to individual customer’s needs.

Company Y has undertaken a downstream vertical integration, resulting in ownership of the receiving section. This was formerly contracted out. In addition, they have already entered into a 50% joint venture with the main supplier in China. They have a short-term objective of totally buying out the other half of the share. Company Y maintains a high level of understanding of their supply networks. This is to ensure they can identify those parts of the network which contribute to the performance objectives as valued by their customers: quality, dependability, innovative products and on-time delivery. In this way, the company is able to compete effectively, identify particularly significant links in the network, and focus on its long-term position in the network.

Market research is undertaken to best capture customers’ wants and needs. They adopt questionnaires and interviews on focus groups, keeping up with competitors’ products and strategies, and with an excellent after-sales service with the customers. Once orders arrive at the receiving section, a container check-off which includes
scanning of goods, is undertaken to ensure that the delivery corresponds with orders despatched. Goods are then sorted and separated between assembled and non-assembled goods, and bulk storage is decided on. Once these processes have been carried out, the order of products to be assembled and packaged is determined. The goods are forwarded into the cells to undergo transformation. They are transported into the cell area using forklifts. They are then sorted according to automated or manual assemblies. Once assembly has been finalised, they are handed over with kitting lists to employees to sort by packaging type. The goods are then appropriately packaged and labelled, ready for despatch.

The next step is delivery by forklift to the picking and packing area, where the decision is taken on whether to pick using an automated or manual picking process. This information is pre-determined according to type of product. It is necessary then to decide what type of packaging is needed (bulk, boxes, bubble wrapping or individual wrapping). Goods are invoiced once this process has been completed. The packed products are then ordered on the delivery priority (according to destination or urgency). Then the goods are loaded to delivery vehicles for despatch.

Company Y uses an Enterprise Resource Planning (ERP) system to give best estimates for the purpose of future orders. This software is a dependent demand system. It relies on critical data, before it can produce outcomes. Consideration is given to special events or festive seasons for forward planning with their larger retail stores. Data is gathered and entered into the ERP system – along with known and forecast orders, bill of materials (BOM) and inventory information. The system will then provide an output of how much to order and when to order it. Apart from most orders taken electronically, Company Y deals with a large number of paper orders. This unfortunately gets chaotic when trying to match up with invoices. This creates a bottleneck in terms of timing and efficiency in the finalisation of all orders taken, delivered and invoices processed.

Company Y also has to face issues of inventory held and unsold stock. Since a fraction of goods imported are from Europe, it takes a substantial period to receive them. Company Y would rather hold the stock, than face a stockout situation. Some of the products have a life-cycle of about six months only (especially fashionable hair
accessories). Any unsold products after this period will be liquidated to discount shops and markets, to be sold at reduced prices. Garment hangers that are sold to customers eventually get returned to Company Y for recycling, before they are purchased again.

Company Y has recently relocated to Sydney in July 2000, integrating all their operations at one location. The newly purchased site is being considered for expansion. The company has planned for customer and sales growth, through developing the Greenfield site, and simultaneously buying out smaller competitors. The expansion strategy can be cited as follows:
- provision for the introduction of split shifts to accommodate 24-hour operations,
- 30% excess storage capacity,
- option to expand the existing 16,000 square metre Distribution Centre by another adjacent 8,000 square metres,
- Capacity to extend the building by another storey, and
- A $1.2m investment to increase its 2,000 stock keeping unit (sku) to 4,500 sku within five years.

6.2.3 Company Z

Company Z is one of the largest suppliers of timber frames and builders’ hardware to the construction industry. The company has 22 branches operating in Australia. Each branch operates similarly, except for the fact that they vary in size and bulk storage capabilities. The development of a new store model, since the acquisition of a supplier company in Australia, gave Company Z an opportunity to develop a low cost distribution strategy. This supplier company had been operating successfully for the past 20 years, competing in an aggressive market against large competitors. One of the main reasons for their continued success was their reputation of being a ‘dedicated’ trade supplier. They achieved this through building relationships and having a customer focus. The target market is the project homebuilder. This type of business does not have a retail or trade counter, and sales are received by fax or mail, administered by an account manager.

Company Z aims to become the most efficient and preferred supplier for hardware, timber and appliances to project homebuilders and construction builders. The key element of its business strategy adopted for the low cost Distribution Centre focuses
on a specific target market. This is to minimise stock levels, and focus on their core product range, to satisfy customers’ needs.

6.2.3.1 Operations

The support functions sustain all of the key operating systems within the business. They include accounts payable, accounts receivable, administration and management. They interface with all departments of the business, and are considered cross-functional.

6.2.3.2 Key operating system

The following processes account for the business’ key operating system and are highlighted in the following subsections:

External sales and marketing - There are three employees responsible for this function. Two account managers are placed in charge of their territory (North and South Sydney respectively) and customer base. They report directly to the general manager. They coordinate all of the promotional activities with Company Z’s key accounts. By establishing rapport with their customers, they can build on customer support and loyalty. These are confidently translated into customers’ sales orders received by phone, fax or mail.

Customer service/ internal sales process - The customer service and internal sales process for Company Z currently consists of three employees. They comprise a centrally coordinated hard copy information system, as well as the computer database. There is also a company car allocated to one of them, to access customers should the need arise. Most requests from customers are received by fax after the initial phone call. Quotations are then entered directly into the computer system, and the hard copy printout is faxed back to the customer. Another function is to intercept all in-coming faxes from both the customers and suppliers. The employees either redirect them to the appropriate place, or action them accordingly. From a customer’s perspective, this may include pricing requests, product enquiries, stock level enquiries, and customer information updates. From a supplier’s perspective, this may include special pricing for purchases of product for particular builders, price list updates, bulk purchasing deals, and product information.
Manufacturers' pricing information is processed in various ways. Special prices may be quoted to certain builders, and are entered separately into excel spreadsheets for easy access. They are developing a specialised software such that once information is entered, the computer can identify and directly link the special contracted price list to the particular builder.

*Sales order processing* - The sales order processing function is coordinated in two separate areas of the operations. Each area of the business involved in sales order processing has a number of employees. Various people handle data coordination, data entry, proof reading and sales order release separately.

The receptionist currently handles all the customers’ orders received by fax or mail. They are date-stamped and recorded directly into spreadsheets, with information on order numbers, customer name, receipt date and site address. Two employees handle the proof reading. They access the files of new orders, and systematically identify any potential problems on the orders. These problems may be obvious mistakes made by the customers, pricing errors, or discontinued products ordered.

The data entry operators process sales orders chronologically, or by priority orders. The details of each section of the sales orders are entered directly into a sub-system in the computer called job processing. This system allows them to enter and create multiple deliveries for a single sales order at various stages of the building process. Five employees including a supervisor, handle the order releasing process. The orders are checked for accuracy and amendments to the delivery instructions. Details and comments are added to the order to release a picking slip. These are passed to the warehouse department for processing. After the goods are picked, the order release employees will generate a delivery docket automatically creating an invoice in the system. If there is a stockout on a particular picking slip, the details of this shortage are transferred to a new delivery docket and invoice. The original delivery docket is adjusted so that when the delivery docket and invoice are printed, the customer does not get invoiced for any undelivered items. The sales order employees notify the customers immediately, so they can plan the job around the inconvenience.
Storage and handling - In the Distribution Centre, the hardware supervisor and the warehouse manager manage a team of six casual and permanent employees to handle the storage and handling process. Stocks are received and despatched daily. As the company has very little control over the timing of incoming deliveries, the receiving of goods is a continuous process throughout the day. Either the warehouse manager or the supervisor receives deliveries, and they compare the purchase order to the details of the delivery docket. The driver countersigns any variations or short deliveries.

The items are classified as stock or specials, and marked appropriately. This will aid the store men in identifying where and how the products should be stored. All specials or non-stock items are manually written onto the product, or a sticker placed on the items for easy future identification. All delivery documentation is sent for creditors invoice approval at the accounts payable section.

The store men at the unloading docks unload almost half of the supply deliveries manually. They are placed either on hand trolleys or pallets to be picked up by forklifts. Employees are deployed to pack smaller shelf items into boxes marked with the delivery docket number. All goods are placed on the loading dock ready for the next day’s deliveries. Heavy items such as cement, steel, and flat sheets are loaded directly by the drivers since there is no need to repack them.

Procurement - The purchase of specials or non-stock items have previously been manually flagged on the sales order in the proof-reading stage of sales order processing. The release of one section of the sales order will flag the purchase of any special items that are required at a later date on the same sales order. A typical sales order from the customers would be a full hardware order for a house. This would be broken into typical sections that will be required for delivery at different stages of the job. This system enables the company to control the time period that the ‘specials’ sit on the Distribution Centre floor. This acts to assist with inventory control and cash flow management through shortening the operating cycle.

There are two stages to creating a purchase order. Firstly, the requisition form stage and secondly, the processing of the form into the computer system. These will result in a printed computer generated purchase order. It has the correct quote numbers
and product information on it to be faxed to the supplier. An administrative employee is deployed to reduce costly mistakes, by handling this live inventory system. The warehouse manager and the hardware supervisor daily supervise stock checks, through a stock card system. This card system indicates minimum and suggested maximum stock levels. Requisition forms are filled out subsequently. The negotiation and bulk purchases for the company are coordinated in the management and administrative support, with the negotiations and deals done directly by the management. Situations arise where manufacturers actually negotiate deals with customers directly for rebates and special rates. Company Z then accounts for these rates for any purchases made for the particular customer.

Transport and logistics - 10 vehicles are company-owned, and any additional transport requirements would have to be outsourced. The warehouse manager currently manages the fleet maintenance process by outsourcing all maintenance and vehicle repairs for the transport fleet only. The transport system comprises the delivery scheduling and recording of the daily run details. Information is transferred directly from the delivery docket to the drivers’ run sheet or how the run will be delivered.

6.3 Pilot case study

Company Z agreed to participate in the research as the initial pilot case study. The survey instrument was then conducted based on the preliminary studies and put on trial with this company. After being granted permission, interviews were conducted with the general manager, human resource manager and administration manager. They were very generous in providing feedback on the questions asked, and even assisted with some parts of the questionnaire structure. With these comments and feedback, some of the questions were improved, and sections and sub-categories added. The section on capabilities and individual competencies in the survey questions was improved. Additional categories were added to both the survey questionnaire and the interview questions. The general manager was very helpful in highlighting the importance of change in innovation, and advised the inclusion of a section on change. He recommended including a query on why companies had change, and how change was accepted within the organisation. This was important to investigate, as innovation deals with change. As a result, a revised survey questionnaire and interview questions were constructed. After a second round of interview sessions with Company Z, a
review of the transcript was undertaken and approved by the managers. Company Z agreed and has been allocated as Firm A for this study. Nine other independent organisations were sourced for further research.

6.4 Implications for research

From the field visits, preliminary interviews and the pilot case study conducted, it was discovered that a greater depth of understanding of company operations was required to explore the innovation possibilities and strategies of organisations. The methodology was refined to using ten Distribution Centres as case studies. The data collection was planned to be conducted using both a survey questionnaire and semi-structured interviews. All questions were first drafted and categorised into sections. First of all, questions on the company background and general operations were asked. The contingencies were then considered, taking into account that they are only external influences on the innovation of organisations at some point in time. These contingencies included the firm’s degree of globalisation, extent of customised services, the complexity of processes, technology and customer interface, the accessibility of knowledge, the extent of inter-firm relationships, the labour and unionisation in the organisation. They were set as multiple choice type questions, where the respondent only needed to tick their answer in the appropriate boxes provided.

These initial field studies developed a clearer picture of logistics generally, and how logistics firms conducted their operations, systems and processes. Issues were highlighted pertaining to varying conditions faced by different firms. As a result of this understanding, it was easier to draft the questions. They were more relevant and designed close to the purpose of this study. The section on drivers of innovation was a straightforward question, asking managers what caused the firms to innovate. The next section on capabilities for innovation was rather complex, and had to be subdivided into categories. These included subdivisions on how the firms were able to satisfy customers, how they could integrate their operations, how they managed technology, and how they collaborated with partners in the supply chain. The behaviours supporting these capabilities were considered and integrated with the questions. A section on how the firms reviewed and assessed their operations was included as part of the capabilities. The sub-sections on performance review were based upon the National Quality Award criteria (PSB, Singapore, 1997) – where firms assess themselves for excellence. These
included how firms assessed their leadership, the use of information and analysis, strategic planning, human resource, process quality and management, customer satisfaction and operational results. For operational results, set performance indicators were used, requiring firms to check boxes if they were evident in the organisation.

Finally, a section of questions on the competencies of employees was included. It asked how employees in the organisation were given opportunities to demonstrate innovative capabilities or improvements to processes and systems. The purpose was to find out the qualities inherent in individuals. The subsections included creativity, effective communication skills, learning, flexibility, teamwork, empowerment, and adaptiveness to change. Questions that were simple and straightforward, requiring only short answers or multiple-choice type answers were placed in the questionnaire.

6.5 Background to the organisations interviewed

The ten Distribution Centres involved in the in-depth case study research comprised firms from various industries, size and structure. But all of them dealt with the logistics functions of warehousing and distribution. They ranged from small family-owned businesses to large multi-national corporations. Some of the data were collected via survey questionnaire, and certain aspects will be presented through descriptive statistics. The first five Distribution Centres (A-E) were from Australia, whilst the latter five (F-J) were from Singapore. Table 6.1 shows a profile of the firms involved in the case study.
<table>
<thead>
<tr>
<th>Firm</th>
<th>No of employees</th>
<th>Organisation Structure</th>
<th>Annual Turnover in AS mil</th>
<th>Years of operations</th>
<th>Main functions</th>
<th>Main products</th>
</tr>
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<tr>
<td>A</td>
<td>36</td>
<td>Part of a large company group</td>
<td>80</td>
<td>25</td>
<td>Warehousing &amp; Distribution (of finished goods)</td>
<td>Hardware, PC &amp; Appliances</td>
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<tr>
<td>B</td>
<td>200</td>
<td>Part of a large company group</td>
<td>30</td>
<td>5</td>
<td>Assembling, Warehousing &amp; Distribution (of finished goods)</td>
<td>Automobiles</td>
</tr>
<tr>
<td>C</td>
<td>470</td>
<td>Subsidiary of a multi-national Corporation</td>
<td>350</td>
<td>50</td>
<td>Warehousing, Distribution, Import, Export (of raw materials &amp; finished goods)</td>
<td>Refrigerated foods</td>
</tr>
<tr>
<td>D</td>
<td>11</td>
<td>Single privately owned business (projected)</td>
<td>4.2</td>
<td>0.5</td>
<td>Warehousing, Distribution, Import, Export (of raw materials &amp; finished goods)</td>
<td>Varied</td>
</tr>
<tr>
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<td>100</td>
<td>Single privately owned business</td>
<td>230</td>
<td>6</td>
<td>Warehousing &amp; Distribution (of finished goods)</td>
<td>Refrigerated foods</td>
</tr>
<tr>
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<td>Subsidiary of a multi-national Corporation</td>
<td>234</td>
<td>5</td>
<td>Assembling, Warehousing and Distribution (of finished goods)</td>
<td>Varied</td>
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<td>320</td>
<td>6</td>
<td>Warehousing and Distribution (of raw materials &amp; finished goods)</td>
<td>Varied</td>
</tr>
<tr>
<td>J</td>
<td>115</td>
<td>Subsidiary of a multi-national Corporation</td>
<td>68.9</td>
<td>27</td>
<td>Warehousing and Distribution (of finished goods)</td>
<td>Rolling bearings and seals</td>
</tr>
</tbody>
</table>

Table 6.1 Profile of companies interviewed
6.5.1 Firm A

Firm A is a public company listed on the Australian Stock Exchange. The firm is a major supplier of timber and building products to professional builders, contractors and homeowners undertaking building and home improvement projects. The firm also manufactures a comprehensive range of engineered timber products, including roof and floor trusses, wall frames and engineered structural timber. The employees in the firm are trained to provide practical advice and personal assistance to homebuilders. They supply free project sheets and relevant product information. They advise on projects such as repairing a floor, replacing a door, lining a wall, adding a pergola or carport, landscaping the garden or adding a room. The employees of the firm go to the extent of assisting home improvers in arranging for professional tradesmen to complete any home improvement project.

With an annual turnover of about A$80 million, Firm A aims to become the most efficient and preferred supplier of hardware, timber and appliances to project homebuilders and construction builders. The key element of its business strategy adopted for the low cost Distribution Centre, focuses on a specific target market, to minimise stock levels, and focus on core product range to satisfy customers’ needs.

6.5.2 Firm B

Firm B is an Australian Distribution Centre which deals with processing, storage, rectification and project management for manufacturers, importers and exporters of vehicles. The firm is committed to providing quality services to meet customers’ specific needs in the automotive and other related industries. The firm accesses international manufacturers with strategically aligned partnerships, and is able to enter into independent alliances providing logistics support. Quality is the foundation of the business, ensuring that all employees are committed to providing services that exceed customer expectations. This will ensure that the business can continue to expand. The quality system conforms to ISO 9002 and is the basis for the stringent quality requirements for processing clients’ products. Firm B has storage facilities at the port, wharf side storage, as well as processing facilities in the country. This Distribution Centre has the latest technology and security services available on site. Besides providing storage for vehicles, the Distribution Centre includes a 6,900 square-metre processing facility and an office complex. The firm recently acquired and
developed an additional six hectares of land, for more storage area if market conditions demand the need for expansion.

At Firm B, all the customers tend to be suppliers as well. This is because the business receives vehicles from major car companies such as Volvo, Toyota or Hyundai from the shipping ports before transporting to the Distribution Centre site for inspection. The vehicles are then provided with some light assembly such as the fitting of accessories. This light assembly is usually fitting in air-conditioning, or some rectification and paintwork, before sending the vehicles to their respective company dealers. Firm B also has other suppliers, besides the major car companies. These suppliers provide them with materials needed for the accessories and rectification work.

6.5.3 Firm C

Firm C is a multinational corporation, the sixth largest public refrigerated logistics operator in the world with an annual turnover of more than US$350m. The multinational corporation operates in four countries with in excess of 2,000 employees. They provide a wide range of services and facilities, from basic refrigerated warehousing and transport, to supply chain management for the manufacturing and retail markets. The firm strives to meet the challenges and growth opportunities of the fast-changing international logistics marketplace. Services are provided such as ordering, storage, order picking and guaranteed next-day distribution of the region’s daily requirements of chilled, frozen and ambient dry products.

Firm C specialises in temperature-controlled logistics services with the established coordinated infrastructures, international exposure and an intimate understanding of local markets and conditions. The key to its success is the development of a highly integrated software technology, allowing the control of various operational aspects such as stock receiving, stock rotation and overall inventory management. The firm adopts a Total Quality Management approach to business, by integrating the principles of Continuous Improvement of its systems and processes.

6.5.4 Firm D

Firm D is a rather small Distribution Centre which caters for split case picking up to bulk freight. It is a private business recently set up less than a year ago. The firm
provides third party logistics. It extends the contract warehouse function to cover additional services such as international and domestic distribution. It is a packing and unpacking Distribution Centre, and has facilities in New Zealand and Australia, offering customers a flexible service. This service can be tailored to suit short, medium and long-term warehousing and distribution needs. The firm also provides outsourced services which will effectively manage the facility on behalf of customers, who subsequently have an investment in the Distribution Centre facilities. Firm D was developed in response to growing demand from customers, for professionally managed contract warehousing and distribution services, that can be accessed as a stand alone service, or as an add on to an existing logistics contract. The firm has significant expertise and commitment in managing complexity. From split order picking, to managed customer facilities, the firm values its customers whether they are large or small.

Firm D invests in the long-term, and recognises that building a relationship requires a commitment to flexibility and innovation. It has competence in problem solving, facilitation and negotiation, and the ability to customise contract Distribution Centre packages to suit a range of business requirements.

6.5.5 Firm E

Firm E was founded by a sole proprietor in 1972, and started off as a family business in the meat industry. The owner quickly realised that there was a need for a reliable refrigerated meat carrier. He purchased his first truck whilst not realising he was creating a firm, that would become the largest meat storage and carrier in New South Wales, Australia. The firm has grown to 100 employees, and operates a fleet, consisting of 3 rigid, 36 prime movers and 50 vans, with all vans having double loading facilities.

In addition, Firm E has diversified into interstate transport, and specialises in refrigerated transport throughout Australia. It has a distribution fleet in Sydney and Brisbane. The firm believes in the paramount importance in displaying standards of excellence, competitiveness and long-term commitment through 'total service'. Firm E provides clients with a large volume distribution facility, including ordering, storage,
order picking and guaranteed same day or next day distribution of dry, chilled and frozen foods.

6.5.6 Firm F

Firm F is a multi-national corporation with its headquarters located in Belgium. It has 16,000 employees with 500 offices located in 36 countries. The multinational corporation provides logistics services to customers. It is also a leader in the transportation business via sea and air. As a result, this has enabled Firm F to appeal to customers as a one-stop shopping to coordinate and transport products worldwide.

This Distribution Centre operates warehousing, distribution and some assembling of goods. They rely on five core values directing its operations and processes towards world-class excellence. Firstly, integrity allows the firm to forge solid, long-term relationships, showing customers that transparency and confidence are critical. It places importance on identifying any problems, informing the customer, taking remedial action, ensuring the right result, and learning lessons to improve future performance. Innovation is another core value, where all employees are encouraged to put new ideas and suggestions forward. Managers adopt innovative thinking for strategies to create new business dynamics. They push for the expansion of activities, to find new partners and customers, allowing for new cultures and new ways of doing things. The firm is constantly in search of excellence, and sets high standards through benchmarking. This can raise customer satisfaction, save costs, increase profits and improve the work environment. All employees are given opportunities for self-development through empowerment and teamwork. The image of Firm F is built on demonstrating its pride in its strengths and services. People come first, and pride goes with job satisfaction and with recognition.

6.5.7 Firm G

The Distribution Centre at Firm G is part of a large manufacturing firm dealing with electronic, electrical and fiber optic interconnection products and systems. Its parent company is located in the United States. The firm manufactures components related to telecommunication or data communication, computer peripherals, automotives, premise wiring and industrial products. The firm maintains a leading edge by pioneering the application of self-aligning and flat flexible circuitry for the
automotive industry, to designing the world's smallest connectors, for more compact and powerful consumer electronics. New product development drives the business, especially innovations in connector design for applications for the fiber optic market to higher-speed, higher-density back plane connectors and cable assemblies for the telecommunication industry.

Each year, Firm G invests in expanded facilities, the latest equipment, new tooling and processes. This is to make measurable improvements in the quality and competitiveness of products, as well as spending on facilities and capital equipment. The firm operates 54 manufacturing facilities in 19 countries, and major value-added centers in every region of the world. In Singapore, the Distribution Centre and the manufacturing facility are located at the same site. All factories are ISO 9000 certified. This firm believes in constantly keeping up with the latest technology. The manufacturing facility continually updates core moulding, stamping, plating and assembly processes. Many plants use computer-integrated manufacturing and capitalise on the latest innovations, from ultra high speed manufacturing processes and dual-level manufacturing. The Distribution Centre obtains the products direct from manufacturing, stores the goods and components for further distribution.

6.5.8 Firm H

Firm H is an integrated logistics solution provider offering a one-stop land-based logistics and island-wide distribution network services in Singapore. It provides services from shipping to port clearance, local transportation, storage and handling, to tracking of materials, and customised inventory reports. Firm H is capable of providing customers with a flexible and cost effective logistics supply chain, tailored to meet specific needs. The core expertise is to provide logistics supply chain solutions with key concentration on engineering and chemical industries, as well as the shipping lines. They have dedicated employees, systems infrastructure and technological support. This enables the firm to continually strive for improvements and innovation, to help customers stay competitive in a dynamic and fast-changing market environment. The firm aims to be the logistics hub in Singapore with its distribution center supporting customers from various parts of the world, mainly Asia, Europe and America.
Firm H manages all aspects of warehousing and related distribution requirements. It is one of the four only customs-approved establishments in Singapore to handle and store ‘PSA Class II’ and hazardous cargo. The firm continually invests in processes and systems infrastructure development and information technology. This is to remain agile in the face of stiff competition. The Distribution Centre has a large container trucking fleet, and operates the only Vertical Chassis Parking System in the country. The facility keeps existing large fleet of chassis off the congested road, and also promotes efficient monitoring, prompt response and speedy deployment of container fleet. Firm H owns and operates a container depot, capable of storing more than 8,000 TEUs of containers in an eight-level high configuration. This innovative layout provides both, optimum efficiency for clearance and easy retrieval, ensuring fast turnarounds for hauliers. With this support of a customised computerised container information system, Firm H has a highly efficient information flow for customers by providing them global access to the system.

6.5.9 Firm I

Firm I is a large, private business operating worldwide on six continents. It has a total employee strength of 12,000 people in over 70 countries. As a modern integrated logistics supplier, the firm works in partnership with customers, to manage their intercontinental shipments and associated supply chain management solutions. The firm aims to become a reliable business partner, providing logistics consulting, risk management, as well as hands-on assistance in the supply chain.

The firm designs and manages complete business-to-business logistics networks worldwide, with an efficient transportation network, optimising global cargo flows. Its core area of business lies in air and sea freight forwarding. It combines local knowledge with a global outlook, using its own transport hubs to coordinate and create efficient supply chains. The airfreight network is based on a series of hubs, interconnected by scheduled flights. The hubs have large high-security Distribution Centres next to the airport’s tarmac, creating fast connections between the world’s economic areas. This enables the firm to deliver freight consolidation, time definite delivery and through-pallet services. The shipping network however, is based on fixed, long-term agreements with leading shipping lines. This strategy allows concentrating freight volumes, and
passing the benefit to customers. Firm I believes the main strength lies with its network of people spread throughout the world.

6.5.10 Firm J

Firm J is a Distribution Centre, and is part of a manufacturing firm for rolling bearing and seals. The firm has its own manufacturing plants, warehouses and Distribution Centres located in 130 countries. It is a global supplier of products, solutions and services with competencies including technical support, maintenance services, condition monitoring and training. The firm has developed a comprehensive supply chain system to service customers worldwide. In Singapore a regional Distribution Centre was set up to serve 22 countries in the Asia Pacific. It holds about 18,000 items and operates 24 hours to ensure one-day delivery.

The firm is highly computerised in its inventory system, processes and networks, where customers can access for enquiries, order entries, receive orders acknowledgement and shipping details through the internet. Firm J is known not only for its quality engineering products, but also for its logistics innovation and expertise. The firm adopts a Total Quality Management approach, where positive results can be discerned and focused on customers, employees and processes. All of the most important business processes have been identified. It has intensified strategies to improve quality. By involving the employees, the customer values have been increased.

From the description of the ten firms and Table 6.1, there was variety in the Distribution Centres, dealing with warehousing and distribution services. The firms varied in size, type of goods dealt with, years of operation, and functions. Firm G has both manufacturing facilities and Distribution Centre at the same location. Firm J engaged in manufacturing as well, but had a separate location for its Distribution Center. Only the managers in Firm J Distribution Center were interviewed, as the focus of this study was on Distribution Centers only. The diversity of firms helped to contribute to an unbiased analysis and gain useful information for the purpose of this study. Emphasis is placed on innovation in the warehousing and distribution functions, systems and processes.
6.6 Main functions of firms

Figure 6.2 Main functions of firms

Figure 6.2 shows the main functions of firms that were interviewed. Firm G was the only firm that dealt with manufacturing and assembling its own products from raw materials to finished goods in the same location. It obtained its raw materials (electrical, fiber optic and computer peripherals) from countries globally, and mainly from its parent company in the United States. The difference between Firms A, E and J with Firms C and D is that the former dealt with warehousing and distribution of finished goods only. Firms C and D included both raw materials and finished goods. Firms B and F contributed more to its supply chain by assembling products. Apart from warehousing and distribution functions, Firms H and I also dealt with import and export of raw materials and finished goods. The above chart shows that there was a good mix of firms from both Singapore and Australia. There was a variety of firms dealing with logistics of raw materials and finished goods from the countries.
6.7 Ownership and size of firms

![Graph showing ownership and size of firms]

Figure 6.3 Ownership and size of firms

As seen in Figure 6.3, Firm C was the largest Distribution Centre studied, with employee strength of 470 employees at one location. It was a subsidiary of a multinational corporation. Out of the ten firms, four of them were subsidiaries of multinational corporations. Only Firm G was a single company in public ownership, with a reasonable size of 250 employees in the firm. This is because it included personnel from the manufacturing facility as well. Firms D, E and I were single privately owned businesses. It was observed that Firm I was the largest among the rest of the Singaporean Distribution Centres interviewed. It had 320 employees at a single site. Its operations spanned across six continents over 70 countries, showing the great success over the years of continually expanding from a small family business in Switzerland. Firm D was the smallest firm interviewed, with a size of only 11 employees. It had been in operation for six months prior to being interviewed. Nevertheless, the owner and general manager had many years of experience in the logistics industry. Most of the 11 employees in Firm D were colleagues of the general manager in the previous organisation, and they have similar work experience. The general manager of Firm D decided to start the business after having the experience, and seeing the opportunity of growing and flourishing in the dynamic logistics industry. Similarly, Firm E started out as a small family business transporting chilled and frozen meat some 30 years ago, but has grown to a successful refrigerated storage and transportation business today with a size of 100 employees.
From Figure 6.3, the firms interviewed in Australia came from two main categories i.e. part of a large company group (Firms A and B) and single privately owned business (Firms D and E). Only Firm C in Australia was a multinational corporation. Figure 5.3 also shows that the Australian firms were generally smaller in size (with the exception of Firm C having 400 employees), than those firms in Singapore. Two of the Australian firms had employees of less than 50 people, whereas the average size of firms in Singapore interviewed was about 200 employees.

6.8 Turnover and size of firms

![Graph showing turnover and size of firms](image)

**Figure 6.4 Firm turnover in relation to size**

Figure 6.4 shows the turnover of the ten firms in relation to their size. Since Firm D had only been in operation for some six months, the general manager indicated an approximate projected yearly turnover based on past results. From Figure 6.4, the efficiency, magnitude and scope of operations for Firms A, E, F and I are clearly depicted, in relation to the other firms. Firm E in particular, had only 100 employees, but was able to produce some A$230 million in turnover. The managers stated a high daily turnover, with goods stored and delivered in large volumes, as the Distribution Centre operates 24 hours. Firm F also operates 24 hours, and has some assembling of products in addition.
The operations of Firm I, on the other hand included import and export of goods to supplement the warehousing and distribution functions. The firm had a relatively large turnover considering the size. In analysing Firms B and G with a slightly lower proportion of turnover, it was important to consider the nature of business. Firm B dealt with some assembly, and had a rather complex process. In this regard, they require additional trained personnel. Firm G was a part of a manufacturing organisation, and employed additional employees at the factory for production and assembly. From Figure 6.4, it depicted the differences in the firms' turnover and efficiency. This could be due to the number of employees in the organisations, as well as the nature of products the firms dealt with.

### 6.9 Profile of Interviewees

<table>
<thead>
<tr>
<th>Firm</th>
<th>Managers Interviewed</th>
<th>Tenure in Firm (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>General Manager</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Administration Manager</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Human Resource Manager</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>Regional Manager</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Human Resource Manager</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Quality Assessor</td>
<td>16</td>
</tr>
<tr>
<td>C</td>
<td>Director of Operations, Australasia</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Regional Manager, Australia</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Director of IT, Australasia</td>
<td>11</td>
</tr>
<tr>
<td>D</td>
<td>General Manager</td>
<td>19 (including past tenure)</td>
</tr>
<tr>
<td>E</td>
<td>Operations Manager</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Human Resource Manager</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Warehouse manager</td>
<td>10</td>
</tr>
<tr>
<td>F</td>
<td>Managing Director</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Operations Manager</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Human Resource Manager</td>
<td>2</td>
</tr>
<tr>
<td>G</td>
<td>Logistics and Warehouse Manager</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Production Manager</td>
<td>7</td>
</tr>
<tr>
<td>H</td>
<td>General Manager</td>
<td>17</td>
</tr>
<tr>
<td>I</td>
<td>Assistant Manager, Regional Operations</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>IT Manager</td>
<td>2</td>
</tr>
<tr>
<td>J</td>
<td>Managing Director</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Logistics Manager</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 6.2 Profile of Interviewees

Table 6.2 depicts the profile of the managers interviewed. It was highlighted in Chapter Four that there was difficulty securing three managers from each firm, and as a result, only 23 managers were interviewed. There was a range of interviewees based on
their experience in the organisation as shown in the table. This difference is elaborated in the following section.

6.10 Tenure in the organisation

![Tenure of interviewees showing distinction between the countries](image)

Figure 6.5 Tenure of interviewees showing distinction between the countries

Figure 6.5 shows that the highest percentage of managers worked in the firm for less than five years. The second highest percentage worked between 5 to 10 years in the firm. A smaller percentage of managers had worked in the firm for more than ten years. The logistics industry has been operating for many decades, but only recently been a booming industry in the last decade, as stated by various authors in the literature. This is an explanation of the high turnover and recent surge in logistics firms and Distribution Centres set up over the decade.

Figure 6.5 also shows the distinction between the countries. 31% of the Australian managers interviewed had tenure less than 4 years in the firm. This is rather similar to 30% of the Singaporean managers also with tenure of less than 4 years. In looking at the longer tenure term of more than ten years, the Australian firms had a slightly higher percentage (46%) of experienced managers than Singapore firms (40%). There was only one manager interviewed in Singapore than worked for over 30 years in the firm.
6.11 Significance from descriptive statistics

From the above charts, graphs and descriptive statistics, it can be seen that there was variety in the firms and interviewees across the two countries. This will contribute in providing a good cross-section of Distribution Centers for analysis. It gave a general idea of the type of firms involved in the study. Such data and information could prove to be typical in Distribution Centres with logistics services. The simple comparison done between the firms and interviewees between two countries show that there was not a strong difference, and indeed appeared reflective of firms in general.

The next two chapters analyse the research questions and focus on the variables as set out in the previous chapters. They discuss the factors involved in innovation for the ten Distribution Centers and elucidate the details and implications for this study.
CHAPTER SEVEN

ANALYSIS - DRIVERS, CAPABILITIES, & BEHAVIOURS FOR INNOVATION

~ The significant problems we face cannot be solved at the same level of thinking we were at when we created them. (Albert Einstein) ~

7.1 Introduction

This chapter consolidates, analyses and discusses the results of the research activity, together with the contribution made by the literature, to validate any conclusions reached. It examines the first three research questions pertaining to drivers of innovation, the capabilities evident in firms, and the behaviours supporting them. The first section explores the drivers of innovation in the ten Distribution Centres examined. They are reviewed in detail, based on the goals and direction of the firms. Additionally, the drivers were presented, as ranked by the managers, and some comparisons made. The factors have also been considered in accordance with the views presented by various authors. The section on capabilities reports managers’ observation and opinions disclosed during the interviews. These capabilities initially had been identified from the literature review, chiefly from Bowersox, Closs and Stank (1999). They have been used as a guideline when interviewing the managers. All the managers confirmed their firms possessed the identified capabilities for Continuous Innovation. Furthermore, the managers were asked to discuss the importance and issues of each capability. These discussions are reported in this chapter.

The third section analyses the behaviours apparent in the Distribution Centres found in the interviews and survey questionnaire. The findings reported are based on managers’ perceptions and comments made, as well as results of the survey questionnaire. Analysis was then made related to literature supporting the views, and some comparisons explored between the firms and two countries in general. As reported and analysed, there were some pertinent issues, similarities and differences between the ten Distribution Centres. This chapter concludes with the argument that these firms all possessed the drivers, capabilities, and behaviours required for Continuous Innovation, but not equally. It identified a few significant variations in
characteristics and qualities of firms, especially among the firms in Australia and Singapore.

7.2 Analysis using NVivo

This study utilised the software QSR NVivo to hold and manage all the documents related to the research in a highly linked and integrated way. The documents that were utilised in the software incorporated the literature review, the survey questionnaire, the interview questions, the transcripts from the interviews and a short write-up of each firm. These were put into a document system to assist in organising, linking, and exploring for analysis. The benefit of placing the literature in the software was to later assist with the coding and analysis. In addition, the software was able to retrieve important and relevant sections from the literature by using a search database system and the coding system, to link both the analysis and the literature.

The node system was explained earlier in Chapter Five in Section 5.4.4. It was deployed as a second database relevant to the research, and provided a tool for relating, categorising, characterising, coding, and manipulating the Documents and Node Systems together. This tool was mainly used to assist in the qualitative data analysis. Certain themes, issues or key points were coded to bring together common or contrasting points of concern. They were further analysed and reported in the chapter.

7.2.1 Documents

Altogether there were 57 documents placed in and used by the software. The literature review was broken down into four separate documents because of the sheer size, and to assist in faster processing and retrieval. The transcripts for each organisation consisted of four separate documents in NVivo. They were broken into sections dealing with the interviews on capabilities, behaviours and competencies as one; contingencies as another; performance indicators as the third and finally the survey questionnaire responses. In addition, there was a document on each firm with a short write-up. All these documents were placed and coded in NVivo. A document listing used in NVivo is included as Appendix 7A.
7.2.2 Sets

In the document explorer, sets were also created to group documents together for easier management, coding and retrieval. The sets consisted of the literature review (consisting of 4 documents), the combined transcripts of each firm (10 documents), the capabilities, behaviours and competencies (10 documents) and the contingencies (10 documents).

7.2.3 Nodes

In the Node explorer, there were altogether 193 nodes created under the Tree structure. Since the research consisted of a structured questionnaire and a semi-structured interview, it was feasible to place the questions as nodes. This was done using a template where the questions were inserted. Similarly, the questions were broken down into sections (or parent trees) and subsections according to titles. These refer to the capabilities, behaviours and competencies, contingencies and performance indicators with questions in sub-headings. As a result, the coding was able to merge both the questions and managers’ responses simultaneously. The result of this was a separate document for each question with the ten organisations’ responses in a single document. This assisted in organising and retrieving information on particular questions. There were also nodes created on important themes or issues which could be used for subsequent analysis. Some examples of such themes were motivation, empowerment, competition, and training. A listing of all the nodes used in the research is included as Appendix 7B.

7.2.4 Cases

The case node system was used for the research to make it easy to handle cases, their types, and sub-types. It works by grouping nodes which are cases of the same type such as the Company and the Literature. Within the company case, further 10 sub-cases were created, one for each organisation. Within the organisation sub-cases, all the four transcript documents for each firm were placed. This is illustrated in Figure 7.1 following:
7.2.5 Linking the literature

Upon writing the analysis from the coded documents, NVivo also facilitated a search of the literature on the relevant topics or findings. This search could be done using the nodes where the literature review had been coded into themes (or nodes); or alternatively using the search tool in the software. The search tool allowed searching for text, based on matrix intersection (similar to Boolean search with more than one word or code), text search or proximity search for particular words. For example, after writing up a section on the creativity of individuals in the analysis, a text search was performed in NVivo on the literature review. The search run was able to produce 30 finds from the literature review. It produced the respective 19 paragraphs where the word ‘creativity’ was found 30 times in the literature. This document can then be used to relate back to the findings and analysis. A sample of this search listing by NVivo is attached as Appendix 7C.
7.3 Research Question 1

What are the main drivers of innovation in the selected Distribution Centres providing warehousing and distribution services?

[Diagram showing drivers for innovation leading to continuous innovation through organizational capabilities, behaviors, and competencies, with performance measures and contingencies]

7.3.1 Introduction

During the interviews with the ten Distribution Centres, it was clear that business performance and innovation were topics on the agenda for the managers. They were concerned about creating the conditions, to favour the firms' innovation in order to improve their competitiveness in the industry. The factors that caused firms to innovate, also known as drivers, push or pull the initiatives to embark on innovative strategies. These factors also can be internal or external to the company. In analysing the responses given by managers, many of them gave answers that focused on the desired output (pull factors) when questioned. This implied that most of the firms were innovating with an intention to achieve something, rather than as a consequence of a situation. This will be explained at the end of this section.

7.3.2 The drivers for innovation

The responses obtained from managers were very similar and tended to focus on certain themes. The drivers of innovation were also identified from the literature and grouped into categories. The drivers were grouped into the following seven categories: competition; employee orientation; customer orientation; shareholder orientation; financial motive; to attain a leading edge in industry; and operational performance.

Competition referred to the aggressive nature of the logistics industry, where there were rival firms operating and striving for market share. In order for firms to survive or excel, they turned towards innovation. Employee orientation referred to the individuals in the firm who were highly spirited and motivated, constantly seeking ways
to improve; consequently driving the organisation to improve and innovate. **Shareholder orientation** referred to the fact that the firm wanted to give better returns and value to its owners who invested in it. **Financial motive** was another driver, whereby the firm wanted to either reduce costs, or ultimately increase its profits. The fifth factor was where the firm wanted to be an **industry leader** or gain competitive advantage over other firms. Lastly, **operational performance** encompassed the determination to enjoy quality, speed and efficiency of the services provided.

Additionally, all managers gave more than one factor that caused their firms to embark on innovative strategies. In order to assist the analysis, they were asked to rank the drivers by importance. The following figure depicts the managers’ responses to the drivers for innovation in the selected firms interviewed. Figure 7.2 shows the frequency of their responses according to the seven main drivers.

![Drivers for innovation](image)

**Figure 7.2 Motives for innovation**

From Figure 7.2, it can be seen that customer orientation was the highest motive for innovation, demonstrating that it had been mentioned the most number of times by managers. It also shows a breakdown of how they were ranked. Two firms stated customer orientation as the most important factor, another two as second most important, and fours firms as third most important. Although customer orientation had
the most number of responses, there were more firms that chose financial motives as the most important factor.

7.3.2.1 Financial motive

Three firms interviewed rated financial motive as most important (Firms, C, G and H). The managers interviewed stated that they either wanted to lower operating costs or gain higher profits in the long run, as a result of innovating. All managers stated that cost is a crucial factor in any organisation. Firms innovate to improve cost efficiency. To manage and maintain a reasonable margin with the operations of the firm, the three managers in Firm C saw the importance of having the right systems and processes in place. They stated that then only, can there be profits and growth accruing to the firm. These cost savings can then be passed on to customers in terms of lower prices.

The logistics and warehouse manager at Firm G argued that operating with low costs was also another strategy for the basis of competition, as firms strive to stay cost-competitive. It provided a sound and prudent business practice. The production manager added that they wanted to reap the financial benefits of streamlining processes, reducing labour and unit costs. According to the literature, service firms innovate because they want to improve the cost efficiency (Hauknes, 1999). Hauknes wrote that firms reduce cost in line with better quality products and services as empirically proven in the changes in nature and structure of competition in the service sector (Hauknes, 1999).

7.3.2.2 Competition

The next factor is competition. Surprisingly, none of the managers rated this as the most important factor driving their firms to innovate. However, it was second most important in four firms. Many of the managers understood that the logistics industry is a highly competitive one, with firms moving in and out of the industry all the time. They indicated the need to keep up with competitors, and especially the big players in this market. The general manager in Firm D felt that with a high number of new entrants constantly in the market, they have to be price competitive to retain their customers. Firm A managers expressed a concern that the industry is very competitive.
with new technology arising all the time such as e-commerce. The general manager stated:

“Firms in the supply chain compete on this basis using web-based orders and communication via the internet. It is a growing trend and has gained popularity in logistics firms. Many Distribution Centres are automating as well, using technology such as barcoding, radio-frequency communication and automated systems. We need to overcome competition and to keep up with rival firms. I feel that innovating is a means of sustaining competitive advantage.”

7.3.2.3 Leading edge in industry

In relation to the point of competition, some firms also strive to achieve a leading edge in the logistics industry. Firms want to innovate so as to be leaders and capture a larger market share in logistics services. Two firms interviewed (Firms A and I) chose this as their most important factor for innovating. The managers stated that competitive advantage was the basis for superior performance. Understanding and attaining competitive advantage was of paramount importance to management and employees, who bore the ultimate responsibility for a firm's long-term survival and success.

7.3.2.4 Customer orientation

Customer orientation had been selected the most number of times as causes of innovation. Two firms (Firms E and J) found it the most important factor to innovate whilst four firms rated it as second important. When asked to comment on this aspect, the logistics manager of Firm J said:

“I believe customer satisfaction lies at the heart of all endeavours of organisations. Customers are the most important factor for any business. They are the ones that ultimately dictate the operations of businesses. In this regard, everything that we do or plan here should be for the customers and their satisfaction.”

These firms allowed customer issues to be reflected in the internal management structures and processes of their firm. They conducted regular analysis on their
customers - how the customers perceived the delivery of services relative to expectations, sales, profit, and their satisfaction levels. The logistics manager at Firm F explained that the firm conducted analyses in detail - by area, time series and product group. They used data on customer satisfaction to implement marketing strategies and operations.

The firms looked upon innovation as a means to achieve customer satisfaction. They could build customer loyalty by delivering superior value which was also an underlying source of competitive advantage. The general manager of Firm E felt that by increasing customer satisfaction and customer retention, it could indirectly lead to improved profits, positive word-of-mouth, and lower marketing costs. However, he mentioned that for successful customer satisfaction, the firm needed a fully committed, well-trained, and involved workforce. Howells (2000) also supported this view and claimed that customers and competition are the main driving forces for innovation in service industries.

7.3.2.5 Employee orientation

The managers of Firms D and F ranked employee orientation as the most important driving force of innovation in their Distribution Centres. Employee orientation refers to the mindset that the people in the firm possess. They chose to innovate because the employees were motivated, trained or enthusiastic about continuously improving. The general manager of Firm D considered the employees to be the 'heart of the company'. He reported:

"I have a very motivated bunch of employees, of whom I am very confident in. They see their work as always challenging, and in keeping the work more viable for further improvement. This is evident when they are given some form of ownership and authority in their jobs (empowerment).... They respond more quickly to customer service requests, act to rectify complaints and even more engaged in service encounters."

The evident success of empowerment at Firm D was possible with appropriate management style and employee participation. Once empowered employees were given
the discretion, autonomy, power and control, they developed the motivational aspect, and took the initiative to improve. They were the ones that drove the firm to innovate.

The managers in Firm F had a slightly different view than those of Firm D. The human resource manager asserted that employees were the most important asset of the firm. The recruitment process, employee development and organisational expectations affected the drive to innovate. It was important to recruit the right people or to train existing people. In addition, the operations manager added that culture played a role as well in influencing the aptitude to innovate. Emphasis was put on inter-relationships, requiring a shared understanding of the direction and values needed for effective business performance. Employee motivation to innovate could only be steered by strategic direction from management in Firm F.

It was felt that the employees from these two firms were indoctrinated on the holistic meaning of innovation. There was freedom from traditional hierarchical structures in the management of innovation. It was apparent that creativity, team working, communication, empowerment, project management, opportunities to learn, change and leadership were evident in the firms that caused them to innovate. All these points are in line with the literature. Brafman and Folmer (1998) wrote that as the organisation embraces the culture of innovation, employees display zealous efforts, motivation and are willing to take risks. Similarly, Quinn (1985) wrote that individuals needed to possess certain characteristics and factors, affecting their mindset in being motivated, trained or enthusiastic about continuously improving.

7.3.2.6 Shareholder orientation

Another motive for innovation is the focus on shareholders. The general manager in Firm H was the only one to mention this commitment to their investors. It was ranked third in importance among other factors. He stated:

“We want to achieve a stock price appreciation as a result of innovating. We intend to launch a steady stream of competitive new successful services in the operations by innovating. With this success, the company can yield increased quarterly dividends and attract new investors. So the shareholders can enjoy consistent financial rewards. Also from this, our
stock price can appreciate or increase. This will benefit them and increase their confidence."

The coding on shareholders in NVivo software linked this to the writings of Brafman and Folmer (1998). This view by the general manager in Firm H supported their views. They report that with a culture of innovation, firms will be able to create an enduring change and an increase to shareholder value (Brafman and Folmer, 1998).

7.3.2.7 Operational performance

Operational performance was a factor where firms wanted to attain quality, speed and efficiency of the services provided. Four firms indicated this as a driver to improve, however only Firm B regarded this as most important. The managers viewed innovation as a means to be more efficient and provide high levels of service to customers.

Figures 7.3 and 7.4 further break down the various factors according to country to determine if there are any major differences between the firms.

![Drivers of innovation in Australian firms](image)

Figure 7.3 Drivers of innovation in Australian firms
Figure 7.4 Drivers of innovation in Singaporean firms

From Figures 7.3 and 7.4, the drivers for innovation were rather similar in the firms between the countries. There were more Singaporean firms that focused more on financial motives, and placed it as most important, as compared to the Australian firms. None of the Singaporean firms found operational performance as the most important factor for innovating, whilst only one firm in Australia ranked it top. But two Singaporean firms found it as second most important, and another as third most important. There were no striking differences in firms between the countries. However, in looking at the total responses of drivers for each country, further comparisons and analysis could be added.
Figure 7.5 Drivers of innovation between the two countries

Figure 7.5 shows that there were more Australian firms who had a higher total response to customer orientation for innovating. There was one firm in each country with response to employee orientation and having a leading edge. The previous section asserted that more Singaporean firms focused on financial motives and placed it as most important. However, Figure 7.5 shows the opposite. There were more Australian firms in total who considered financial motives for innovating than Singaporean firms. Similarly, it was mentioned that none of the Singaporean firms found operational performance as the most important factor for innovating. But the radar chart depicts more Singaporean firms than Australian firms who focused on operational performance. This is because the radar chart gives a view based on the total responses, adding up the most important, second most and third most important rankings.

7.3.3 Discussion

It is found that all the Distribution Centres embarked on innovative strategies. Each firm had its own motives or underlying factors causing the desire to improve. These factors for innovation could be further analysed, and grouped as push factors or pull factors. The push factors are the drivers or causes, initiating a realisation or a
response. The pull factors are actually the desired end outputs that the firm wishes to achieve out of innovative efforts. These factors can also be grouped according to internal or external conditions of the firm. The external conditions refer mainly to the environment or industry that they are operating in. The internal conditions relate to the people, systems, processes and strategies within the organisation. They can be illustrated in the following diagram.

Drivers of innovation grouped into push, pull, internal and external factors

**PUSH FACTORS**  
*(causing innovation)*  
- Employee orientation  
- Competition

**INTERNAL**  
*(to organisation)*  
- Employee orientation  
- Shareholder orientation  
- Financial motive  
- Quality, speed, efficiency  
- Leading edge in industry

**EXTERNAL**  
*(to organisation)*  
- Customer orientation  
- Competition

**PULL FACTORS**  
*(innovate to achieve)*  
- Customer orientation  
- Shareholder orientation  
- Financial motive  
- Quality, speed, efficiency  
- Leading edge in industry

Figure 7.6 Grouping of drivers of innovation

From the above, it can be deduced that the firms embarked on innovation projects due to a combination of internal and external motives, both leading to improve their position in the business market. They proactively or reactively embarked on innovative strategies as depicted by their main drivers for innovation. Upon further analysis of the overall drivers of innovation, there were more pull factors than push factors in both the Australian and Singaporean firms. However, the Australian firms
pursued innovation mainly for external motives. The drivers for Singaporean firms tended to be more internal to the organisation.

Table 7.1 following summarises the drivers as outlined in this section. The respondents stated that the most important drivers for change or innovation were financial pressures, customer focus and increasing global competition as shown in the graphs. This is in line with the literature (Roberts, 1991; Shanklin and Ryans, 1984) stating that businesses, in order to innovate, must evolve primarily from an inward orientation keeping in mind their resources, capabilities and competencies, towards an outward orientation where the firms devotes attention to the needs of customers and the aggressive marketplace. It can be concluded that the responses by managers from the firms were similar to the literature and supported what authors have written about the drivers of innovation.

<table>
<thead>
<tr>
<th>Drivers of innovation</th>
<th>General comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Motive</td>
<td>• Most important driver for Firms C, G, H</td>
</tr>
<tr>
<td></td>
<td>• Also a driver for Firms B and E</td>
</tr>
<tr>
<td>Customer Orientation</td>
<td>• Most important driver for Firms E and J</td>
</tr>
<tr>
<td></td>
<td>• Also a driver for Firms A, B, C, D, F, G</td>
</tr>
<tr>
<td>Employee orientation</td>
<td>• Most important driver for Firms D and F</td>
</tr>
<tr>
<td>To have a leading edge in</td>
<td>• Most important driver for Firms A and I</td>
</tr>
<tr>
<td>industry</td>
<td></td>
</tr>
<tr>
<td>Operational Performance</td>
<td>• Most important driver for Firm B</td>
</tr>
<tr>
<td></td>
<td>• Also a driver for Firms H, I and J</td>
</tr>
<tr>
<td>Competition</td>
<td>• Driver for Firms A, C, D, G and J</td>
</tr>
<tr>
<td>Shareholder Orientation</td>
<td>• Driver for Firm H</td>
</tr>
</tbody>
</table>

Table 7.1 Summary of drivers for innovation in firms
7.4 Research Question 2

What capabilities do the selected Distribution Centres have to be innovative?

As discussed in Chapter Three, the definition of a capability is the knowledge and achievement essential to developing logistical inclination. It relates to why work is being performed, as contrasted to how it is being performed. It reflects the value of the work’s performance, applying integrative principles that allow multiple processes to be synchronised (Bowersox, Closs and Stank 1999). It involves the aptitude, capacity, knowledge or achievement of organisations to be innovative. Firms need to align their capabilities for competitive advantage. They are at most times more visible or prominent in selected situations or among different organisations because economic, social, cultural or competitive situations occur. These capabilities constitute behaviours and competencies that can be learned, implemented and measured. There were six capabilities highlighted and investigated in the Distribution Centres. These were derived from the literature with Bowersox, Closs and Stank (1999) as the main reference. All the managers from the Distribution Centres confirmed that they possessed these capabilities. The managers were asked to discuss the issues faced by their firms for each capability, and their importance for successful operations. In addition, the necessity of the capabilities was supported during the interviews, and reinforced using the examples and comments made by managers. The six capabilities that have been investigated are listed as follows:

- Satisfying customers (A)
- Integrating internal operations (B)
- Collaborating with partners in the supply chain (C)
- Managing technology (D)
- Managing change (E)
- Reviewing performance (F)
7.4.1 Satisfying customers (A)

The literature previously reported that in order to provide customer satisfaction, firms needed to have enduring and permanent operations or dealings, and to form unique relationships with their customers. They have to understand the end customers and how to create value for them. Firms provide products and services at reasonable prices, so as to make a profit. Customers perceive this value as low price, supported with an acceptable degree of service. Secondly, the services provided have to be efficient, surpassing competitors, in order to retain customers. The most important factors making the real difference to attaining customer satisfaction are being familiar, confident, and building lasting relationships with customers (Bowersox, Closs and Stank, 1999).

To have this capability of satisfying customers, the managers from Firms C, F and I stated the importance of identifying the long-term requirements and expectations of customers. Only then could customer integration be achieved. The director of operations in Firm C stated:

“Many Distribution Centres face this issue of generating unprecedented and superior service offerings. We need to find out first the exact needs and expectations of our customers, and tailor the services accordingly. This is the key to customer satisfaction, and that makes the organisation unique or different from others.”

When there was intense competition, Firms D an E focused on service quality, features and pricing, as well as established proximate relationships with customers. The managers explained that this could provide enhanced value by understanding and excelling in the areas which satisfied their customers.

Eight of out the ten firms (all except Firms D and J) performed customer segmentation in order to provide services accordingly. The managers stated that segmentation enabled the firms to channel their resources more efficiently, and relative to the needs of selected customers. All eight firms distinguished between key customers and normal customers. The general manager in Firm H expressed that the first step was to grasp the value-added that can be provided by the logistics services.
This ensured their profitability and growth in future. The distinction stemmed from comprehending the specific services to be provided to which customers. This comment made by the manager in Firm H was in line with Bowersox, Closs and Stank (1999). The literature supports that competitive advantage and innovative efforts can arise when the firm is able to sustain satisfaction of strategically important customers. Similarly, Choffray and Lilien (1978) maintained that applying a segmentation approach allows organisations to handle this diversity by focusing resources on particular customer groups. Major customers typically have differing needs and will need superior services provided, otherwise they will eventually turn to competitors who can serve them better. Firms should possess the capability to satisfy this segment most importantly (Bowersox, Closs and Stank, 1999; p.33). This capability has the potential to help businesses fine-tune their customer offerings and develop competitive advantage, as well as aiding the process of resource allocation and strategic planning (Hansen, 1972).

Several managers reinforced the view that they segmented their customers because there were different types and levels of logistics services required by different customers. For instance, Firm B which dealt with automobiles, had different customers requiring different or unique levels, disparate from average services, and they were willing to pay more for them. Some of Firm B’s customers required additional accessories to be fitted in cars such as rear spoilers, air-conditioner and CD players. The regional operations (assistant) manager in Firm I gave another example, where they served a range of customers. They had customers from different industries such as pharmaceuticals and electrical, and needed to be segmented accordingly. Only Firms D and J did not segment their customers. A comment made by the general manager in Firm D was:

“All customer satisfaction is maintained in the same way regardless of the frequency of service, the size of the job, or the fees charged. We provide speed and accuracy of services in accordance to our Key Performance Indicators.... Every customer should be treated equally.”

Successful organisations providing logistics service are aware that customers' needs are always shifting with rising affluence, competition, market conditions and other factors. They innovatively keep up with such changing needs to maintain
customer focus (Bowersox, Closs and Stank, 1999; p. 35). Some managers commented that in dealing with customers' varying needs, the organisation had to provide pertinent services through 'proactive planning, envisioning and continued relationships with customers' (operations manager in Firm F). They had to continuously meet customers' changing expectations to maintain customer satisfaction. Most managers held that they could achieve customer satisfaction through sustaining relationships, joint planning with customers, and obtaining feedback to identify future logistics services required. All these points will be elaborated in the next research question, investigating the supporting behaviours and how they were carried out.

Another issue that arose was being flexible and responsive to customers' needs. All managers interviewed stated that they planned and forecasted customer demand. Some managers gave the reason for this as adapting and accommodating unexpected situations or unique requests in satisfying customers. The general manager in Firm A stated that previously, the firm faced instances where plans did not materialise or resources allocated were not used efficiently. So they had to plan and forecast more effectively. The general manager of Firm H also brought up the issue of having the ability to accommodate for unplanned or unexpected situations. He mentioned that customers might make unusual, unique or spontaneous requests. He cautioned that firms subsequently would have to respond easily and quickly to satisfy them. This meant coordinating resources and operations with customers and suppliers to accommodate unplanned situations. This also will be elaborated in the next section on supporting behaviours for this capability. The logistics manager in Firm J added that by capitalising on such instances, whereby being flexible and varying operations or resources to fit the circumstances, the firm can actually enhance customer integration, providing superior services and retaining them.

This capability was definitely present in all the ten Distribution Centres, as verified by the managers' comments, issues and concerns. They maintained the need to continuously satisfy customers and took the necessary measures to achieving it. In addition, the views of the managers are in line with that reported in the literature.
7.4.2 Integrating internal operations (B)

According to Bowersox, Closs and Stank (1999), this ability to link internal operations affirms the dynamic development and leveraging of proficiencies within the firm. In doing so, organisations can then implement their strategies. By integrating operations and synchronising processes, systems and functions, the firm can satisfy customer requirements. Managers have to consider the market, customers' needs as well as resources to plan the coordinated efforts and manage holistically. Furthermore, there must be commitment from all employees making them aware of this interconnected competency. In addition, Schein (1985) also wrote about the importance of internal integration which supported knowledge and information transfer among individuals.

In order to integrate internal operations, firms need to have cross-functional structures (Bowersox, Closs and Stank, 1999). This is because cross-functional inputs necessitate the consideration of how coordination and integration can be sustained across this inter-firm relationship. This can be achieved with an appropriate organisational structure with fewer formalities, more empowerment and work teams. The managers agreed with this point but pointed out the considerable challenges faced in their Distribution Centres for motivating employees with minimal hierarchies and some reasonable supervision. The regional manager in Firm C stated:

"In theory, cross-functional organisations means having less hierarchical structures, where the functional span is greater and allows for better integration and interaction between areas. Processes and activities can be effectively coordinated in this way. However, in reality, logistics is a very labour-intensive function entailing many processes. We have to make sure that the employees are adequately trained, and understand fully their job scope and functions, before empowering them."

In line with this view, the other managers understood that cross-functional teams implied empowerment, where employees were entrusted with authority to make decisions and to perform work independently. The human resource manager in Firm B mentioned that as a result, communication was better and information could be shared across functional areas to satisfy customer requirements. This was befitting for them in
logistics, because they could focus on managing processes, rather than functions. In addition, the managers also agreed that logistics services entailed products, customers, suppliers and orders. This necessitated meticulous work and the comprehensive management of processes. The literature also supported this fact and states that the nature of logistics is such that it involves intricacy, extensive documentation and detailed management (Bowersox, Closs and Stank, 1999).

Several managers expressed the complexity of logistics services during the interviews. They reported ever-escalating services with the rise in product variety such as brands, sizes, colours or other features. This brought about the concern of handling stock keeping units (SKUs) which should be weighed against full activity-based costing, as some managers pointed out. Many of them such as in Firms A, B, E and J also considered reducing facility and operational complexity, by decreasing the number of suppliers to just a few core suppliers, or reconfiguring network linkages to get optimum costs and operations. In addition, Firms J and H attempted to offer standardised service packages to customers, so as to simplify operations. However, major customers, or those that were highly valued, often requested exceptions and additional services. Many of the managers interviewed expressed that they were facing the growing complexity of operations and services. There had been a proliferation of varied services, activities and work practices over the years.

In resolving the issue of complexity, the literature advocated that by streamlining operations, as well as redesigning work routines and processes, there is scope to eliminate redundancy of work. They can save on cost, time and quality of services, and ultimately increase value to customers (Bowersox, Closs and Stank, 1999). The NVivo software helped to organise the comments made by managers in relation to the nodes on ‘cost saving’ and ‘time saving’. The administration manager in Firm A indicated that by interfacing with partners in the supply chain, they could simplify the process, and save a lot of time and reduce order cycle time, to have a quicker turnover. The employees at Firm G performed concurrent picking of goods and staging of orders, whilst verifying their customers’ credit standing so as to save time. Additionally, Firm G had modular packaging by sections, and flexible filling equipment on the same product line which helped the Distribution Centre in time and cost reduction.
In addition to the concept of empowerment given to employees, some managers raised the issue of standardising the policies, procedures and practices in the organisation to streamline operations. The quality assessor at Firm B mentioned this. In addition, the warehouse manager in Firm E expressed his concern about the rigidity arising from standardising, and firms therefore faced the challenge of balancing this with some degree of flexibility given to employees, when dealing with problems and customer issues. He stated:

"I think employees should be conscious of the standardised operations and practices, and conform their work and responsibilities to those. It is important to inculcate this practice. By having standards or SOPs (Standard Operating Procedures) set to integrate operations, our company can focus on areas that need improvement and consistent performance."

The standards used in the Distribution Centres were in three forms, namely organisation, industry or national standards. The managers gave examples of standards used as EDI, barcodes, Universal Container Code (UCC), operational configurations involving pallet size and containerisation. Once these standards were set, management needed to enforce and ensure that they were adhered to. Periodic appraisals and measurement systems could then be scheduled. These will be highlighted in Section 7.5.6.

Apart from deploying human aspects and work processes to assist in internal integration, another important issue is the physical assets used for operations. To facilitate integration, they need to be modified or updated for optimum efficiency (Bowersox, Closs and Stank, 1999). The managers acknowledged innovative techniques with physical assets and mentioned the efficiency of technology, computerisation and appropriate transportation vehicles. For aspects in the Distribution Centre, computers and materials handling equipment were also evident, as they were able to save on manpower and costs as well.

This capability was again evident in the Distribution Centres. The managers stated that they were able to link internal processes to support customer requirements,
and gave issues and views they faced in their firms. Bowersox, Closs and Stank (1999), and Schein (1985) also reported studies corresponding to situations and circumstances faced in these firms. In addition, the NVivo software revealed the linkages of what managers said with the literature. These were incorporated in the analysis.

7.4.3 Collaborating with partners in the supply chain (C)

From the above two capabilities, it was shown that organisations are required to relentlessly restructure and re-engineer to increase their effectiveness and satisfy customers. In the midst of this pursuit of excellence, they also need to measure their competencies needed to achieve competitive advantage. This realisation requires firms to span beyond their companies' organisational boundaries to evaluate how the resources of suppliers and customers can be utilised to create exceptional value. Integration, cooperation and collaboration require aligned objectives, open communication, sharing of resources, risk and rewards are mandatory for innovative and leading firms in the logistics sector.

Chapman, Soosay and Kandampully (2002), advocate that firms have been forced to restructure both internal and external relationships to respond flexibly, innovatively and rapidly to shifting and splintering market demand. This recognition has created a major increase in importance of the value chain, inherently linked to the idea of relationship networks. Firms need to successfully collaborate and strategically align their work processes with supply chain partners. This is done through developing common vision of processes, planning and shared responsibility (Bowersox, Closs and Stank, 1999).

The managers interviewed agreed with the above concepts and acknowledged that their firms possessed this capability. They further explained that collaboration was carried out through sharing information and resources such as strategic information, forecasts, sales, inventories and promotional plans. These points will be elaborated in more detail in the next section on behaviours. Firm A managers mentioned that it was essential to rely on partners' trust and creditability when collaborating with them. The three managers indicated there was some form of joint financial ventures, decision making and strategic planning when integrating operations with partners. For instance, the cost to change over to a new hardware system to interface with a particular supplier
was shared by Firm A with its major supplier. This information system established a
common infrastructure, unified management practices and measures, apart from just
improving communication with the supplier. This instance of increased operational
efficiency offset the initial cost of installation and implementing the information
system.

A few of the managers pointed out the basis of trust that facilitated the
collaborative linking externally with partners in the supply chain. This issue of trust
arose because some of them explained that they took specific actions to develop
networks, invested a considerable amount of capital, as well as made strategic decisions
for the future. These managers reinforced the view that integration of both external
engagements with partners and internal processes led ultimately to competitive
advantage for the firm and scope for innovation. In analysing the coding on trust using
Nvivo, this view of managers was linked to the work by Bijlsma-Frankema (1999). She
stated that innovation is dependent on high levels of trust in (vertical and horizontal)
relationships. Additionally, March and Oslen (1975) reasoned that trust promotes
willingness to engage in interaction and learning for innovation. Trust was considered
important in the process of building and maintaining relationships (Lagace, Dahlstrom

This capability to work together with partners has enabled firms to both
integrate and link operations for increased effectiveness. This was evident in the views
of managers across all the firms examined, supporting the importance of cooperation
and efficient allocation of resources throughout the supply chain.

7.4.4 Managing technology (D)

Technology can be a significant source of competitive advantage and capability
for innovation to occur. Authors such as Broersma and McGuckin (1999), Pilat (2000),
National Institute of Standards and Technology (NIST) (1998), Howells (2000), and
Caffyn et. al., (2000), supported technology as enhancing innovation. New innovations
must first meet the needs of customers, whilst satisfying management, providing a good
business proposition for the company, and using feasible and affordable technology
(Innovation Management Incorporated, 1999). The most prevalent forms of technology
adopted in logistics were EDI, barcoding, systems for order entry, order processing,
inventory management, vehicle routing and scheduling, and real time communications, as evident in the selected Distribution Centres and from literature. New innovations must first meet the needs of customers whilst satisfying management, providing a good business proposition for the company, and using feasible and affordable technology (Innovation Management Incorporated, 1999). The ability to manage such technology so as to support and reinforce operations is a challenge facing organisations. The logistics manager in Firm G stated:

"Technology should be used to facilitate supply chain operations and allocation of resources. They can help to coordinate activities in a lot of areas. Some of them include inventory, storage, transportation, and communication resources. They are used to maximise benefits."

Managers in Firms A, B, D and E had expressed that there was no necessity to invest in state-of-the-art technology to guarantee outstanding performance or innovation in logistics. The general manager of Firm A mentioned:

"I think there is no doubt that our Distribution Centre has a long way to go in terms of technology and automation. But firms can be efficient, through proper integration and coordination of systems and processes. The existing technology here is sufficient enough. It is how we manage it which matters, in the sense that it should efficiently support our systems and processes... Technology is just one capability among others that gives rise to competitiveness or innovation in the firm."

In addition, authors such as Bigoness and Perreault (1981) claim that the adoption of technology does not equate to the firm's tendency towards innovation. They argue that it is the consistency of the firm towards adoptive innovative processes and ideas that demonstrates innovative tendencies. An area where technology is apparent in firms is where networks, hardware and software are utilised. Examples of networks linking the organisations interviewed include satellite, leased line, wide area network (WAN), local area network (LAN) and the internet. For hardware, firms used mainframes, microcomputers, processors and storage technologies were utilised. Softwares used are the programmes to organise and analyse data. All firms interviewed except Firm A used E-commerce through the internet, where customers could place
orders through a web-based system. Such technology could be used to share standardised and customised information internally. Firm G used an integrated planning system to link with production departments. The materials requirement planning (MRP) system linked them to parent and subsidiary organisations regionally.

The managers supported the benefits of technology, stating that it allowed for exchange of information across various functions internally. For example, integrated databases in Firm C gave more timely and accurate information. They facilitated sharing information with external supply chain partners and customers using EDI. Firm C shared information on inventory status, shipment release schedules, warehouse shipment, point of sale information, forecasts, production schedules, new product introduction and marketing plans.

All the managers interviewed supported the importance and commented that technology, especially IT, will be a key competitive factor in logistics. Major players in the market were profound adopters of technology, and appeared to leverage on IT to gain competitiveness. Embracing technology could increase the value of logistics services, however the high cost of IT deters smaller firms from investing in it such as Firms A and D. Nevertheless, a capability of all firms is to effectively manage technology such that it supports their operations and systems optimally.

7.4.5 Managing change (E)

For firms to be innovative, they must cultivate the awareness throughout the organisation. Apart from streamlining operations and processes to improve service delivery, the mindset of employees needs to change. Since innovation is an important factor for future growth of any business venture, all the managers interviewed agreed that innovation was a mindset. As mentioned in the literature, it is a new way of perceiving the business strategies and practices. This thinking drives every aspect of a successful, dynamic organisation, and penetrates every element of business, creating a clear and enduring vision. There must be total organisation involvement for effective change. The change process must begin from, and have the support of senior management. To effectively meet needs of customers, the change process should weigh up the competencies and capabilities of the organisations, as well as partners in the supply chain. This has been supported by numerous authors in the literature such as
Potter (2001); Hultman (1995); Bond (1995); Steinburg (1992); Dunphy and Dick (1989); and Ford, Ford and McNamara (2002).

All the ten Distribution Centres had some form of change within the last five years, and managers indicated a positive response from their employees. Change for innovation came in different forms. The subtlest was Continuous Improvement or small incremental steps. The other extreme is radical change, considered as risky and may face high resistance by employees, as expressed by some managers. Eight firms (except Firms E and J) had a change in their organisation structure recently to improve operations, systems and processes. In the logistics industry, change is needed to attain competence in the operations. For instance, the managers in Firms B, I and J interviewed, stated that their firms chose to outsource the transportation function to an external party after a few years of operations. This was because they realised that it had been too costly, and they had to change their perspective and vision. By identifying and realising this situation, they had to seek an opportunity and find ways of improving their cost effectiveness. The change implemented allowed these firms to reallocate their resources on other more profitable areas of services.

In addition, most of the managers stated that change required flexibility and openness from employees to work outside the routine functions. The employees had to be prepared to perform additional duties or services beyond their job scope, so as to reduce crises, or to get the operations back on track. The production manager at Firm G gave the examples of when customers made unusual requests, or faced an urgent situation, or when there was a breakdown in the production plant. Change required management and employees to react positively to the market, industry or environment. It was remarked by several managers that the ability to effectively implement new procedures, processes or systems required acceptance and cooperation from all employees.

In view of the responses by managers, change is considered a crucial capability for innovation to occur. This is in line with the arguments made by several authors on change such as Jacob (1995), Jeffane (1995), Markovich (1997), Hultman (1995), and New and Singer (1983). Innovation requires change, and in the business environment, resistance to change is deleterious to organisations. People have to continuously adapt.
to change. As stated in the literature, this capability will enable firms to achieve sustainable value creation and competitive advantage (Innovation Management Incorporated, 1999). Effective managers should be aware of this by focusing on building confidence, competence and self-esteem in employees to manage change.

7.4.6 Reviewing performance (F)

According to Bowersox, Closs and Stank (1999), there must be integrated measurement systems to maintain performance in the supply chain. The complexity and numerous functions and systems cannot be completely monitored and controlled using traditional financial or quantitative measures. There may be indirect or non-representational measures for specific functions unique to logistics services. Measurement systems should reflect the operating process more accurately, and cover more than just financial aspects (Bowersox, Closs and Stank, 1999).

Out of the ten organisations interviewed, only Firm C managers mentioned using a Balanced Scorecard approach. It provided management with a comprehensive picture of business operations and a methodology that facilitated the communication and understanding of business goals and strategies at all levels. The critical success factors were defined. Measures were constructed that helped target-setting and performance measurement in areas critical to the strategies. The Balanced Scorecard approach used was a performance measurement system, derived from Firm C’s vision and strategy, and reflected the most important aspects of the business. The managers explained that this included aspects such as financial, customer, process, learning and innovation perspectives. They also mentioned focus on customer service, cost, quality, productivity and asset management.

The other firms used different forms of measurement systems. For example, the production manager in Firm G supported costing methods (such as total cost, activity based and activity management) which assisted the firm to integrate internal and external activities. He reported that cost information could help to develop new routines to simplify and streamline order place, or re-engineer the supply chain structure. As a result the firm could derive strategies and solutions based on specific analyses. Using standards of comparisons (benchmarks, inventory dwell time, cash to cash cycle time) was also extended measures of improvement. The warehouse manager
in Firm G gave an example where the firm committed to zero-defect logistics performance by using these indicators. It was important to assess the overall impact on the firm using performance measures.

All the managers agreed that performance measurement systems were critical for logistics services. Firm B adopted a process quality management system. Everything had to be documented, kept in procedure binders and maintained by the quality assessor. The quality assessor mentioned that the firm evaluated current performance and set standards for cost, productivity and service objectives. Other managers gave examples of adopting standards of comparison in areas of operation, or followed ISO guidelines. Firm F used a set of indicators encompassing various aspects such as customer satisfaction, cost, time, efficiency, Distribution Centre productivity, and supplier performance. The senior managers in Firm C highlighted the need to formulate competitive strategies to meet market demand, and integrate a suitable performance measurement system. This could then facilitate consistent organisational actions toward achieving these strategies. Similarly the general manager of Firm E stated:

“It is important to achieve internal coordination through consistent performance measures across departments... They can be used to measure customer satisfaction levels or to control costs in our organisation.”

As the logistics industry is dynamic with changes and competition occurring constantly, it presents great challenges for measurement and control of business activities. Management should consider financial and operational performance, and devise appropriate measures to set meaningful objectives for time, quality, costs and efficiency. The focus of measurement systems can assist firms to develop, streamline and manage processes and systems within the organisation. As stated by Fawcett and Clinton (1996), performance measurement both directs the design of the logistics strategy and monitors the strategy’s implementation. From there, corrective action can be taken, as advised by Mentzer and Firman (1994). It can be concluded that the strategy of firms using performance measurement systems occurred in all ten Distribution Centres and coincided with the views of authors in the innovation literature.
7.4.7 Discussion

The capabilities identified in the literature have been supported and demonstrated to a large extent by the managers interviewed in the selected firms. The responses given from managers validate what previous authors have written, as to what logistics firms should possess in order to be innovative. They have reinforced those points and shared how these were put into practice in the respective Distribution Centres. The managers also imparted their views and concerns as to the capabilities based on their experience and perceptions. Surprisingly, there were no additional capabilities identified during the interviews. Table 7.2 following summarises the main points that have been highlighted in this section.

To be successful, firms need to nurture and embed the organisational capabilities and distinctive behaviours which deliver innovative solutions ahead of competitors. The details relating to the competencies and behaviours for these capabilities to be operationalised will be elucidated in the next two research questions.
### Capabilities for innovation

<table>
<thead>
<tr>
<th>Capability</th>
<th>General comments</th>
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<tbody>
<tr>
<td>Satisfying Customers</td>
<td>• Evident in all firms&lt;br&gt;• Importance of identifying the long-term requirements and expectations of customers (Firms C, F and I)&lt;br&gt;• Focus on service quality (Firms D, E)&lt;br&gt;• Performed customer segmentation (Firms A, B, C, E, F, G, H, I)</td>
</tr>
<tr>
<td>Integrating Internal Operations</td>
<td>• Evident in all firms&lt;br&gt;• Allowed for cross-functional structures and teams&lt;br&gt;• Issue of complexity in logistics. Decreased number of supplier (Firms A, B, E, J). Standardised services (Firms J, H)</td>
</tr>
<tr>
<td>Collaborating with Partners in the supply chain</td>
<td>• Evident in all firms&lt;br&gt;• Collaboration through sharing information and resources&lt;br&gt;• Basis of trust facilitated collaboration</td>
</tr>
<tr>
<td>Managing Technology</td>
<td>• Evident in all firms&lt;br&gt;• Most prevalent forms of technology adopted in logistics were EDI, barcoding, systems for order entry, order processing, inventory management, vehicle routing and scheduling, and real time communications&lt;br&gt;• Technology was not mandatory for innovation (Firms A, B, D, E)&lt;br&gt;• E-commerce with customers (evident in all firms except Firm A)&lt;br&gt;• Integrated planning system (MRP) (Firm G)&lt;br&gt;• Too high cost for investment (Firms A, D)</td>
</tr>
<tr>
<td>Managing Change</td>
<td>• Evident in all firms&lt;br&gt;• Recent change in structure (evident in all firms except Firms E and J)&lt;br&gt;• Outsourcing of transportation (Firms B, I, J)</td>
</tr>
<tr>
<td>Reviewing Performance</td>
<td>• Evident in all firms&lt;br&gt;• Used Balance Score Card (Firm C)&lt;br&gt;• Used costing methods (Firm G)&lt;br&gt;• Process quality management system (Firm B)</td>
</tr>
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Table 7.2 Summary of capabilities for innovation in firms
7.5 Research Question 3

What behaviours are indicative of these capabilities in the selected Distribution Centres?

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It is evident that firms with superior capabilities would be expected to achieve a competitive advantage resulting in better performance than competitors. These must add value and be difficult to replace by substitute processes, or for competitors to imitate. In the previous section those capabilities apparent in the firms were further elucidated with supporting behaviours to operationalise and make them effective. These behaviours had been listed previously in Table 5.1. The managers elaborated on the behaviours, strategies and actions taken to materialise the capabilities, and it was apparent that the behaviours in the Distribution Centres differed, given the nature of operations, policies, systems and processes in place. Nevertheless in their own ways, the behaviours contributed to implementing effective capabilities for Continuous Innovation to take place in the selected Distribution Centres. The findings in relation to this are outlined below.

7.5.1 Satisfying customers (A)

7.5.1.1 Maintaining customer satisfaction (A1)

Organisations must strive to maintain customer satisfaction at all times. In the interviews with the managers at the Distribution Centres, nine of them (all except for company I) stated that they did this mainly through the delivery of services. Most of the managers spoke about delivering services accurately, timely and in full, meeting the requirements and expectations of customers. The efficiency of services was crucial, as the firms had to ensure that they had the goods on hand when orders arrived, preventing out of stock situations. Firm G was very particular in keeping their assurance and agreements made with customers. Firm J had a different response to this, and mentioned that they instilled a mindset in employees to achieve customer satisfaction.
All staff had to attend an in-house training programme on handling customers and service quality.

Secondly, customer satisfaction was maintained by continuously building relationships with them. A close rapport with customers was imperative for obtaining information and feedback. Some of the firms planned informal social events to maintain these relationships. At these events, they could also discuss business plans and joint planning for the future, or listen to and resolve their issues. The managers in Firm F gave this example:

"We try to retain customers and keep ongoing relationships with them. Customers are treated as partners. We even set up a department to handle grievances and complaints. Sometimes our sales personnel are expected to socialise and spend after work hours with them. The activities include dinners, drinks or a social game of golf. From such informal activities, we are able to obtain more information and feedback on areas to improve."

Firm I on the other hand, designed focused attention on their customers by assigning specialised staff to handle each customer. The IT manager mentioned:

"In our organisation, we assign a single point of contact to manage the customer relationship. It consists dedicated persons from the Global Account Division who are sales-oriented, focusing on the business relationship with a particular account. Each person may handle up to three (customer) accounts because their attention has to be very focused and specialised."

In addition, services have to be delivered and performed to an optimum standard. Most firms stated that they did this through performance measures or indicators. Performance indicators helped to set standards and targets to meet. Some of these include the issue of delivery errors, order entry errors, picking order errors and barcoding errors; all of which are targeted at zero-defect. Many managers, especially those in Firms B, D, F, G and J mentioned delivery of services to an optimum standard, or using KPIs to ensure satisfaction. They adopted standardised processes. Everything
was recorded into standard operating procedures for employees to follow and ensure quality services to an ISO standard. Performance indicators helped to assess if they were able to meet the requirements and expectations of their customers. Customers advised these firms about the service delivery and in which areas they needed improvements through measurement systems. In regard to the cooperation of customers, the regional operations (assistant) manager of Firm I noted:

"We have performance indicators jointly defined with our customers. We adopt and modify what the customers use to measure them. As a result, different customers will have different standards... We conduct performance audit annually to assure customers of their service quality."

It was also claimed that the challenges for organisations in today's economy are to establish and maintain customer satisfaction and loyalty (Scott, 2001). It is important to build strong and lasting relationships between the organisation and the customer. Gerson (1992) states that those firms which develop a reputation of excellent service require a commitment to the service throughout the organisation that is consistent over time. Firms have to constantly maintain satisfaction because satisfied customers may not remain satisfied forever (Miller, 1993). By building relationships with customers, employees can provide the fresh perspective and creativity they gain from interacting with customers (Mouawad and Kleiner, 1996).

It was evident from the interviews that all the ten Distribution Centres identified the importance of maintaining customer satisfaction. They took the necessary measures of sustaining adequate, efficient delivery of services to meet the expectations and requirements of their customers.

7.5.1.2 Collecting information to anticipate future needs of customers (A2)

To anticipate the needs of customers, the managers indicated that the main mode of collecting information was directly from the customers. This was done by establishing and maintaining good relationships with them. It was crucial for the firms to constantly be in touch with customers and monitor them, as stated by the managers in Firm C.
The employees or appointed personnel regularly met with customers for planning and to discuss forecasts of customers. It was the customers that governed their operations ultimately. Customers will state what they want or expect in future in the meetings. Firm E maintained that they obtained information through informal meetings and social gatherings organised. From there, they obtain feedback and plans of customers indirectly. The operations manager in Firms F stated:

“We anticipate that in the future, IT will be a major issue in meeting customer requirements. Customers will expect improvement in technology and ultimately, we will have to compete with big players in the logistics industry such as UPS (United Parcel Services) and FedEx (Federal Express).”

Firm H had customer service departments set up to ensure they retained customers. The employees in these departments were highly trained to provide assistance. They understood customers’ needs and communicated with them. These employees were able to obtain information about the future needs of customers. Similarly, Firm I set up a competency center where specialised staff handled customers and obtained information from them.

Firm G obtained information about customers through external sources. They cooperated with large players and leaders in the electronics and computer peripheral market. The firm co-invested with them in the areas of Research and Development as well as in technology. This enabled them to anticipate the demand of customers. Similarly, Firm A managers mentioned obtaining information through their suppliers. The general manager stated:

“We continually look for new innovative products all the time in the market. This keeps us abreast with what customers want and expect in future. We liaise with suppliers constantly on any new manufactured products. Since they also engage in market research, they inform us about the needs of customers.”

The second most important source of customer information is through performance reviews and performance indicators. The firms were able to assess past
orders, the history of customers, or use project trend analyses. Customer survey reviews were another common form used to see future needs and expectations. Some firms obtained information through professional body membership such as the Singapore Logistics Association which organised seminars, conferences and distributed newsletters to member organisations. Four of the five (except Firm I) organisations interviewed in Singapore acknowledged their membership of the association.

The literature supported that firms had to envisage the future needs of customers to maintain satisfaction. It was stated by Amidon (1999) that a focus on the success of customers helps to identify future unarticulated needs that are the source of growth and future success. Boer (2002b) also wrote that firms can be operationally effective by satisfying today's customers needs, using exploitation capabilities whilst at the same time be strategically flexible in meeting future customers needs using exploration capabilities. Consequently, it can be concluded that these firms were proactive in determining future needs of customers through the various strategies and methods deployed. They constantly monitored and interacted with customers, as well as reviewed their levels of services provided.

7.5.1.3 Identifying new and different ways to satisfy customers (A3)

When interviewed, all the managers felt that their firms had strategies in identifying new and different ways to satisfy customers. Each firm wanted to provide superior services so as to retain them. For instance the logistics and warehouse manager in Firm G felt that the firm was very customer-oriented and was always looking for new and different ways to satisfy customers. They devised strategies in the areas of pricing, delivery and quality of products so as to keep the customers happy.

Other firms identified improvements through maintaining relationships and obtaining regular feedback from customers. The firms were able to gauge the demand patterns, and saw the strategic directions of customers. For example, each customer of Firm B (that dealt with the automobile industry) was analysed separately, so that there was better focus on specific problem areas. Some customers required specialised services and fittings to their cars ordered. Firm B tried to find new ways for improving and was more efficient in their service provision.
The human resource manager in Firm E supported that by benchmarking against competitors, the firm was able to set higher standards and surpassed others in the industry. The managers in Firms D and J also mentioned that they analysed competitors and engaged in 24-hour operations, or worked during weekends in the Distribution Centre for more efficient order fulfilment. Other firms stated that they needed to keep up with new developments in the industry so as to formulate new and different ways to satisfy customers. The managers in Firm J explained they did this by attending seminars, conferences and events organised by external organisations.

Firm H devised a new system in their container trucking using a Global Positioning System (GPS) and the mobile phone GSM network. It incorporated technology to the container trucking industry where the system is installed at the driver’s seat of large trucks. They were able to locate the truck via satellite. Customers could then monitor the movement of their goods anywhere in the country via internet access.

Firm F was the only firm that did not come up with new or different ways to satisfy customers. The managing director said:

“The current level of services is adequate in satisfying customers at present. Nevertheless, we are always sourcing and keeping up with competitors and big players in the market. I feel that the key factor in satisfying customers is having the right personnel at all times.”

The literature supports the views of the managers interviewed. Authors such as Kassing (2002) wrote that embarking on a more thoughtful way to satisfy customer and retention goals, takes an investment of time, talent and a pre-determined focus. It was evident that the firms (except for Firm F) came up with new ways and methods to retain their customers all the time. In order to do that, they needed to understand the customer and analyse the benefits of being unique in their provision of services. The firms focused on new and different ways in terms of their processes, relations and strategies, so as to provide timely delivery and meet the needs of their customers.
7.5.1.4 Being flexible and adaptive to unique requests (A4)

During the interviews, all the managers stated that they were flexible and adaptive to unique requests. It is a key area in the supply chain that organisations should consider. The managers cautioned the risk of inflexibility, especially when there was too much standardisation. They advocated that firms needed to adjust to customers’ needs. In addition, they maintained that their firms possessed dedicated staff, willing to be flexible and responsive to customers’ demands and requests. In this regard, many of them gave the example of fulfilling orders, mainly within a restricted time period, causing their staff to work overtime, or conduct operations at the Distribution Centre to 24 hours. The managers in Firm C mentioned that they operated the Distribution Centre 24 hours when needed, so as to meet customers needs. They felt that being flexible would give them the opportunity to expand in future. The logistics and warehouse manager at Firm G stated that they had to weigh out cost and time factors, and build it into the service charged for customers, whereas Firm H normally gave a quotation first before obliging.

The logistics manager at Firm J stated that they had to efficiently manage their materials, goods, suppliers and inventory. They also planned for such unusual requests by forecasting demand rather conservatively. He gave an example of flexibility in terms of timing of delivery. The employees would deliver the service at odd hours just to satisfy their customers. He cited taking a freight container sometimes late at night to the wharf for it to be shipped by the vessel so that the customer could receive it the next day. The general manager in Firm B stated that the biggest opportunity to add value to the process is to be flexible. They try to incorporate requests and modify processes to maintain customer satisfaction and fulfil customers’ requirements. Being in the refrigerated business, the warehouse manager of Firm E stated:

"Customers sometimes want to change the temperature for storing their products such as cake, meat, carcasses, cheese and ham. We have to be flexible to meet different storage requirements of the different goods. So we have different chiller temperatures for different types of goods. However we are rigid and work within limited temperature brackets. The goods are classified according to chiller groups – for example minus 25 degrees to minus 18 for ice-cream."

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Providing logistics services is a very competitive job. Firms try to surpass each other in terms of their service provision. Organisations have to weigh out the costs and benefits in being flexible and adapting to needs. Using the coding on flexibility, NVivo identified the supporting literature. Various authors highlighted organisations that are flexible and able to respond successfully, will reap the benefits and have a competitive edge. They have to be aware and adapt existing structures and practices to develop a more open and flexible system (Abbassi and Hollman, 1991). On that account, logistics organisations will have to move from a bureaucratic mode to a responsive mode, to deliver value to the customers, and this necessitates being flexible, lean, and yet able to satisfy customers (Mohanty, 1999). Similarly, firms should remain flexible in forming the ‘right’ type of relationships with their business customers, and this can be achieved through mutual adaptations (Ahmad and Buttle, 2001). The firms interviewed generally tried to fulfil the needs and be adaptable to the needs of their customers. Adaptiveness is the core of flexibility which ultimately reaps competitive advantage for the firm.

7.5.1.5 Accommodating unexpected situations (A5)

It was apparent during the interviews that the firms handled unexpected situations in different ways. It was common for the managers to mention conducting regular planning sessions and meetings to handle contingencies. In Firm I, business impact analyses were conducted to explore the magnitude of natural disasters affecting the business continuity of customers. Having several branches worldwide, the firm had to make advance preparations in case of disruption such as floods, fires or any natural catastrophes.

The managers in Firms F and G also maintained that they had effectively planned for contingencies with their experience and expertise in handling such situations over the years. They claimed their employees to be competent and equipped with adequate training. This was evident in firms and the examples as cited by managers. Firm A had employees who were willing to put in the extra effort to look for particular products that customers want. Employees at Firms B and D would stretch a little further, or go out of their way to ensure smooth operations. Firm G had employees on standby in case there was a plant breakdown or emergency. The employees were deployed to work overtime so as to fulfil customer orders. Firm J had selected staff
who were contactable 24 hours. They were trained to handle emergency and unexpected situations, and even had special clearance with customs and the airport to receive and transport goods via air at all hours, should the need arise. An example was given where employees might even be required to personally hand-carry and deliver important products to customers overseas.

This allowed management to be very hands-on in the operations of the business. Most of the managers interviewed stated that they would consult higher management or have emergency meetings to resolve such issues. The regional manager in Firm C stated:

“The main thing is for core activities to be well-organised all the time so that when something unexpected arises, they (employees) are in the position to be able to stretch a bit more to do extra activities... Communication is also a key factor within departments as well as with customers to help us deal with such situations.”

All organisations face unexpected situations at some time or other. To resolve or effectively manage them, proper planning and execution is mandatory. Firms need some form of contingency planning for the unexpected. (For instance to have zero downtime, or to fulfil orders promptly) Contingency plans should ensure the continuing operations of the Distribution Centre with minimum recovery and restoration time.

From the above interviews with managers, it can be deduced that most of them adopted a flexible mindset, seeking additional information about the future, exploring the validity of current expectations about the future, and engaging in contingency planning. It remains true that the future can never be projected with certainty, and managers should manage Distribution Centres in this regard for future competitive advantage and seek to satisfy customers.

7.5.1.6 Forecasting future demand (A6)

Out of the ten firms interviewed only Firm I did not forecast future demand very extensively. The managers in Firm I reported their inventory demand was dependent on market demand fluctuations, and also affected by the shortening of product life-cycle, or the risk of obsolescence. However, their customers shared information on inventory management and purchasing to some extent. The rest of the firms forecasted future
demand. They utilised various techniques for planning such as budgets, financial reports, key performance indicators, historical information on trends, statistical methods, regression analysis or computerised software.

Firm H used People Scheduling and a Trucking System (PSTS). In addition, a 3-day moving average was deployed for stock planning. The managing director in Firm J mentioned that their methods concentrate on the flow and product classification. This is where each product is placed in groups and planned accordingly. He said:

“One method used is business trends by forecasting through the sales unit. All information on volume is collated quarterly. Secondly, we forecast each item with statistical and regression analysis. Each product is placed in an A, B or C group. They depend on how long the product has been introduced in the market and if it will be discontinued soon. Within the group, they are ranked from 1-9. Products termed A1, B1 or C1 normally have many customers. Regression analysis is used to forecast such products with high turnover. Thirdly, we also forecast separately with major customers.”

From the above comments by the managers and the examples given, it is apparent that there was diversity in the methods adopted for forecasting demand. This was due to the nature of industry the firms were operating in, and the type of goods dealt with. To satisfy customers, firms needed to effectively forecast future demand such that there was correct and adequate stock at all times. It was crucial to plan for the future, and the importance of having regular meetings and feedback from customers can assist firms provide superior services and achieve customer satisfaction. The literature stated that forecasting demand (and subsequently setting inventory levels) is difficult, owing to the influence of promotions, changing demand patterns and competitive pressures. The traditional answer to inventory problems has been to simply hold increased inventories. Holding high levels of anticipatory inventory may offer a way to avoid out-of-stock situations, but it is a very expensive method of avoidance (Stank, Daugherty and Autry; 1999). They predicated that the approach is to work together with cooperative planning to manage inventory. This will be highlighted in Section 7.5.3.2 on joint planning.
7.5.1.7 Ensuring appropriate levels of safety stock (A7)

The firms had different methods of ensuring a level of safety stock kept at the Distribution Centre. Each firm was different and had to use different methods. For instance, Firm A did a daily stock-count whereas Firm D did it weekly. This was because Firm A dealt with bulky goods of less variety (such as building materials and timber) as compared to other firms that dealt with a wider range of goods, making it difficult to do stock counts frequently. As a result, other measures had to be taken.

Firm B which managed automobiles had to control storage based on landscape. Their customers were the ones that dictated the orders and inventory level. When the market was sluggish, cost factor became an issue for the Distribution Centres. It would become costly to store goods. In this regard, Firm C minimised the amount of stock to keep to two days supply only, at a time. Firms F, G and J adopted computerised and mathematical formulae in determining the level of stock, due to the varied and numerous goods dealt with.

7.5.1.8 Customising services for customers (A8)

All the firms customised services to a large extent. Although Firms D and J did not segment their customers, the services were customised. The managers in Firms A and F felt that there was greater customisation of services for the smaller customers who had more diverse needs. This was because their key customers normally had repetitive orders in large volumes. As a result, sales representatives were delegated to cater to such smaller customers.

Similarly, the services at Firm B were customised to a very large extent, because customers gave exact specifications for certain vehicle models which they had to adhere to. Firm C treated customers individually and catered specifically to each of their needs. Firm D tried to meet the needs and customise extensively. The general manager mentioned:

“Some customers need to have more leeway and time given to them, in terms of attention and special services. We also provide advice to customers, list of their freight - what and when is coming. We try to
meet the needs of the customers in every form. Reliability is the most important factor."

Firm E dealt with refrigerated products, and had to tailor the storage temperature to the requirements of customers’ products and their shelf life. As a result, they had to have a very stringent delivery time, especially for perishable goods. Firm G being a manufacturing firm, customised their production schedules and vendor management of their inventory for customers’ convenience. Firm H grouped customers into different categories. ‘Class A customers’ were given more attention, as they were major to their operations. Dedicated personnel were placed in charge of them. Sometimes special documentation and paperwork had to be customised for these customers. Firm I on the other hand, customised their IT application and operating procedures to suit the needs of customers.

Firm J provided customised services for customers in different countries. Different countries utilised different equipment when handling products. For developed countries they utilised palletised products. The logistics manager in Firm J stated:

“In developing countries (such as India, Bangladesh and Myanmar), they still adopt conventional methods and use manual labour. We have to cater our cartons and boxes, ensuring that the weight is not too heavy for manual lifting. Also, many of the companies and shops in India have very small and narrow staircases, or tiny cargo lifts, making it difficult to transport goods. As a result, we have to modify the dimensions of pallets and cartons to ease the handling requirements of customers.”

All the firms had evidence of customisation of services, as mentioned by managers. It is concluded that to be able to satisfy customers and customise services, firms need to adopt a flexible system.

7.5.1.9 Discussion

This section has investigated the behaviours that supported the capability of satisfying customers. Based on the managers’ reports during interviews, it can be concluded that all ten Distribution Centres displayed the identified behaviours except
for Firm F. Table 7.3 following highlights the main points from this section. Each firm
differed in practices, actions and strategies. Nevertheless customer satisfaction was
achieved in some way. Customer satisfaction is the key to continued organisational
survival. It relates to customers’ perception about the performance of the Distribution
Centre. Satisfaction is based on the extent to which customers perceive the service to
meet their expectations. Poist, Scheraga and Semeijn (2001) stated that management
plays an important role in logistics. They have to confront the challenges of meeting
the needs of customers to enhance quality and service. Additionally, the organisation
has to look beyond customer satisfaction, not only to stay competitive, but also to
become innovative.
<table>
<thead>
<tr>
<th>Satisfying customers</th>
<th>General comments</th>
</tr>
</thead>
</table>
| **Maintaining customer satisfaction (A1)**                                          | • Evident in all firms  
• Maintained through delivery of services except Firm I  
• Services were accurate, timely and in full, meeting the requirements and expectations.  
• Used performance indicators (evident in all firms).  
• Fulfilling assurance and agreements (Firm G)  
• Training of employees on handling customers and service quality (Firm J).  
• Building and maintaining relationships (Firms A and F)  
• Specialised staff to handle each customer (Firm I) |
| **Collecting information to anticipate future needs of customers (A2)**             | • Evident in all firms  
• Generally collected information directly from the customers  
• Maintaining relationships and monitoring customers (Firm C)  
• Regular formal and informal meetings and social gatherings (Firms E and F)  
• Service department/ competency centre (Firms H and I)  
• External sources, suppliers (Firms A, F, G, H, J)  
• Professional body membership (Firms F, G, H, J) |
| **Identifying new and different ways to satisfy customers (A3)**                    | • Evident in all firms except Firm F  
• Pricing, delivery and quality of products (Firm G)  
• Maintaining relationships and obtaining regular feedback. Each customer analysed separately (Firm B)  
• Analyse, benchmark competitors (Firms D, E and J)  
• Keep up with industry (Firm J) |
| **Being flexible and adaptive to unique requests (A4)**                             | • Evident in all firms  
• Dedicated staff, fulfilling orders within a restricted time period. (Firms C, G, H, J)  
• Forecasting demand rather conservatively (Firm J)  
• Modify their processes (Firms B, E) |
| **Accommodating unexpected situations (A5)**                                       | • Evident in all firms  
• Business impact analyses (Firm I)  
• Planned for contingencies (Firms F, G)  
• Competent employees (Firms A, B, C, D, G, J) |
| **Forecasting future demand (A6)**                                                 | • Evident in all firms except Firm I  
• Utilised various techniques for forecasting |
| **Ensuring appropriate levels of safety stock (A7)**                               | • Evident in all firms  
• Used different methods |
| **Customising services for customers (A8)**                                         | • Evident in all firms  
• Greater customisation for smaller customers (Firms A, F)  
• Customised to exact specifications of each customer (Firms B, C)  
• Customised production schedule and VMI (Firm G)  
• Customised IT application and operating procedures (Firm I)  
• Categorised customers. Class A customers had more attention (Firm H)  
• Customised services according to countries (Firm J) |

Table 7.3 Summary of behaviours evident in satisfying customers

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7.5.2 Integrating internal operations (B)

For this capability, six behaviours were identified and investigated as follows.

7.5.2.1 Streamlining the vision and mission of the organisation (B1)

The operations of any organisation depend on the overall goals and direction of the firm. From there, strategies are set in line with the operations of the firm. The managers were interviewed on the company mission and vision of their firms. Eight out of the ten firms had a company mission/vision focused on serving customers as the first priority. Others envisioned being market leaders through growth, efficiency and Continuous Improvement. They also mentioned serving their employees by training, development and in areas of quality, occupational health and safety. Two of the firms' missions included increasing profits to shareholders and concerns to environmental issues. The managers also spoke about reducing costs and improving quality in their operations.
Mission/Vision areas - Australian firms

Figure 7.7 Targeted areas for Australian firms' company mission/vision

Mission/Vision areas - Singaporean firms

Figure 7.8 Targeted areas for Singaporean firms' company mission/vision

From the above two graphs, all five of the Singaporean firms had customer focus as part of their company mission/vision in comparison to only three Australian firms. In addition, two firms in Singapore placed emphasis on improvements and innovation as their mission, whilst none of the Australian firms focused on this. However, there were other areas of concern which Australian firms placed emphasis on such as occupational health and safety, quality, and protecting the environment which the Singaporean firms did not target in their firm objectives. This could be due to issues
of business culture or government regulation in the two countries. It is felt that the government in Singapore promotes innovation campaigns consistently, and urges firms to embark on innovative strategies more obviously than in Australia.

It was significant to contrast the company mission/vision of these firms in relation to their drivers of innovation depicted earlier in Figure 7.5. The drivers were in line with the mission of the firm to some extent. For example, the most frequently mentioned driver for innovation in Australian firms was customer orientation. In relation to the mission/vision of Australian firms, the highest emphasis was also on serving customers. In Singaporean firms, the most frequently mentioned driver for innovation was customer orientation and operational performance. Similarly, all the Singaporean firms had this focus in their company mission/vision. Additionally, two of the Singaporean firms (Firms G and J) had Continuous Improvement and innovation as firm objectives which could have contributed to the drive to improve operational performance. It was difficult to establish a correlation between the drivers of innovation with the mission/vision of the firms. However, it can be concluded that the company mission/vision was important in steering the direction of firms, integrating operations, and affecting the innovative strategies subsequently.

7.5.2.2 Imposing organisational policies and procedures (B2)

The ability to link and integrate systems and processes depends highly on organisational policies and procedures. A policy is a widespread application that is expressed in broad terms, addressing major operational issues. A procedure is a narrower application, generally stated in detail and describes a process. The importance of procedures is to establish corporate-wide standards across diverse practices of the organisation, and describe the details of processes and systems in place. This is crucial for the effective integration of operations across departments.

When asked if all the departments in the firm had standardised policies and procedures, all managers agreed except for those in Firm A where only some of the departments had these standardised policies and procedures. Firm A relied on the broad corporate policies set by headquarters bi-annually. Overall, the firms had standardised policies and procedures targeted at various areas. These are illustrated in the following table.
Target areas in policies and procedures of firms

<table>
<thead>
<tr>
<th>Australian Firms</th>
<th>Targeted areas in policies and procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm A</td>
<td>Occupational Health and Safety (OHS), Security, Operations, Management</td>
</tr>
<tr>
<td>Firm B</td>
<td>OHS, Discrimination, Work practices, Quality.</td>
</tr>
<tr>
<td>Firm C</td>
<td>OHS, Environment, Ethics, Discrimination, Contingency plans, Harassment, Non-smoking and tobacco-free policy, No alcohol and drugs in the workplace.</td>
</tr>
<tr>
<td>Firm D</td>
<td>Safety, Operations</td>
</tr>
<tr>
<td>Firm E</td>
<td>Environmental issues, Training, Quality</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Singaporean Firms</th>
<th>Targeted areas in policies and procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm F</td>
<td>Operations</td>
</tr>
<tr>
<td>Firm G</td>
<td>Operations, Manufacturing, Environmental issues.</td>
</tr>
<tr>
<td>Firm H</td>
<td>Quality, OHS</td>
</tr>
<tr>
<td>Firm I</td>
<td>Operations, Planning, Management</td>
</tr>
<tr>
<td>Firm J</td>
<td>Operations</td>
</tr>
</tbody>
</table>

Table 7.4 Target areas in policies and procedures of firms

Four out of the five firms’ managers in the Singaporean Distribution Centres mentioned being steered by ISO guidelines. Firm G used ISO 9000, ISO 14000 and QS 9000 (for manufacturing), and Firms F, H and I used ISO 9002. Unexpectedly, only one manager in the Australian firms mentioned ISO when they were interviewed. It did not imply that these firms did not adopt ISO guidelines. (Firms A and D were not ISO accredited). Only Firm B in Australia indicated using a quality system incorporating ISO 9002. From Table 7.4, it is suggested that the Australian firms’ policies and procedures were targeted at varied areas. Occupational Health and Safety (OHS) was prominent and common among these firms. Only Firm H in Singapore included OHS. Relating back to Singapore firms’ company vision/mission in Figure 7.8, it showed also that none of the firms placed emphasis on this aspect. The most prominent area with policies and procedures was on operations.

Firms enforced policies and procedures to ensure consistency of operations through documentation, and keeping manuals for reference. The managers elaborated that all employees were made aware of the standardised operations, to ensure an integration of internal processes and systems. The NVivo software analysis also related
this behaviour to the works of Bedwell (2002). He noted that policies and procedures convert the philosophy of the business into action, providing the means to run operations efficiently and connecting interrelated departments. They improve productivity and strengthen operations by providing authoritative standards, ensuring compliance, and also assist to accelerate the decision making process.

7.5.2.3 Having cross-functional unification across departments (B3)

During the interviews, all the managers explained having some form of cross-functional unification across the organisations, where each department knew what the other departments were doing. This helped to streamline operations and work towards common objectives. This was obvious through regular meetings, departmental meetings and management directions set. Company wide objectives are set at managerial level and filtered to all departments during periodic meetings. All the managers in the ten organisations mentioned that this was evident in their firms.

For instance, the human resource manager in Firm E mentioned that they conduct management meetings every month. She stated:

"Each departmental manager reports to see how things are going, what the department is aiming to improve. We discuss and update the other department managers what we have been doing. It enables everyone to become involved in all parts of the organisation, and makes meetings useful to everyone."

This cross-functional unification across departments can assist synergistic processes and activities in the organisation. Information is exchanged through various methods as shown in Figure 7.9.
Methods used to exchange information

- E-mail: 35%
- Memos: 33%
- Notice/Bulletin boards: 31%
- Newsletter: 14%
- Periodic Staff talks/meetings: 3%

Figure 7.9 How information was exchanged across departments in the ten firms

The most common communication method used were emails (35%) and notice boards (31%) for the ten Distribution Centres. This is depicted in Figure 7.9. In addition to the forms of exchange, the type of information exchange varied from each organisation. Examples given by managers included departmental costs incurred, profits gained, the goals and directions set for the next quarter, areas for improvement, and how they can make operations more transparent among the departments. The employees and management viewed this exchange of information as a connection and to have an overall picture of the direction of the firm.

The literature on cross-functional operation states that communication or information exchange within departments enables people to become involved in all parts of the organisation. Roffe (1999) asserts this makes knowledge transfer and idea implementation useful for innovation. Similarly, Drucker (1992) supports successful innovations evident in cross-functional organisations, where departments participate. They encourage cooperation, new ventures (Quinn, 1985), increase productivity and decrease costs (Filson, 1999). In addition, the valuable input and coordination from the individual departments can bring the separate forecasts, plans and strategies together into a single plan for the whole organisation (Tosh, 1998). It can be concluded that these firms had the correct strategies and approach to facilitate innovative strategies.
7.5.2.4 Streamlining operations and managing efficiency (B4)

Receiving and despatching goods (B4.1) - Firms need to manage efficiency in the operations for warehousing and distribution. As explained in the earlier section, coordination between departments was crucial for streamlining processes and systems at the Distribution Centres. Due to the difference in nature of goods and size of firms among the ten firms, each Distribution Centre was different. For example, the procurement or administration department should be in relation with the Distribution Centre in managing goods ordered and received. When queried on the receiving docks, loading, unloading and average time spent on counting and inspection of goods, there was a slight difference between the firms. These differences are illustrated in Table 7.5.

<table>
<thead>
<tr>
<th>Firm</th>
<th>No. of receiving/despatch docks</th>
<th>Time taken to unload goods per unit pallet (receiving)</th>
<th>Time taken inspecting and checking per unit pallet</th>
<th>Time taken to load goods per unit pallet (despatch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>5-10 minutes</td>
<td>15 minutes</td>
<td>More than 30 minutes</td>
</tr>
<tr>
<td>B</td>
<td>18</td>
<td>25-30 minutes</td>
<td>5 minutes (per automobile)</td>
<td>25-30 minutes</td>
</tr>
<tr>
<td>C</td>
<td>12</td>
<td>10-15 minutes</td>
<td>15 minutes</td>
<td>10-15 minutes</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>10-15 minutes</td>
<td>2 minutes</td>
<td>10-15 minutes</td>
</tr>
<tr>
<td>E</td>
<td>8</td>
<td>20-25 minutes</td>
<td>5 minutes</td>
<td>More than 30 minutes</td>
</tr>
<tr>
<td>F</td>
<td>12</td>
<td>10-15 minutes</td>
<td>1 day (40 containers)</td>
<td>10-15 minutes</td>
</tr>
<tr>
<td>G</td>
<td>3</td>
<td>15-20 minutes</td>
<td>15 minutes</td>
<td>15-20 minutes</td>
</tr>
<tr>
<td>H</td>
<td>10</td>
<td>25-30 minutes</td>
<td>15 minutes</td>
<td>25-30 minutes</td>
</tr>
<tr>
<td>I</td>
<td>60 (on 5 levels)</td>
<td>10-15 minutes</td>
<td>2 minutes</td>
<td>20-25 minutes</td>
</tr>
<tr>
<td>J</td>
<td>6</td>
<td>10-15 minutes</td>
<td>No inspection</td>
<td>15-20 minutes</td>
</tr>
</tbody>
</table>

Table 7.5 Average time taken to handle goods

As shown in Table 7.5, some firms generally took a longer time to load a pallet of goods for despatch, than to receive one from suppliers. This, as explained by the managers, was to ensure that the right orders and quantity were delivered to the satisfaction of the customers. The accuracy in order fulfilment was critical in ensuring customer satisfaction, and firms had to correctly integrate their operations for this.
Controlling defective/damaged goods (B4.2) - An issue of concern to firms was the amount of soiled, defective or damaged goods. This was important because the value of such goods affected the profits. Most of the time, the damage was caused from handling during despatching, or that the packaging material was not secure enough when received. Firm C for instance, once received milk cartons sealed with inferior glue from their suppliers. By the time they goods arrived, the milk had leaked through the cartons and into the pallets.

All the firms generally received more defective or damaged goods from their suppliers than they caused as a result of mishandling or storage. This is illustrated in Figure 7.10. Sometimes, stock was damaged by natural calamities or instances beyond the firms' control such as fire, floods or accidents. Firm I recently experienced an unpleasant loss due to a faulty sprinkler system at the Distribution Centre. A large amount of goods had to be written off because the packaging was wet and affected the quality of their products.

Employees in all the firms had to minimise losses to the firm and were held accountable for the stock that they mishandled or despatched to customers. In addition, they were made aware of the shelf life or expiry dates of products, and needed to have effective stock control to manage this. However, only one firm (Firm J) had a slightly higher percentage of goods damaged from handling and storage than received. This was because it was a manufacturing facility of rolling bearings and seals. The defective goods were as a result of errors or defects in manufacturing. Firm A had a high 10 percent of defective or damaged goods received from suppliers. This was due to the nature of products dealt with. Majority of them were timber, construction and building materials.
Figure 7.10 Origin of defective goods

To prevent goods from being damaged, soiled or mishandled, the managers reported that employees at the Distribution Centre needed to be adequately trained with proper skills. Supervision was also seen just as important to ensure proper handling. The employees in Firm A were instilled with quality awareness. The administration manager stated:

"All goods must be 100% free of defect. If it is damaged, it does not get delivered."

Firm B on the other hand, used a different approach. Everything was documented, and damaged goods (vehicles) were put on display to all employees to highlight their mistakes. Posters and reminders were pasted on the walls in the Distribution Centre such as in Firm I for efficient handling. This included the machinery and equipment to handle goods such as forklifts or conveyor belts. The logistics and warehouse manager at Firm G stressed the importance of using proper box pallets and shrink-wrapping of cartons to prevent any damage to the contents. Firm J re-boxed cartons whenever necessary as a precaution. The general manager at Firm H also commented that the layout of goods at the Distribution Centre determined the condition of goods. Well-designed racks and shelves should be utilised, capable of sustaining the weight and dimensions of goods. It can be seen that all the firms took proper measures in handling goods to prevent unnecessary costs.
Controlling stock (B4.3) - Inventory shrinkage was another concern that surfaced. This referred to the loss or pilferage of goods at the Distribution Centre. There was a range of losses in the firms from 0% (at Firm B dealing with automobiles in a tight security Distribution Centre, and Firm E) to 5% at Firms A and D per annum. The main reasons for inventory shrinkage in these firms were pilferage or theft; stock items incorrectly or not recorded; damaged goods not written off; and shipment errors.

To minimise inventory shrinkage, the managers spoke about taking appropriate measures. A physical stock count was conducted periodically for Firms A, B, D and E. Firms F and J did cycle counting whereby a stock take was done once a re-order level was reached from documents, or on computer (according to usage value). Cycle counting is the physical counting of stock on a perpetual basis, rather than counting stock periodically. A cycle is the time required to count all items in the inventory at least once. The frequency of cycle counting can be varied to focus management attention on the more valuable or important items or to match work processes.

Firms C, G, H and I adopted both practices. Barcoding was another effective method in controlling stock as goods were scanned, and details entered into the computer system for easier monitoring. Firms H and J had responsibility assigned to employees. The stockkeepers were held accountable for items handled. The goods were labelled with the employee’s identification for tracking and reference, should a situation arise. Managers in Firms G and J mentioned using a computerised system such as Automated Storage and Retrieval System software (ASRS) which made it easier to control and monitor stock.

The firms utilised different location control systems for the positioning of stock at the Distribution Centres. It refers to a system where all places within a warehouse are identified in some way to facilitate storage and retrieval of stock. As shown in Figure 7.11, 50% of firms utilised stock location information system at random sequence. This meant that there was no fixed location for a stock assigned. The computer software would assign an available rack or shelf at a point in time. With a high turnover of goods at the Distribution Centre, it was impossible to leave empty or idle racks. The random sequence was common in Singaporean Distribution Centres with four out of five adopting a random sequence.
Figure 7.11 Stock positioning systems utilised by firms

Figure 7.11 shows that Firms C, D and I utilised a product code sequence (or logical sequence). This was fixed throughout the Distribution Centre at all times, and employees could become familiar with locating goods easily. Goods were stored according to their product codes. Whereas in Firm A with only 36 employees, it was possible for them to know and assign products according to their knowledge and familiarity with the Distribution Centre. Firm B on the other hand, utilised a big plot of land to store the vehicles (with the more expensive vehicles sheltered under a marquee). They were easily identified through barcoding. The computer would display the exact place (row and aisle number) of where the vehicle was located.

During order picking, employees collected the goods from the Distribution Centre (except for Firm B) for despatch to customers. This was done through different methods. 50% of firms had order picking conducted according to individual customers’ orders. The employees at the Distribution Centre were assigned to a customer order, and were responsible for picking the goods from storage, to be packed and delivered. The other 50% adopted an approach of picking the whole day’s orders at a time for multiple orders, saving on numerous trips, or picking the same product in the same day. The goods were then sorted out and packed according to individual customers. The managers mentioned the need to streamline the operations in this regard, so as to add to the efficiency of warehousing and distribution.
7.5.2.5 Provision for growth and expansion (B5)

Eight out of the ten firms interviewed (all except Firms G and I) had provisions for growth and expansion of the Distribution Centre. The structure and layout of these Distribution Centres had been designed to accommodate for expansion. Firms B, D, E and H provided for this by purchasing extra land space adjoining their property for future construction. Firm C on the other hand, was prepared to relocate the Distribution Centre and distribution facilities. The other firms intended to provide for better racking systems, extra or extendable shelving, and bulk storage. The managers indicated that they had to be proactive and look into the future. Eight managers were optimistic about the expansion of their Distribution Centres, because of the buoyant logistics industry and increasing turnover. The managers in Firm C stated:

“We see that the new millennium represents new opportunities for retailers to expand. As many companies have come out of recession, investments in new store development and new technology have markedly improved, creating an increasingly internationalised retail business environment. This poses new challenges for us.”

It was necessary to make provision for expansion in the business. As stated in the literature, firms have to develop strategies to improve performance and profitability in their existing business, and develop strategies for further growth (Perrson and Virum, 2001). This strategic direction for the firm might be important to increase market share in the long run.

7.5.2.6 Restructuring the organisation (B6)

All the managers in the firms stated that the organisation structure allowed for cross-functional activities and operations. There was easy access between departments and information was shared or exchanged internally. All the firms, but two (Firms E and J) had a change in their organisation structure within the last five years. Every manager of the eight firms affected stated that this change was beneficial and assisted to streamline internal operations.

In the literature, it is stated that the most common organisation structure today is the matrix formation which is a compromise between functional focus and customer
focus. As more Distribution Centres continue to integrate with supply chain members, this trend towards informal communication structures will inevitably increase (McAdam and McCormack, 2001). They advocate that flatter structures imply employees to be multi-skilled, flexible and react quickly to market changes. For larger organisations to compete, the solution is to empower employees.

7.5.2.7 Discussion

The primary concern of internal integration was business operations. All the Distribution Centres interviewed integrated their activities and operations together in a system which simultaneously helped to minimise total distribution costs and maintain customer satisfaction. Each firm differed in their own way because of contingent factors, policies, procedures or strategies adopted. A summary of the behaviours is depicted in Table 7.6 following. The coordination of activities among departments mandates the consideration of firm objectives as a whole, rather than those of individual departments. Ultimately, they should work towards the satisfaction of customers.
### Behaviours evident in integrating internal operations

<table>
<thead>
<tr>
<th>Integrating Internal Operations</th>
<th>General comments</th>
</tr>
</thead>
</table>
| **Streamlining the vision and mission of the organisation (B1)** | - Evident in all firms  
- First priority was serving customers except Firms A and D  
- Mission/vision of firms were in line with drivers for innovation to some extent |
| **Imposing organisational policies and procedures (B2)** | - Evident in all firms  
- All departments had standardised policies and procedures except Firm A  
- All Singaporean firms mentioned ISO guidelines (except Firm J)  
- Prominent area in Australian firms was OHS  
- Prominent area in Singaporean firms was Operations |
| **Having cross-functional unification across departments (B3)** | - Evident in all firms  
- Obvious through regular meetings, departmental meetings and management directions  
- Information exchanged through various methods. Highest was through emails |
| **Streamlining operations and managing efficiency (B4)** | - Evident in all firms  
- Firms had different time spans in receiving and despatching goods  
- Firms received more defective/damaged goods than caused (except Firm J) Firm A had the highest percentage of defective goods received than other firms  
- Controlled defective/damaged goods through training, supervision (all firms), awareness (Firm A, B, I), proper handling and packing (Firms L, G, J), goods layout (Firm H)  
- Highest stock loss of 5% per annum (Firms A, D)  
- Various forms of stock control deployed. Physical stock count (Firms A, B, D, E); Cycle counting (Firms F, J); Both methods (Firms C, G, H, I)  
- Various forms of stock location control deployed. Random sequence (Firms E, F, G, H, J); Product code sequence (Firms C, D, I); Barcoding (Firm B); Personal knowledge (Firm A)  
- Order picked one at a time according to customer (Firms A, D, E, H, J)  
- Order picked by the whole days order (Firms B, C, F, G, I) |
| **Provision for growth and expansion (B5)** | - Evident in all firms except Firms G and I  
- Purchased extra land space for future construction (Firms B, D, E, H)  
- Will relocate (Firm C)  
- Change the storage structure (Firm A, F) |
| **Restructuring the organisation (B6)** | - Evident in all firms recently except Firms E and J |

Table 7.6 Summary of behaviours evident in integrating internal operations
7.5.3 Collaborating with partners in the supply chain (C)

The strategic collaboration with partners in the supply chain is important for all members to work together to be successful. They should pool and utilise resources together efficiently such that each party reaps benefit from the collaboration. It concerns the intelligent use of combined resources which enables both the customer and the supplier to not only share cost and risks, but to also reduce overall costs through the elimination of duplicated effort, and to improve quality. Such relationships provide a win-win situation.

Authors have supported the benefits of cooperative relationships, integration of processes and information systems, and inter-organisational problem solving in logistics (Glaskowsky, Hudson, and Ivie, 1992; Cooper and Ellram, 1993; Pföhl, 1994; Cooper, Lambert and Pagh, 1997). Collaboration implies cooperation and some form of strategic alliances between two or more organisations. There is a variety of economic reasons for the formation of inter-firm collaborations. These collaborations are formed for sharing the costs of large investments, pooling and spreading of risk, and access to complementary resources. Six behaviours supporting this capability have been investigated and reported as follows.

7.5.3.1 Maintaining standardised operations (C1)

The firms interviewed had relationships with both suppliers and customers. All ten firms had some standardised operations in their dealings with most partners. The managers confirmed that they had set procedures on the operations with suppliers and customers. However, some of the smaller customers had different requirements, and needed to have modifications day to day, depending on their production type. There were different types of customers in the Distribution Centres, from small manufacturers to large wholesalers. Firm B kept a procedure binder for each customer which contained procedures on work details for their products. Each part of the process was documented for the customer. But for the suppliers, this was not the case, as some of them were not accredited.

Managers interviewed mentioned that they maintained standardised operations by documentation. Most of the operations and dealings were kept as Standard Operating Procedures (SOP) on paper or computerised. Regular meetings were
conducted with suppliers and customers to update or reflect changes in the documentation. The managers stated the need to consider the environment or technological improvements in updating the SOPs. Some of the firms stated that smaller customers have difficulty interfacing with their system or working with different operating systems. This was the case for Firms F and H. It was difficult to standardise for all. There was some variation in terms of reporting, invoicing, closing of accounts, and special personnel involved. The warehouse manager in Firm E expressed concern that smaller customers’ agreements were mainly verbal in form, and may change from day to day.

The standardisation of processes and procedures in the ten firms varied. Firm A being a small company, had to keep processes as simple as possible for their customers. However, the general manager raised the issue of being compelled to stay abreast with some large suppliers in terms of automation and computerisation. Firm B on the other hand, maintains standardised operations with all of their customers and suppliers. Being in the automotive industry, all of their suppliers and customers had computerised systems, and most operations were carried out electronically. The general manager stated:

“Most operations are carried out electronically. Information is exchanged practically every fifteen minutes. All information is interfaced to our system. To maintain standardised processes, all the vehicles are barcoded and have a Vin number for identification. They are further documented and maintained by our Quality Administrator.”

Firm E was relatively different, as compared to the other firms. Being in the refrigeration business, it had a different set of accredited operations known as Hazardous Analysis of Critical and Control Points (HACCP). The operations manager stated that customers normally would like to know if the company has a HACCP certificate. When they include this HACCP Plan in the paperwork, the customer would be aware that the organisation was strictly monitoring their equipment. Everything was documented and coded into the computer. This indicated if their products were working within a temperature range (i.e. -20 to -10 degrees Celsius). The customers had the
right to check or inspect such documentation to reassure their confidence in Firm E. The HACCP certification also allowed the firm to export to various countries.

7.5.3.2 Joint planning with customers and suppliers (C2)

All the managers interviewed, except for those in Firm E, stated that they had some form of joint planning with their customers and suppliers. These firms engaged in joint planning for a win-win situation. They planned with customers on marketing, promotion and advertising of products. With the customers, they were able to gauge sales forecasts, plan on new product launches and ensure appropriate stock levels. For the firms with manufacturing plants such as Firms G and J, production schedules were planned. The production manager in Firm G stated:

"We plan with suppliers beforehand on their manufacturing and about supplying us the materials for production. With customers, we plan on marketing new products. Planning can facilitate the use of VMI (Vendor Management Inventory) and JIT (Just In Time delivery)."

Similarly, the logistics manager in Firm J stated:

"We plan with the factory before the production, about supplying the product to customers. We may have to repack them in smaller quantities for delivery. Major customers also update us their marketing and future plans."

By joint planning with customers, firms could design ways to carry out operations with minimum interference, and effectively manage inventory at the Distribution Centre. For instance if there was a promotion campaign anticipated, they could make provision for huge volumes or excess capacity storage. Joint planning with suppliers enabled these firms to forecast products, or know about manufacturing and production schedules. Firms B, C and D jointly set benchmarks and KPIs with their suppliers. This indicated a strong interaction and communication among them. The regional manager of Firm B stated:

"With some suppliers, we mutually form agreements on procedures, because workload is governed by suppliers in terms of work parts. In cases of third party suppliers, we try to have a fairly transparent situation
with the customer. Information is shared through a customised database."

Other firms planned on having better interface such as Firm F. The operations manager stated:

"We plan with suppliers on interfacing with each other, how to improve and be more efficient. With the customers, we joint plan on ways to carry out operations with minimum interference, as well as the management of inventory at the warehouse."

Nine out of the ten firms had joint planning with partners in the supply chain, and the managers supported this with examples. The NVivo software linked the coding on joint planning to the literature. Results from the NVivo analysis supported the generally accepted view that cooperative planning between trading partners facilitates better matching of supply and demand, and inventory levels. The estimated level of stock planned can be used to guide business operations and prevent the cost of holding too much inventory (Stank, Daugherty and Autry, 1999). Similarly, White (1999) states that a company which implements collaborative supply chain planning must thoroughly integrate the new process into its existing operations, processes and culture. The company needs to identify its problem areas, or areas where it seeks improvements, and clearly map out what it wants to achieve through collaborative planning (White, 1999).

7.5.3.3 Sharing information with customers and suppliers (C3)

All the firms except for Firm H, shared information and knowledge with their suppliers and customers. There were different content and modes of information shared by the firms. The general manager in Firm A stated that they exchanged some information and knowledge with selected suppliers only. These included aspects of promotional events, buying group seminars and conferences, and written communication. They were also able to access some supplier databases through their internet websites. In turn, they shared strategic information with suppliers on customer orders, to let them know how much stock to produce. Firm B exchanged information on the SOPs that were jointly set before. The SOPs included installation notes, rates chargeable for fitting accessories to vehicles (such as installing a CD player, various
models of stereo system, or an aerial on the vehicle). The information was exchanged freely with suppliers and customers.

Firm C shared information and knowledge through a Balance Scorecard system. It entailed information from the company vision, strategies, critical success factors and measures on how to achieve them. Information was also shared on performance measurement system for strategies (which were derived from the vision and strategy, reflecting the most important aspects of the business), financial information, customer information, processes, learning and innovation perspectives.

Firm E shared information and knowledge to smaller customers by providing advice and assistance. They shared on areas of transportation, despatch issues and technology application. The operations manager in Firm F stated that information was made available only to subscribed customers and suppliers with special access to their website. The website contained information related to their Distribution Centre management system, inventory system, and operations. Strategic and financial information was limited to published material in annual reports, press conferences, magazines and newsletters. The managing director at Firm J reported that certain strategic information was shared only at annual conventions, conferences, and seminars, where they were invited to present and impart their experiences with other organisations.

From the above it can be seen that there were different forms of shared information. Some firms were more protective of their information based on how much they shared. Each had its own strategies and reasons for the exchange of information. As stated in the literature, one of the keys to collaboration is enhancing communication between partners in the supply chain. However, readily sharing information is not an easy proposition for most people or firms. Traditionally, information has been a source of power in the supply chain and as such, it is often hoarded and protected (Frankel, Goldsby and Whipple; 2002). As a result, a high degree of trust is required in sharing information.
7.5.3.4 Sharing processes with customers and suppliers (C4)

Only four firms interviewed (Firms A, C, E, I) had process sharing to a small extent only. Three of them were Australian firms, whilst Firm I was the only Singaporean firm. Firm A for instance, had integrated training with its customers. The management organised and coordinated training courses. From them, the customers can gain full understanding of what their requirements are, and use the right terminology in their orders. Firm C shared processes on purchasing and some management aspects, whilst Firm E engaged in quality management process and HACCP with their suppliers. Firm I alternatively, collaborated with partners on recycling. The IT manager explained:

"We have incentive programmes or rebates on expenditure for expendable items. In the past, when we ship goods out from the Distribution Centre, we often do not get back our pallets. So we have introduced rebates for customers in helping our company reduce cost of purchasing pallets. For example, out of the 150 pallets shipped out and 120 returned, customers get to enjoy a huge discount on the service charge. This is because they have helped us save on pallet cost."

In addition, Firm I gave other incentives to customers for reverse logistics such as the refurbishment and minor rework of damaged products. This was to get them back into saleable condition. These schemes enabled customers to be more proactive to observing policies and procedures that they have set, as explained by the managers.

The other six firms did not share processes, and the managers explained that all the operations and functions were clearly defined and performed by the firms. Processes were mainly clear-cut and contractually agreed at the beginning such that there was no overlap of responsibilities. Firm H however sometimes shared certain costs and performed extra duties. The managing director in Firm J stated that they did not share any processes with customers or suppliers, but demonstrated to them how they handled the order process, and how operations were run. This was to enable them to understand and build confidence with their services supplied. They could also discuss with Firm J on their expectations and other processes to be carried out.
From the above comments and examples given by managers, there was little sharing of processes among the firms. This is also stated in the literature by McAdam and McCormack (2001). In their study, they discovered that there is little evidence of organisations actually exploiting the integration of business processes in their supply chains. They contend that even other authors did not write much about this issue. Business process management techniques were applied to a single firm, although the concept was not bound by company limits, while supply chain research tended to focus on the relationships between organisations (McAdam and McCormack, 2001). They further concluded that to have process integration throughout members in the supply chain, there cannot be a fixed boundary between partners. The supply chain must be managed as a single organisation.

7.5.3.5 Joint investing with customers and suppliers (C5)

Only 50% of the firms interviewed had joint investments with suppliers and customers. The investments are illustrated in the following figure.

![Joint investment areas](image)

*Figure 7.12 Areas of joint investment by selected firms*

In Figure 7.12, the largest sections show joint investments with suppliers and customers in the area of Technology and R&D. 30% of firms had joint investment in these two areas. Some firms saw the need to keep abreast with technology for better communication, and coordination of processes. Interfacing with partners in the supply chain maximised efficiency and sped up processes. Firm A had jointly invested with some suppliers in the installation of EDI. Other firms pronounced the important aspects in technology and expertise. Firm I invested in a new software (SAP) with their customers. The IT manager explained that they initially financed the software
installation, SAP implementation and customisation costs, and then amortised it over
the contractual period, so that customers can pay back in instalments.

Only Firm A jointly invested in marketing projects. Firm A rendered assistance
to their suppliers with the advertising of building materials, and new product launch.
Capital investment included long-term projects, equipment and storage facilities, as also
evident in Firms B, C and I. Only Firms G and J that dealt with production and
manufacturing, had some joint investment on R&D. These managers mentioned sharing
costs with some customers on innovation projects, new product development and
production methods. In addition, Firm G invested with some customers on Vendor
Management Inventory (VMI). This method offered many benefits including
substantial cost savings due to more efficient control of inventory levels, and the
elimination of many associated tasks. The production manager in Firm G mentioned:

"The VMI system gave us savings of between 5% and 15% in
transportation and logistics costs. It manages stock levels, processes
inventory receipts, shipments, returns and adjustments. In addition, it
provides extensive screen enquiry and reporting functions to give the
detailed, current information about quantities, prices, item movements
and sales history that is crucial for effective inventory management."

Other authors have also supported the joint investment strategies of partners in
supply chains. Most of them share costs in the area of ICT for improving processes and
communication between firms. Westervelt (2002) even states that in the logistics
industry, there has been massive joint investment in the area of IT over the past few
years.

7.5.3.6 Synchronising and interfacing with customers and suppliers (C6)

All firms except for Firm D, have some form of operational synchronisation and
interface with their suppliers and customers. Firm D however, still maintained the
traditional method of receiving orders through telephone and facsimile. There was a lot
of paperwork to administer. The other nine firms were able to link using ICT. They
operated and communicated through web-based, intranet, the internet, or EDI. Not all
firms' customers or suppliers were able to interface this way, especially the smaller ones. For those firms, information would have to be keyed in manually.

An example cited was Firm J which used two different software packages for different processes. For instance, customer service operations deployed an in-house system. It was different for the distribution system, warehouse management system, factory manufacturing planning system and transportation system which used another system and was linked to supply chain partners. In their dealings with international customers, the logistics manager expressed the view that a few of them had different and incompatible systems. As a result they had to rely on other forms of data exchange such as facsimile and letters. Apparently, this was manageable and not considered a big issue, as the number was small.

7.5.3.7 Discussion

In this section, all the behaviours identified from the literature relating to supply chain collaboration were apparent in most of the firms. The managers gave examples and explanations of how their firms integrated with suppliers and customers. They were able to set procedures in their dealings with partners, sharing information and processes, and subsequently joint-planning and investing with them for better operations, systems and processes in the supply chain. Similarly, the literature supports the strategies and objectives shared by the firms interviewed.

Firstly, La Londe and Powers (1993, p.11) propose that "the logistics executive of the future will require both horizontal (cross-functional) and vertical (supply chain) information capability to effectively contribute to the competitiveness of the firm." Logistics executives at integrated firms reported significantly better performance with respect to improved customer service, productivity improvements, reduced costs, improved strategic focus, cycle time reductions and quality improvements (Daugherty, Ellinger and Gustin; 1996). Similarly, Keller (2002) states that the competitive market pressure within today's contemporary business environments has encouraged the partnership of many supply chain members. Of particular interest is the development of successful relationships between firms in an effort to gain product and service quality and efficiency. There is a need for supply chain members to foster healthier relationships to realise success and obtain the benefits associated with external
partnerships (Keller, 2002) Similarly, collaboration with partners in the supply chain can expect to realise reduced overall costs for the firms (Stank, Daugherty and Autry; 1999). In a partnership, the customer and supplier commit to Continuous Improvement and shared benefits by exchanging relevant information and by working together to resolve problems (SMMT and DTI, 1994).

The open exchange of information and coordinated decision-making in supply chain partnerships can increase efficiency as reported by the firms interviewed. This collaboration is characterised by the level of investment and mutual trust. Longer-term commitment to the partnership encourages members to invest in further improvement of the joint supply chain to mutual advantage (Corbett, Blackburn and Van Wassenhove; 1999). This was evident with Firms A, B, G and I jointly investing in technology.

The nature of interaction and the interface with partners had an important influence on supply chain activity. The firms realised that by working together, they were better able to serve the end customer, and at the same time enhance their own profitability. This collaborative strategy according to Bommer, O'Neil and Treat (2001), enhances their position for maintaining and improving their competitive advantage. Table 7.7 shows a summary of the behaviours supporting this capability.
### Behaviours evident in integrating with supply chain partners

<table>
<thead>
<tr>
<th>Collaborating with partners in supply chain</th>
<th>General comments</th>
</tr>
</thead>
</table>
| **Maintaining standardised operations (C1)** | • Evident in all firms  
  • Through documentation, SOPs, Quality manual (Firm B), HACCP (Firm E)  
  • Had difficulty with some customers and suppliers because of different operating system, smaller in size |
| **Joint planning with customers and suppliers (C2)** | • Evident in all firms except Firm E  
  • Marketing, sales forecast, new products, stock levels, VMI, JIT  
  • Production schedules (Firms G and J); Set benchmarks and KPIs (Firms B, C, D); Interfacing (Firm F) |
| **Sharing information with customers and suppliers (C3)** | • Evident in all firms except Firm H  
  • Marketing, promotion, databases through internet/intranet  
  • Strategic information on customer orders (Firm A)  
  • SOPs (Firm B)  
  • Balanced Score Card approach (Firm C)  
  • Advice and assistance to customers on transportation, despatch, technology issues (Firm E)  
  • Information on management, inventory and operations through website for subscribed partners (Firm F)  
  • Strategic information shared at conferences, seminars, and conventions (Firm I) |
| **Sharing processes with customers and suppliers (C4)** | • Evident in four firms (Firms A, C, E, I)  
  • Integrated training with customers (Firm A)  
  • Purchasing and some management aspects (Firm C)  
  • Quality management and HACCP aspects (Firm E)  
  • Recycling and reverse logistics (Firm I) |
| **Joint investing with customers and suppliers (C5)** | • Evident in five firms (Firms A, B, G, I, J)  
  • Technology (Firms A, B, I)  
  • Marketing (Firm A)  
  • R&D (A,G, J)  
  • Capital investment (Firms B, I)  
  • VMI (Firm G) |
| **Synchronising and interfacing with customers and suppliers (C6)** | • Evident in all firms except Firm D  
  • Mainly through ICT- web-based, intranet, internet, EDI |

Table 7.7 Summary table of behaviours evident in integrating with supply chain partners
7.5.4 Managing technology (D)

Section 7.4.4 previously highlighted the capability of firms deploying technology to be a significant source of competitive advantage and for innovation to occur. Various authors supported this point. Firms should be able to maintain technology to support systems and processes in the Distribution Centre. The two behaviours supporting this capability were investigated and reported as follows.

7.5.4.1 Automating in operations (D1)

The managers were asked to state the areas where technology was evident in the areas of operations at their firms. Table 7.8 depicts the main areas where technology and automation are present in the Distribution Centres.

<table>
<thead>
<tr>
<th>Areas of technology evident</th>
<th>Firm A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
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<tbody>
<tr>
<td>Conveyance systems</td>
<td>Y</td>
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<td></td>
<td></td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Conveyance devices</td>
<td>Y</td>
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<tr>
<td>Storage and retrieval system</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Computer controllers</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<td>Y</td>
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<tr>
<td>Barcode readers/ scanners</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>Lift and transport equipment</td>
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<tr>
<td>Total</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 7.8 Areas where technology was present in warehousing and distribution

Firm A did not deploy technology in their conveyance systems, storage or lifting and transport equipment and facilities in the Distribution Centre. The operations were still employing manual labour, and dealt with a lot of paperwork. Firms C and J show the most number of areas where automation and technology was present in their warehousing and distribution functions. There could be some correlation between the fact that these two firms were part of a large multi-national corporation, and had been operating for the most number of years in contrast to the other eight firms. They had invested in such equipment and facilities to enable their operations to run more smoothly and efficiently. The second highest utilisation of technology came from Firms D and G. Both firms G and J were part of a manufacturing facility. This could be the reason for the firms possessing machinery and automated equipment in their warehousing and distribution functions as well. A striking factor was the heavy
investment by Firm D. It was the smallest firm out of the ten Distribution Centres with eleven employees, and had only been in operation for six months. Yet the firm was able to invest extensively in technology, automated equipment and information systems.

The investments on technology for the ten firms interviewed lasted between 3 to 20 years. The average rate of depreciation for the equipment and facilities ranged from 5% (Firm D) to 30% (Firm G) per annum. Firm J on the other hand, leased all their equipment and facilities. Firm E was unable to give an average rate of depreciation, as it had only been in operation for six months.

7.5.4.2 Maintaining information and communication systems (D2)

For sharing standardised and customised information internally, all ten firms had some form of computer software and technology. The management and employees were linked through electronic mail, facsimile, and telephone. Some of the firms linked externally through web-based systems such as the intranet, internet or EDI. The managers acknowledged the need to be keeping up with changes, competitors and the industry, with the use of ICT. The administration manager at Firm A stated that they were in the process of upgrading the computer software to be congruent with their larger suppliers and customers. This was at the office in the administration and order processing. They also intended to enter into e-commerce in the future with web-based orders to all customers and suppliers. He stated:

“With the advent of high-speed communication, it is imperative for our Distribution Centre to keep up with other firms and competitors. We need to have quick effective links to our partners.”

But some managers conveyed their sentiments about the high rate of technology innovation and maintenance. The general manager in Firm H stated:

“Better, lower cost models (of technology) appear on store shelves faster than ever. It is hard to maintain our equipment and software. It gets costly to keep changing every few years, and the depreciation rate is getting higher. Many people don’t realise that when a new technology is introduced, there will always be processes that must be aligned and managed.”
The literature supports the view of the general manager in Firm H. While information technology (IT) is an essential supportive tool as well as a competitive weapon, it is costly. Information systems expenditure is high, although it may help the company reduce transaction cost and time-to-market. The costs of managing and maintaining information, including the costs of computer hardware, software, networks and staff have risen. Organisations should therefore find ways to reduce IT expenses, increase effectiveness and increase the company's return on investment (ROI). The solution is for companies to find cost-effective ways to manage IT for generating and using knowledge faster and more effectively (Chen, 2002).

7.5.4.3 Discussion

Today, technology is a far more integral part of investment, serving as a strategic tool. It can act as an agent of growth, providing Distribution Centres with service advantages that represent a true competitive edge. The issue facing firms is that technology can become increasingly costly and complex, but adds to competitive advantage, and customer satisfaction. In that sense, the adoption of technology starts with evaluating the firm's specific needs, reviewing the business plan and establishing a realistic budget. As mentioned previously in Section 7.4.4, managers in Firms A, B, D and E had expressed that there was no necessity to invest in state-of-the-art technology to guarantee outstanding performance or innovation in logistics. The most effective logistics systems may not necessarily be the most automated or have the most sophisticated information systems and computer networks (Cunningham, 1996). Technology is just one of the capabilities of firms and can be used for sharing information, cutting costs, reducing cycle times and improving customer satisfaction. It is up to the firm to effectively deploy and manage technology to its competitive advantage in this dynamic industry. Table 7.9 shows a summary of the behaviours supporting this capability.
Behaviours evident in managing technology

<table>
<thead>
<tr>
<th>Managing technology</th>
<th>General comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automating in Operations (D1)</td>
<td>• Evident in all firms for automation in operations (except Firm A)</td>
</tr>
<tr>
<td>Maintaining information and communication systems (D2)</td>
<td>• Evident in all firms</td>
</tr>
</tbody>
</table>

Table 7.9 Summary of behaviours evident in managing technology

7.5.5 Managing change (E)

Organisational change refers to process of continually renewing the firm direction, structure, capabilities, operations, systems and processes to serve the ever-changing needs of external and internal customers. Many authors support the pervasive idea that organisations' internal activities and operations are dependent or even determined by the external environment (Styhre, 2002). Managing change enables firms to realign their operations and strategies to embark on innovation. Three behaviours were identified for this capability and investigated as follows.

7.5.5.1 Perceiving change (E1)

For any organisation to continuously innovate, they should be able to realign their operations, processes and systems effectively. This versatility involved the correct attitude at all levels. When asked how they perceived change in the organisation, different managers gave different responses. Some of them regarded change as keeping up with technology, restructuring the organisation, improving the systems and processes, training employees to be more competent, and having improvement activities. Nevertheless, all the managers in the ten organisations portrayed a positive attitude towards change.

It was highlighted earlier that all the firms except two had a change in the organisation structure within the last five years, but all managers reported having some form of change within the organisation recently. When asked the main reasons for change, managers who gave various responses were asked to rank their reasons in terms of priority. Figures 7.13 to 7.15 illustrate the reasons for change within the selected organisations. They also show the difference in reasons for change and give a clearer breakdown between the two countries.
Figure 7.13 Drivers for change in Australian firms

Figure 7.14 Drivers for change in Singaporean firms

The most important reason for change in Australian firms was to achieve customer satisfaction and provide better service value. Four firms in Australia found it important and two of them (Firms C and E) rated it as the main reason for a change.
Supporting this reason was the organisation mission/vision of Firms C and E. (See Figure 7.7). They indicated that serving customers was part of their overall firm objectives. There were three firms in Singapore who initiated change to provide better services for customer satisfaction. Only Firm F, out of the three Singaporean firms rated it as most important. It was also part of Firm F's mission/vision, as shown earlier in Figure 7.8. The smaller firms' motive for change was to keep up with technology, as in Firms A and D.

The most important driver for change with the highest rating in the Singaporean firms was achieving Continuous Innovation or improvements. Firms G and J recently had a change in their operations for this purpose. The managers indicated that there had been a change in the organisational structure, allowing for a leaner organisation with fewer levels of authority. Employees were assigned to work in teams with a flat structure, allowing for generation of new ideas or improvements. These firms strategically had the same objectives for their company mission and vision. As shown in Figure 7.8, both these firms had Continuous Innovation as part of their organisation mission/vision. It can be inferred that the overall objectives of these firms had some impact for their recent project to embark on change. Figure 7.15 shows the combined overall drivers for change between firms in the two countries.
Figure 7.15 Drivers for change – total responses between the countries

Three Australian firms and two Singaporean firms changed because of competitive pressures. These firms had realigned their processes and systems, and were able to operate similar with competitors. One of these two firms stated that to match their rival competitor, they provided same day delivery upon receipt of orders. The logistics manager at Firm J stated that this meant having longer hours of operation and sometimes working overtime at the Distribution Centre.

There were other reasons effecting change in organisations. The managers of Firms B, F, H and I indicated the need to operate more efficiently. This was the reason for one firm in Australia and three in Singapore for the importance of operational performance, depicted in the radar chart above. By being more effective in their operations, firms can provide better value for the price of their services rendered. Closely related to this point is the drive for financial performance. Ultimately, firms want to reduce costs, and reap profits. The value improvement will lead to growth and
profitability. Firms in this manner can achieve competitive advantage and customer success.

Firms A, D and F had recently changed over to improved software or more modern systems with IT application. This was to keep abreast with the ever-evolving technology in the competitive market. The human resource manager in Firm F gave an example of where the firm needed to upgrade the accounting system. The accounting department had been using a manual system, but it had become increasingly obvious that it could not handle the pace of the firm's growth. He said:

“We handled the situation rather tactfully. We assigned both the computer and accounting departments responsibility to investigate and explore alternative options. We invested in magazine subscriptions that reviewed new accounting systems, and even sent staff to attend workshops. Ultimately it was the department that proposed their own change.”

Another reason for change was the external push, either from suppliers, customers or corporate headquarters. Firm H recently had a reshuffle in the organisation structure because of activities at their corporate headquarters. Firm A also decided to upgrade its IT system and introduce EDI because of the pressure by major suppliers and the joint investments with suppliers to be better linked electronically.

Figure 7.16 following indicates the comparison between firms in the two countries. The main reasons for change in Australian firms lay more towards customer satisfaction, financial performance and competition. The focus of change in the Singaporean firms on the other hand, was more on improving and innovating, and achieving operational performance.

Figure 7.5 previously highlighted the drivers of innovation between firms in both countries. In analysing between the drivers for change and that for innovation, there is some correlation that can be observed in these firms’ strategy. This can be seen clearly in comparison of the two radar charts.
Chapter Seven – Analysis
Drivers, Capabilities and Behaviours

Comparison between drivers for innovation and drivers for change

![Diagram showing comparison between drivers for innovation and drivers for change]

<table>
<thead>
<tr>
<th>Drivers for innovation</th>
<th>Drivers for change</th>
</tr>
</thead>
<tbody>
<tr>
<td>To have leading edge in industry</td>
<td>Keeping up with technology</td>
</tr>
<tr>
<td>Competition</td>
<td>Keeping up with technology</td>
</tr>
<tr>
<td>Customer orientation</td>
<td>Customer Satisfaction</td>
</tr>
<tr>
<td>Operational performance</td>
<td>Operational performance</td>
</tr>
<tr>
<td>Financial motive</td>
<td>Financial performance</td>
</tr>
<tr>
<td>Shareholder orientation</td>
<td>Continuous innovation</td>
</tr>
</tbody>
</table>

Figure 7.16 Comparison between drivers for innovation and drivers for change

The drivers for innovation in the Australian firms were clearly in line with their change strategies. The drivers focused on customer orientation, financial motives and competition. This was also clearly evident in the drivers for change which focused on customer satisfaction as the highest, followed by financial performance and competition. The Singaporean firms also had some correlation between their drivers for innovation and drivers for change. There was more focus on customer orientation and operational performance in innovative strategies. Similarly, change initiatives were based on customer satisfaction, operational performance and Continuous Innovation.

This is supported in the literature that in implementing successful change, the organisation needs to assess the current state of employees' understanding of various areas, including the mission and strategy of the firm and the degree of change being achieved, so that they can operate with a relentless commitment to Continuous Improvement. Management should bring vision into action by communicating business strategies, translating them into goals and demonstrating commitment to the vision in word and deed (Church, Margiloff and Coruzzi; 1995).
7.5.5.2 Adapting to changes (E2)

All the managers interviewed stated that the employees of their firms were generally receptive to changes. It took from four weeks to about three months to implement a new system or process, before the employees became familiar and proficient at managing it. Many managers referred to the changeover in software systems which required staff to undergo training and hands-on practice before fully implementing it. This is in line with the views of Stuart (1995). He found that employees are able to accept changes with adequate communication and proper training.

7.5.5.3 Minimising resistance to change (E3)

Out of the ten firms interviewed, three firms had some 10-25% of employees in the firms resistant to change. The managers of the other seven firms held that the resistance was minimal and came from less than 10% of their employees. The general manager in Firm H said that there had to be effective leadership and strategies to minimise resistance.

“In our firm, we train middle management and supervisors first, enabling them to be knowledgeable and skilled. Thereupon, they could be allowed to further train their subordinates. In implementing changes, we (senior management) often meet with middle managers to seek their views and consideration.”

The managing director in Firm J stated the importance of obtaining support from all levels, so as to minimise resistance from employees. Dialogue sessions, surveys and intranet discussion were held in some of the firms to obtain feedback and minimise resistance. These comments were in line with the literature. Effective leadership requires approaches that are more likely to enhance workplace change through employee participation, motivation and commitment (Zeifan, 1996).

The managers were asked as to where most of the resistance generally came from. It was indicative that 60% of the firms interviewed in Singapore had resistance in supervisors and middle management, whereas only 20% of the firms in Australia had resistance from this level. Most of the resistance came basically from all levels in 40% of organisations and the lower levels in 60% of organisations. Piderit (2000) also
suggested ways to minimise resistance. She stated that employees are coming to expect involvement in decisions about organisational change. Successful organisational adaptation is increasingly reliant on generating employee support and enthusiasm for proposed changes, rather than merely overcoming resistance (Piderit, 2000).

7.5.5.4 Discussion

The above sections have illustrated the main imperatives for embarking on change initiatives found in the ten Distribution Centres. It was discovered that the drivers for change corresponded with innovation strategies and company objectives. The firms faced resistance to change by the employees to a small extent. The managers need to overcome this and manage effectively. Similarly, the literature reports that organisations attempting to develop collaborative relationships with their suppliers face some implications for change. It is shown that partnering relationships constitute a major change for organisations. Management need to adopt a holistic and integrated approach as advocated by Worley, Hitchin and Ross (1996). Fowler (2002) maintains that the most important ingredient for successful change is employee involvement.

Various authors have written on managing change. They state numerous prerequisites for change to be successful. The list includes vision, mission, culture, communication, strong leadership, and participation (Mabin, Forgeson and Green; 2001). Resistance to change is acknowledged as being a fundamental block to change and a prime reason why change does not succeed or get implemented. Resistance to change is ubiquitous in nature. It can be defined as an expression of reservation which normally arises as a response or reaction to change (Block, 1989). Managers should view resistance to change as a positive factor. The analysis and reasoning provide alternative ideas for consideration. A wider set of people involved in the evaluation of alternatives may overcome the problem that many managers have of failing to consider or evaluate properly enough alternatives (Mabin, Forgeson and Green; 2001). Table 7.10 shows a summary of the behaviours evident in the firms interviewed.
<table>
<thead>
<tr>
<th>Managing Change</th>
<th>General comments</th>
</tr>
</thead>
</table>
| Perceiving change (E1)                | • Evident in all firms as a positive action  
• Had some form of change in the firm within last 5 years  
• Drivers for change varied according to firms’ objectives and innovative strategies                                                                 |
| Adapting to changes (E2)              | • Evident in all firms  
• Employees generally receptive to change in all firms   |
| Minimising resistance to change (E3)  | • Evident in all firms  
• 10-25% of employees resistant to change in Firms A, H, J  
• less than 10% of employees resistant to change in Firms B,C,D,E,F,G,I  
• Managers quoted examples of minimising resistance – training, communication, feedback, effective leadership, participation.  
• Resistance came from lower levels- Firms B,C,F,H  
• Resistance came from middle management- Firms D,G,I,J  
• Resistance came from all levels generally- Firms A,E |

Table 7.10 Summary of behaviours evident in managing change
7.5.6 Reviewing performance (F)

Coordinating activities is a growing concern in Distribution Centres. In Section 7.4.2, managers indicated that logistics entail numerous processes and systems within a firm. The systems and processes have to be effectively coordinated and managed. One method of ensuring this is through measurement systems. Firms can reflect the efficiency of operations and processes more accurately, covering more than just financial aspects (Bowersox, Closs and Stank; 1999). By conducting regular assessment, management can determine where the organisation is, relative to where it aims to be. In addition, they can clarify and verify the strengths and areas for improvement. Effective performance monitoring helps companies ensure that they maintain financial stability and service excellence.

Performance measures can be broadly classified into two categories: operations performance measures and strategic performance measures. The former specifically measure improvements in the operations of the system. These measures are easier to quantify and are more short-term in nature. Examples include cost reduction, cycle-time reduction and improved quality. In contrast, strategic performance measures may be relatively more difficult to quantify and take a longer duration to attain. These may include service development, innovation, competitive knowledge, and access to technology (Sanders and Premus, 2002).

In developing measurement systems for the operations, the key processes in the delivery of services have to be clearly defined before they are measured. They have to be guided by clear objectives and targets (strategic measures) which are linked to the overall business goals and strategies. Only then can firms measure, monitor and control the performance to ensure that quality and efficiency standards are met.

This section briefly reports on the overall measures undertaken by the ten firms interviewed. The details as to what measures have been undertaken by the firms will be reported in the following chapter in Research Question Five.
7.5.6.1 Overall performance measurement system (F1)

During the interviews with the managers, all the firms indicated they had some form of measurement system in analysing their performance. Most of the organisations had positive attempts and results of performance measures. The responses to overall performance measurement can be illustrated in the following figure.

![Response by managers on overall performance measurement](image)

**Figure 7.17 Comparison of performance measurement system from past 3 years**

In the above figure, only nine firms gave responses. The sections marked as N.A (not applicable) refer to Firm D. Since the firm has only been in operations for the past six months, the managers were unable to comment on past performance measures. Seven of the firms interviewed (all except Firms A and G) had an improved performance measurement system in the last three years. The quality of data had improved over the years. Even Firm A had better quality data deployed than in the last three years. The administration manager in Firm A stated:

“We have not produced an efficient measurement system in place yet. But through attending external seminars and courses, we are able to
identify the important areas to monitor. The quality of data that arise is far superior than what we used before.”

Managers in six firms (all except Firms A, D, G and I) mentioned that the accuracy of measures and indicators had been enhanced in tracking their operations and methods. They were able to identify the appropriate indicators beneficial for their operations. The other managers supported that from the assessment, the firm can develop corrective actions and prevent future mistakes.

When asked to explain why the accuracy was not improved in Firm I, the IT manager remarked that there were numerous performance indicators computed yearly, some of which were not fully analysed or considered for operations. He added that it was difficult to come to a general action plan, and each area had to be looked at separately. Only four firms had an increase in the number of performance measures over three years. A quality assessor explained that this was necessary because new processes arose constantly, and had to be measured and monitored as part of operations.

7.5.6.2 Results of key performance indicators

The managers were further questioned on the results of their key performance indicators. The outcomes are presented in the following figure.

Results of Key Performance Indicators

![Results of Key Performance Indicators](image)

Figure 7.18 Results of key performance indicators in firms

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When questioned about the performance of the firm, all of the managers felt that their firm had shown positive improvement trends over the past three years. They indicated that the performance indicators have depicted positive results and the firm met most targets set previously. Figure 7.18 depicts the responses from managers in this aspect. Only managers in five firms (Firms B, E, G, I, J) found that the results were better as compared with those of competitors and benchmarks set. The other four firms were considered to have the same results as benchmarks or competitors. (Firm D was unable to analyse or compare results) However all nine firms were assured that there was a positive trend in overall operations. From the comments and responses made by managers, it can be concluded that performance measurement systems are beneficial for firms to measure, monitor and control the performance. This ensured that quality and efficiency was met, and guided positive improvements over the years.

7.5.6.3 Benchmarking

Benchmarking is a useful tool in logistics firms. Benchmarking competitors has become a commonly used and accepted strategy of US firms today (Bommer, O’Neil and Treat; 2001). One’s competitive position can be best assessed in side-to-side comparisons with one's best target competitors (Day, 1990). It can be used to obtain information for assessing and improving such functions as new products, customer billing, shipping, quality, manufacturing costs and training (Camp, 1989).

All the firms maintained that they had Key Performance Indicators developed for different aspects of operations and systems in the organisation. They were able to maintain such measurement systems through periodic assessment, meetings with management, and review of the measurement system adopted. Such a system or indicators had to be realistic and reflective of their operations capacity. All the managers except for those in Firm A, mentioned having some form of benchmarking in measuring the firms’ performance. They used different standards of comparison in assessing the system, processes and operations. Figure 7.19 shows the standards used to measure some processes (excluding Firm A).
Figure 7.19 Standards used in measuring performance

The Distribution Centres in Australia used a wider range of standards to compare their performance against. They adopted more than one standard, whereas the Singaporean managers mentioned using one standard when interviewed. There were no Singaporean firms using national standards. Only Firms B and F used international standards to benchmark their operations against. This could be due to the nature of the goods handled. Some examples given on standards are zero-defect logistics performance such as the delivery of goods to customers on time, in full with no mistakes, minimum inventory dwell time at the Distribution Centre, picking goods from shelves and racks, and packing them into cartons for despatch in the shortest lead time possible, and the cash to cash cycle time where money is paid to supplier or collected from customers within the stipulated or contracted time period (e.g. 30 days or 60 days).

7.5.6.4 Discussion

The literature states that performance measures linked to strategy are more effective. Moreover, the alignment between the measures, measurement framework and the strategy must be constantly reviewed and treated as a dynamic and complex issue, rather than a linear mechanistic relationship (McAdam and Bailie, 2002). All of the firms interviewed adopted this approach. Any measurement system is of limited usefulness, unless it includes a standard of comparison (Bowersox, Closs and Stank, 1999; p.93). Most firms attempted to compare performance to that of previous years, or to what they feel competitors have accomplished.
A summary table shows the approach taken by the firms in ensuring the ability to develop and maintain measurement system. The various areas of assessment will be elaborated in Research Question Five in the next chapter. Measures of outcomes, as a result of innovation concerns this measurement system.
### Performance measurement in the firms

<table>
<thead>
<tr>
<th>Reviewing performance</th>
<th>General comments</th>
</tr>
</thead>
</table>
| **Overall performance measurement system** | • All firms had some form of measurement system (except Firm D)  
  • Performance measurement system has improved over the years (Firms B,C,E,F,H,I,J)  
  • Number of performance measures has increased over the years (Firms B,C,F,H)  
  • Accuracy of measures has improved over the years (Firms B,C,E,F,H,I,J)  
  • Quality of performance data has increased over the years (Firms A,B,C,E,F,H,I,J) |
| **Results of Key Performance Indicators** | • KPIs have shown positive improvement over the years (except Firm D)  
  • Results as compared with competitors/benchmarks were better (Firms B,E,G,I,J)  
  • Results as compared with competitors/benchmarks were same (Firms A,C,F,H) |
| **Benchmarking** | • Evident in all firms (except Firm A)  
  • Used organisational standards (Firms B,C,J)  
  • Used industry standards (Firms B,C,D,E,G,H,I)  
  • Used national standards (Firms B,D,E)  
  • Used international standards (Firms B,F) |

Table 7.11 Summary of performance measurement in the firms

#### 7.6 Conclusion

This chapter looked at the drivers, capabilities and behaviours of firms and answered the first three research questions. Each firm varied with different strategies and operations. The chapter identified significant characteristics and qualities of firms, especially between the countries in different aspects. Based on the analyses, it can be concluded that these firms had drivers, capabilities and behaviours evident for innovative efforts, but not equally.

The drivers of innovation among the firms varied because each firm had its own motives or underlying factors causing the desire to improve. The firms embarked on innovation projects due to a combination of internal and external motives, as well as push and pull factors. This chapter has identified that the factors driving the ten firms to innovate were mainly pull factors, rather than push factors. Australian firms chose to innovate more for external motives, whilst Singaporean firms chose to innovate for internal reasons. The capabilities and behaviours were identified from literature and used for this study. They have been supported at length by managers who verified all
the capabilities as existent in their firms. They sustained the supporting behaviours with examples and issues of concern. Some of the behaviours as identified and elucidated earlier were not present in some firms. There were no additional capabilities or behaviours which surfaced during the interviews. The managers felt that those identified were exhaustive enough. It can be concluded that each firm was unique in that it had different combinations of behaviours or strategies to administer their capabilities.

The next chapter will analyse aspects on the individual competencies, measures of outcomes, and the links between the contingencies and other factors. A firm conclusion will surface in Chapter Nine, incorporating the perspectives and analysis of all the other factors taken as a whole.
CHAPTER EIGHT
ANALYSIS - COMPETENCIES, PERFORMANCE MEASURES
AND CONTINGENCIES

~ The innovation paradox: Random, chaotic, and unpredictable innovations need a
stable management system and process to nurture the growth and development of lucky
breaks. (Jim Clemmer) ~

8.1 Introduction

This chapter analyses the final three research questions. The previous chapter
looked at the drivers of innovation in the firms, their capabilities and supporting
behaviours. To complement the innovative strategies of the firms interviewed, further
analysis was conducted to investigate the competencies of individuals in the firms to
operationalise such behaviours and capabilities. The competencies had been identified
and established based on the literature as well. Managers were questioned as to whether
employees in their firms possessed them. It concerned the fundamental skills, abilities,
personality and characteristics inherent in employees, in relation to their work functions.

This chapter also looks at the performance measures undertaken by firms to
ensure that Continuous Innovation was successfully implemented and monitored.
Various aspects of the strategies and operations were investigated, if they were
measured, and subsequently any outcomes from them. The last research question
investigates if there are any relationships between the contingencies and the drivers,
capabilities, behaviours, competencies, and performance measures. This is to reveal
any possible effects of firm characteristics on innovative strategies.
8.2 Research Question 4

What competencies are evident in individuals to operationalise the behaviours and capabilities for innovation?

8.2.1 Introduction

In order for organisations to possess innovative capabilities and behaviours supporting them, they need to have the right personnel. It is essential for management to pay attention to the competencies of their employees, and their strategic commitment to innovation. This is because the skills and motivation of employees are important strategic aids in the realisation of the firm's objectives. Ultimately, the organisation's effectiveness in developing systems, and implementing strategy depends upon the commitment and skills of its employees (Doyle, 1995). Nurturing these competencies depends on the ability to communicate an inspiring vision of the innovative organisation and commitment to customers, but it also means selecting and training people, who can share this vision, and be dedicated to implementing it.

The competencies of individuals are concerned with fundamental personality characteristics intrinsic in employees, in relation to their work functions. Even in the literature, authors such as Quinn (1985) and Bergenhenegouwen (1996) state that individuals should possess characteristics and certain factors which are crucial to the success of organisational innovation.

8.2.2 Competency 1 - Creativity

Organisations have to tap into the creativity of employees in order to be innovative. During the interviews, the managers affirmed this competency evident in their employees. However, they expressed the need to encourage or motivate them.
Creativity could only occur when motivational levels were high, according to the general manager at Firm D. Most of the managers interviewed affirmed that teamwork or small group improvement activities were one of the main means to tap into the creative skills of employees.

Some of them indicated using Quality Control Circles (QCC) or Work Improvement Teams (WIT), where employees get together in small groups of four or five people periodically. This was to brainstorm and find solutions to problems relating to their work scope. The managers in Firms D, E and F reasoned that by allowing them to work in teams, the employees tended to communicate more with each other informally. The operations manager in Firm F reiterated:

“This built rapport and trust among our employees in the course of their daily work activities. When they form small groups, they are more able to analyse and solve problems together, rather than individually.”

The managers in Firm C also indicated another method to draw on creative abilities. Suggestion schemes were implemented in Firm C, encouraging employees to put forward their ideas. They explained that all supervisors and managers were advised to demonstrate an open-door policy, be approachable and always open to new ideas and suggestions. All the managers in the ten firms interviewed admitted to being open and receptive to suggestions and views from employees. The human resource manager in Firm E acknowledged that by establishing an environment conducive to learning and sharing, employees became more motivated. He reported:

“They feel a sense of belonging and pride to our organisation. Only then, do they want to improve themselves through learning, and creative ideas, and ultimately improvements for the firm.”

The coding in NVivo software for ‘creativity’ linked various sections in the literature. When analysed, the strategies and comments made by managers on encouraging creativity were in line with various authors’ views such as Amabile (1996), Majaro (1988), Cumming (1998), Cooper (1998), and McAdam and McClelland (2002). In addition, this was evident in Roffe’s (1999) work that management needs to create a climate open to creativity. He put forth that this is possible when management shows
characteristics of being open-minded, encourage flexibility and group involvement, being respectful and perceptive in seeing things from the employees' point of view, as well as motivating the expression of ideas and finding answers creatively (Roffe, 1999). Managers have to organise and motivate the development of their human resources to support innovation and creativity (Brooking, 1996).

The general manager in Firm J established that during departmental planning sessions, employees were required to set their own goals for the year pertaining to work and personal development. He explained:

"This allows them to be proactive towards opportunity and how they gauge themselves. By setting their own targets, and trying to achieve them within the stated period, it creates an environment developing motivation. Management on the other hand, constantly guide them through their objectives and give feedback when necessary."

8.2.2.1 Discussion

All the managers supported the observation that creative outcomes from employees were linked to productive and competitive success in the organisations. This view has been supported by literature. The authors established that creativity is essential to innovation (Gundry, Prather and Kickul, 1994; Pascale, Carland and Carland, 1997; Perry, 1995; Ramsey, 1997). From the above examples and comments made by managers, it can be established that the employees in the firms interviewed possessed this competency which contributed to innovative efforts. This was enhanced by the fact that management fostered an environment conducive to exploiting the creative skills in them.

8.2.3 Competency 2 - Effective communication

All managers interviewed verified that within their firms, there was no trouble conveying messages across to all their employees. They had efficient networks or systems set in place which allowed for channels of communication to all levels. Firms A, B, D, E, F and J had an open office concept. The managers of these firms explained that employee workstations were visible to one another. This concept allowed for interaction, and even cross-functional communication. Individuals could intermingle
with others from various departments or levels. There were no segregation or partitions among departments. Managers worked in offices that were observable to employees for two-way vision. The cubicles or rooms had glass windows, enabling them to see their employees and vice versa. The managers in these six firms indicated that employees were encouraged to walk in anytime, as compared to bureaucratic hierarchical structures. Regardless of their official position in the organisation, employees were encouraged to communicate. The regional manager in Firm B commented:

"Cross-functional communication enables employees to be more innovative. This is because they do not feel myopic about their work scope in their department only. By being exposed to other departments and work functions, they can understand the operations of the organisation and communicate more effectively."

This comment on the concept of cross-functional communication coincides with the illustration by authors such as Roffe (1999) and Drucker (1992). They support that the increase in quantity and quality of information will help employees to gain different perspectives for innovative ideas.

In Firms B, D and E, some of the managers’ offices were located in the warehouse at the Distribution Centre. The managers established that this enabled them to be closer to their operations and employees. They could better visualise and manage operations. Some of the managers indicated that employees at the Distribution Centre did not have many opportunities to communicate with other employees from the administration or office departments because of different locations. This was the case in Firms A, C, E, G, I and J. As a result, there was little cross-functional communication for employees at the Distribution Centre in this respect.

However, the managers in Firms G, I and J advised that they had a central cafeteria and interaction area, where all the employees could meet or interact. Both formal and informal activities were organised in the firms to increase morale, participation and interaction between employees. Managers in Firms A, J and F mentioned that for improvement projects, employees had to work with other sections and departments.
Firms C, F, H and J were multinational corporations and had offices located internationally. When interviewed, the managers illustrated the difficulties faced in communicating with the other partners overseas. This was due to different time zones, and different operating hours. The general manager in Firm H outlined an instance where they had to have a teleconference meeting with their headquarters in the United States at 2 o’clock in the morning. In these MNCs, the employees apart from management had little communication with their counterparts in other countries. The means was through emails and by facsimile. However, all managers agreed that their communication system within the firms allowed for openness, sharing, knowledge transfer and innovative activities to occur.

8.2.3.1 Discussion

It can be seen that the managers believed that their firms had a flexible structure to allow for communication to all levels quickly. Communication should be considered as a two-way activity, both imparting and receiving knowledge and information. These managers highlighted the concept of cross-functional communication existing in their firms. This supported the literature by Roffe (1999) and Drucker (1992). The organisational structure in these firms allowed for the exchange of information, whereby six out of ten firms had an open office concept. However, some difficulty faced was that of separate locations between employees in the offices and warehouses, as well as in the multinational corporations.

Nevertheless the comments made by managers were affirmative that their firms possessed a communication system which allowed openness, sharing and knowledge transfer for the purpose of innovation. This implies that the employees maintained the competency of effective communication.

8.2.4 Competency 3 - Learning

The concept of learning for innovation involves both individual and organisational learning. It encompasses a broad range of concepts such as communication, sharing, diffusing knowledge, culture and solving problems for improvement. Authors such as Sloan and Hyland (2000) state that learning in the organisation consists of more than just individuals gaining knowledge in the simplest
sense. The knowledge captured has to be shared, disseminated throughout the organisation and applied, creating a culture embracing constant change. Companies that possess such learning strategies will gain a competitive advantage in the innovation process.

8.2.4.1 Diffusing knowledge

Knowledge refers to information that is enhanced and used efficiently to benefit the organisation. Firstly, management must have a mindset of innovation themselves, before encouraging and motivating employees. They have to set the example. Both management and employees should have the competency of diffusing knowledge and innovation ideas to everyone.

During the interviews, all the managers understood the importance of having the knowledge and aptitude of innovation themselves, before inspiring and influencing their employees. They agreed with this notion, and disclosed that they had made attempts to translate knowledge and improvement activities within their firms. The regional manager in Firm B illustrated this ability:

“We, as managers have to consider the goals and objectives of the firm first before encouraging subordinates to embark on innovation. Knowledge has to be effectively shared and transmitted throughout the firm at all levels.”

The diffusion of knowledge is dependent upon the communication channels and system that the firm possesses. The managers stated that knowledge was shared most of the time during departmental meetings. From the information they gained in their departments, they communicated to other managers and senior management. Other methods of knowledge diffusion were through emails, databases, reports, newsletters, bulletin boards, during training programmes or even when new process standards were set. In this way, the new knowledge or information necessary for innovation was made readily available to all employees. Similarly, Schein (1985) wrote that there must be the internal integration of individuals, and knowledge must be readily available.
This was applicable for explicit knowledge. The managers were also queried on tacit knowledge which was intangible such as employees’ experiences. They responded illustrating that tacit knowledge was shared through the social system or through informal means. They explained the importance of organising informal social events, gatherings, meetings and training programmes, or through small group improvement activities where employees interacted with one another. The general manager in Firm H observed:

“The intangible knowledge may come informally at times. It is necessary for managers, supervisors and team leaders to capture it and share with management.”

The regional manager at Firm B gave an example of initiative efforts from motivated employees. He explained that at the Distribution Centre, the teams spoke to each other and organised among themselves to work more efficiently and flexibly. In this way, the job was completed more quickly with teams taking the initiative and communicating with each other. Work processes got cut down when staff were willing to perform other teams’ tasks, so as to be more efficient. In a way, this widened employees’ job scope and there was job rotation.

In addition, there were also opportunities for employees to demonstrate new knowledge or innovative methods from external sources. New employees at six out of the ten firms shared new knowledge obtained from previous workplaces. The managers reported that new employees were encouraged to contribute and share their experiences and systems used before. They brought in new, fresh ideas and provided input for suggestions or improvements. New employees at Firm I had to undergo On-the-job-training (OJT). This was to help them to share with their respective department managers the skills learnt from their previous workplace. This also gave them a chance to clearly demonstrate the qualities they had. This method of diffusing knowledge adds to the observation of Gieskes and Langenberg (1999). Management should foster learning by giving employees at all levels the opportunities and tools to learn from their own and others’ experience. Only then can they use this learning to innovate according to organisational objectives (Gieskes and Langenberg, 1999).
Another method where employees diffused knowledge was upon return from external training. The employees were asked to share with their departments the new knowledge gained. The general manager at Firm A mentioned that they used this as a means of pulling out new ideas and constructive criticisms; and ultimately decided as a group if they should take any action. This method is consistent with Sloan and Hyland’s (2000) views that the knowledge captured is more that just individuals gaining knowledge. They report that it has to be shared and disseminated throughout the organisation and applied, creating a culture embracing constant change. Even Hedberg (1981) reported that for diffusing knowledge and innovation, it is the synergistic efforts of the organisation as a whole, rather than considering the cumulative learning of individuals.

8.2.4.2 Upgrading skills and knowledge

All employees in firms had some form of formal training to continuously increase and upgrade their skills and knowledge. The employees at the Distribution Centres at Firms A and E underwent the basic work induction programme and OJT. But the employees at the office and administration had external training such as computer courses. The other firms however, provided external training for all of their employees. Table 8.1 shows the various areas of training that employees went through.
<table>
<thead>
<tr>
<th>Firm</th>
<th>Employees</th>
<th>Training areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>All employees</td>
<td>OJT, Basic work induction (internal)</td>
</tr>
<tr>
<td></td>
<td>Administration</td>
<td>Computer courses</td>
</tr>
<tr>
<td></td>
<td>General manager</td>
<td>MBA</td>
</tr>
<tr>
<td>B</td>
<td>All employees</td>
<td>Computer courses, rehabilitation course, Occupational Health and Safety Course (OHS)</td>
</tr>
<tr>
<td></td>
<td>Quality department</td>
<td>Documentation</td>
</tr>
<tr>
<td>C</td>
<td>Distribution Centre</td>
<td>Warehousing and Distribution (certificate 3 and 4 level)</td>
</tr>
<tr>
<td>D</td>
<td>All employees</td>
<td>Computer courses, Occupational Health and Safety courses, First Aid, Dangerous Goods</td>
</tr>
<tr>
<td></td>
<td>Middle management</td>
<td>Warehousing and Distribution (certificate 4), ad hoc training specific areas when required</td>
</tr>
<tr>
<td>E</td>
<td>All employees</td>
<td>OJT (internal)</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>Basic management skills, short courses on stress management and time management</td>
</tr>
<tr>
<td>F</td>
<td>Distribution Centre</td>
<td>Materials handling, OHS course, computer courses, new technology, OJT on warehousing and distribution by PSB, Singapore</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>Seminars and courses organised by Singapore Logistics Association and Government organisations, stock improvement, warehouse management, technology enhancement and management skills</td>
</tr>
<tr>
<td>G</td>
<td>Distribution Centre</td>
<td>OJT on warehousing and distribution by PSB, Singapore</td>
</tr>
<tr>
<td></td>
<td>Team leaders and supervisors</td>
<td>Supervisory skills, logistics and procurement.</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>Professional courses on management, leadership and computer enhancement skills, in-house 2 year MBA with United States university lecturers.</td>
</tr>
<tr>
<td>H</td>
<td>Distribution Centre</td>
<td>Safety courses, quality management, Information Technology and special equipment operation</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>Logistics seminars, Short managerial courses in specialised and technical areas, Diplomas and university degrees</td>
</tr>
<tr>
<td>I</td>
<td>Distribution Centre</td>
<td>Skill enhancements include forklift driving, capital equipment operating course</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>Courses on governmental regulations and policies affecting growth and operation conditions in the region</td>
</tr>
<tr>
<td>J</td>
<td>Distribution Centre and Supervisors</td>
<td>Computer software and programmes, effective stock-taking, basic warehousing and housekeeping</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>Professional courses, further education, management skills and development</td>
</tr>
</tbody>
</table>

Table 8.1 Areas of training

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The frequency of training, upgrading skills and knowledge was ad hoc for 70% of the firms interviewed. Only three of the firms had a definitive frequency for their training. This is illustrated in Table 8.2.

<table>
<thead>
<tr>
<th>Firms A, B, D, E, F, G, J</th>
<th>Firm C</th>
<th>Firm H</th>
<th>Firm I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees trained ad hoc</td>
<td>Employees trained all year</td>
<td>Employees trained every 2-3 years</td>
<td>Employees trained twice a year</td>
</tr>
<tr>
<td>Management trained ad hoc</td>
<td>Management trained twice a year</td>
<td>Management trained 5 days per year</td>
<td>Management trained twice a year</td>
</tr>
</tbody>
</table>

Table 8.2 Frequency of training

In Firm H, 2% of payroll (or about S$50,000) was spent every year on training employees. Similarly in Firm I, 4% of annual revenue was committed solely for training. The employees in Firm J on the other hand, had an Individual Development Plan for training and skills enhancement. The supervisors or managers reviewed this plan annually and indicated relevant training programmes suitable for employees to attend in that particular year. This training plan was part of the ISO 9002 system. The manager in Firm I mentioned that apart from external training, they had in-house skills enhancement programmes conducted, similar to a structured classroom environment. These programmes gave them updates about trends in the logistics industry. From the interviews and comments made by managers, it implies that Singaporean firms spent more time and effort in upgrading the skills and knowledge of their employees. They were generally more active in training.

Skills Development Fund in Singapore - In Singapore, a Skills Development Fund (SDF) scheme is available to upgrade employees in all industries. It is a statutory regulation to impose a levy on all organisations having employees earning below S$1500 per month. This tax of 1% on their salary is to charge employers indirectly for having ‘less-skilled’ employees in a sense. The rationale behind this is to upgrade all employees to skills justifiable for more than a S$1500 monthly salary. Organisations can take advantage of this scheme by claiming funds back from the government for training their employees who are eligible. The funding mechanism by the government covers broad-based training, nation-wide and industry-wide certification, and external and overseas training in critical high-end or pioneering areas. In addition, a government
organisation, the Singapore Standards, Productivity and Innovation Board provides training courses occasionally, pertaining to various industries, where employees can benefit from.

All the managers interviewed verified that as a result of training, the skills and knowledge of employees were vastly improved. However, there was a need to continually assess employees to ensure that they were putting them to full use, and derive maximum benefit to the firm’s investment on them. The supervisors of employees normally were required to vouch or support the training needs for their employees to ensure that the right training was provided to the most capable employees.

8.2.4.3 Problem solving and work improvement

All the firms had various systems of problem solving and work improvement adopted. Most of the time, they relied on small groups such as quality circles, or work improvement teams. The firms had better results when employees worked in teams than alone. The employees were better in identifying and solving problems, as stressed by the managers in these firms. This corresponds with the writings of Nemeth stating that groups exhibit the potential to both outperform and be more creative than individuals (Nemeth, 1997).

Improvements arose on an ongoing basis, and occurred all the time for seven out the ten firms (except Firms C, G and J). The administration manager in Firm A postulated that there was always constant attention on improving systems and processes, and fixing customer problems. Firm B on the other hand, had management looking into Continuous Improvement issues weekly, to see if there was any scope or projects that could arise out of suggestions made. When improvements were needed, the managers would speak with the teams for their ideas.

Managers in Firms C and J assured improvements occurred on an ad-hoc or random basis, whilst the managers in Firm G reported improvements were implemented as and when the ideas proved feasible. There was no fixed number of improvements or measurable ones for the year.
Other methods used by the firms for problem solving and work improvement involved suggestion schemes or through day-to-day work. Supervisors, team leaders and managers encouraged employee feedback or suggestions pertaining to the scope of their work or working environment. A few of the managers explained that sometimes problem identification and suggestions for improvement surfaced during regular departmental meetings. Firm E had suggestion boxes in addition to weekly meetings for staff to throw in new ideas. Similarly, the human resource manager in Firm F advised:

"We have improvements implemented all the time, since management takes them very seriously. Every suggestion is brought up at weekly departmental meetings with senior management. These issues mainly concern processes, operations and work conditions."

The manager in Firm I verified that improvements in the organisation occurred in a bottom-up fashion, where supervisors acted as representatives of shop-floor level workers at the Distribution Centre. They spoke on behalf of them, as to what issues they were facing, giving information, suggestions and feedback to management. This is along the lines of what has been reported by previous authors. It is crucial for the 'structure' and 'procedures' to be conducive for ideas and feedback from employees with management support, as supported by McFadzean and Money (1994) and Vancouver (1996). Furthermore, O'Loughlin and McFadzean (1999) argue that there must be socio-technical systems that enable the development of efficient and effective problem solving techniques, and management should embrace and encourage interpersonal behaviour within the organisation.

When asked to state the average outcome of problem solving in the organisation, managers in seven firms stated that the employees understood the root causes of problems and errors, and came up with means to prevent recurrence. Managers of the other three firms stated that the outcome of problem solving generated new knowledge or quantum leaps for the organisation. This can be presented in the following figure.
Figure 8.1 Learning process in the Distribution Centres

When employees find out during problem solving what is wrong in the process and how to correct it, this reflects single-loop learning. Figure 8.1 depicts that majority (70%) of the firms engage in a different learning process when solving problems. Wang and Ahmed (2002) report that this learning process is where employees not only ask what it wrong and how to make corrections, but also move on to question why the errors occur and how to make modifications in terms of both quality techniques and the organisation’s underlying norms, policies and objectives so that errors can be prevented. This problem solving approach involves the process of defining the problem, searching for alternatives, and selecting the best solution (Couger, 1996).

However, only three firms had a learning process beyond this. Wang and Ahmed (2002) propose that it involves knowledge creation and is about re-evaluating all existing techniques and systems, reconsidering where the organisation should stand in the marketplace, and how to redefine existing techniques and systems, develop new concepts, and even change fundamentals of judgement. The managers in these three firms (Firms, B, H and J) stated that from identifying problems and solving them, they have implemented new breakthrough systems or processes and even benchmarked them to a standard. As a result, new knowledge was generated, paving the way for innovation to occur. Some of the examples given by these firms include an automated pallet racking system where an employee devised a sensor. When placed at the racking system, the machine was able to detect that there were no pallets left. It automatically replenished the rack with a new pallet. Another example was given concerning the
space utilisation at the Distribution Centre in Firm J. A team of employees in a quality control circle identified the issue of improving space. They suggested a new method of packaging which enabled them to save a lot of space and money; and this subsequently became a standard operating procedure.

8.2.4.4 Discussion

The managers understood the importance of knowledge dissemination for innovation and made attempts to translate knowledge into improvement activities. Knowledge was disseminated through various forms in the firms and communicated to employees at all levels. It was evident in the firms interviewed that there were systems set in place allowing for communication flow and transfer of knowledge. Team effort, job rotation and training were some of the means to increase motivational levels and efficiency for this competency to occur. Most of the firms had adequate training plans to ensure that employees’ skills were upgraded for the job. It was evident that the Singaporean managers were more fervent in training employees. The managers spent more time and effort in upgrading the skills and knowledge of employees, and were generally more active in training, with the assistance of government incentives. The firms budgeted funds solely for this purpose. As a result of training, all managers indicated the improvement of skills and knowledge. In addition, the firms had various systems of problem solving and work improvement for Continuous Innovation. The learning process in majority of the firms reached a degree whereby employees could understand root causes of problems and prevented recurrences. Other firms were able to excel and implement breakthrough ideas. With the approach taken by the firms, the examples cited, as well as the remarks made by managers, it is unquestionable that the individuals in these firms have the competency of learning.

8.2.5 Competency 4 – Teamwork and empowerment

8.2.5.1 Teamwork

All employees in the firms interviewed worked in teams. Some of them form different teams for the purpose of problem solving and improvement. Apart from the normal day-to-day work teams, some firms compelled employees to form other teams for this purpose, to gain a wider perspective and knowledge on the functions and job scope of other departments. Firm J for instance has Quality Improvement Teams
comprising employees at the Distribution Centre from different job areas. A summary of the different teams deployed in the ten firms is shown in Figure 8.2

![Diagram showing types of teams used in firms]

**Figure 8.2 Teams adopted for problem solving and work improvement**

From Figure 8.2, the majority of the Australian firms (80%) adopted normal work teams. The employees work together everyday in the same team, including problem solving and work improvement. The firms in Singapore however adopt QCC, WIT and QIT. The members of these teams may comprise employees from other departments. Nevertheless, all the firms stated that problem solving and work improvements were conducted in a group effort. This approach taken in the firms corresponds with the views by authors supporting teamwork in problem solving. Conti and Kleiner (1997) believe that teamwork improves productivity and builds more flexibility into a business, whereas Sashkin and Sashkin (1994) state that teams have become essential elements in problem solving and in helping businesses move forward into the future.

### 8.2.5.2 Empowerment

There was some form of empowerment given to employees in all the firms. The general manager in Firm A elucidated that this was not very evident because of the small size and flat structure. All the employees in Firm A were assigned set responsibilities. The operations manager at Firm E highlighted that empowerment was only given to employees if they demonstrated capable qualities. Similarly, in Firm B, employees had to be adequately trained to receive the decision making power. This was
because they were dealing with automobiles, and mistakes proved costly and had a big impact on profits. Pietenpol and Gitlow (1996) indicated the need for management to provide first of all, training and skills required by employees to make decisions. Secondly, there must be security to make decisions without fear of reprisal from their supervisors.

The views from managers in the Australian firms were similar to that in Singapore. Firm G had employees closely supervised in the beginning. Once management felt comfortable with their potential, the employees were allowed to make decisions subsequently. However, employees had to share the decisions made at times, and feedback to management. There was mutual communication, and one was discouraged to bypass his superior to higher levels in the tiers of management. The logistics and warehouse manager in Firm G reiterated:

“Our company is rather bureaucratic, where it concerns hierarchy and reporting. Supervisors should always report to their respective managers, before seeking advice from higher management.”

In Firm J, employees required adequate training first to be empowered, so as to get optimum and reliable decisions made. The logistics manager affirmed:

“With confidence gained from supervisors and managers, employees are then empowered to a certain extent only. Certain decisions still need to be made by higher management. We cannot afford costly mistakes since this is a dynamic industry.”

Firm I on the other hand, only empowered employees at middle management. The managers interviewed remarked that empowerment was not clearly perceptible at the supervisory or lower level. The operational staff mainly received instructions and had to execute accordingly based on plans.

8.2.5.3 Discussion

Teamwork was evident in all firms. A prominent point was that Singaporean firms embarked on more cross-functional teams, and placed more focus on problem solving or improvement projects. Firms such as F, G and I adopted more than one type
of team within the organisation. Four out of the five Australian firms utilised normal work teams. It is apparent that the firms interviewed in both countries were cautious about bestowing power and decision making responsibilities to their employees. The Singaporean firms however, seemed more conservative as compared to the Australian firms, based on the comments made by managers. Singaporean managers highlighted bureaucracy, and employees at lower levels not being empowered. This implies that they may still believe in traditional structures and hierarchy system, where employers retain decision making authority. Empowerment was still bestowed in all the firms nevertheless, and there was teamwork effectiveness as illustrated. It can be concluded that the employees possessed this competency to support the innovative efforts of firms.

8.2.6 Competency 5 – Skill flexibility

Employees were reported by the managers interviewed as cross-trained, widening their job areas, so as to ensure skill flexibility. Only in Firm A, the human resource manager clarified that there was resistance from some employees in this regard, because they were resistant to change. The operations manager in Firm E gave examples of some of the employees at the Distribution Centre trained in office skills such as operating the computer for checking stock control and invoices. The managers in the Singaporean firms reported more instances of training and multi-skilling present in the firms. The managing director in Firm F expressed:

“Employees are given opportunities to demonstrate their skills and abilities. This is used to assess the benefits, incentives and promotion aspects that they deserve. In this regard, it is important for all staff to be multi-skilled and cross-trained.”

All the managers in the Singaporean firms encouraged employees to learn new skills all the time. Examples were cited of employees operating different equipment, drivers being trained to work in the Distribution Centre or to do storekeeping, Distribution Centre employees learning to operate computers and the warehouse management system.

Firms G and H had job rotation apparent, where employees were allowed to work in other departments after a few years. They could change work functions or
switch departments to experience variety of job functions and stay motivated. The managing director in Firm J explained the recent downsize in structure about six years ago. As a result, all employees had to be cross-trained and possess multiple skills. Even management was cross-trained through secondment or training at other branches of the MNC around the world, to get more exposure on how the company operated.

8.2.6.1 Discussion

Other authors such as Cordery (1989) have stressed the importance of multi-skilling and flexibility. Organisations can better cope with environmental changes that entail fluctuations in work demands. With a multi-skilled workforce, organisations become more effective and efficient, since there is increased labour flexibility, reduced labour costs and increased productivity (Cordery, 1989). There was evidence of multi-skilling and flexibility in all the firms interviewed. Only Firm A had employees that were a little resistant to this concept. Nevertheless, the comments made by managers and examples illustrated show that this competency was noticeable in firms with managers’ views further supported the literature.

8.2.7 Competency 6 – Adaptiveness to change

Sections 7.4.5 and 7.5.5 in the previous chapter explained the management of change in the firms. It involves the ability to realign operations and strategies to result in creative ideas to improve service and cost. However, it is also a competency of individuals reacting and adapting to change. Employees need to possess the versatility to have the right attitude towards change. Innovative organisations consist of employees who react positively to change. As highlighted before, all the managers interviewed believed that their employees were generally receptive to change. Seven firms had earlier reported minimal resistance (i.e. less than 10%) from employees.

When interviewed about employees’ perception to change, the managers speculated that most employees participated enthusiastically with respect to change. Three managers however stated that it was difficult to measure or gauge the resistance from employees, as they were intangible. Management in the firms tried to gain support and increase the morale of employees when implementing the change. The managing director in Firm J earlier described the instance where the firm downsized some six years ago. Employees were asked to give feedback on the decision. Committee
meetings were conducted with focus groups on the firm’s intranet, inviting individuals to comment and give suggestions. They were able to obtain positive response because all comments were kept anonymous and confidential. As a result of the survey, the firm could implement this structural change effectively with minimal grievances to employees.

The managers in Firm C reported that employees needed to share the same objective as the firm when implementing change. The task for management was to create awareness, gain support and feedback, and allow for joint decision making. They were able to implement change by providing a facilitative climate. This comment by the managers in Firm C was in line with the works of Ford, Ford and McNamara (2002). They propose that successful change implementation stems from employees sharing the same objective and initiative.

8.2.7.1 Discussion

All managers confirmed that employees gave valuable input and feedback upon implementing change. These comments made by the managers suggest that the employees were flexible, and able to conform to new ways of working, or doing things. In order to be innovative, there must be constant or continuous improvements to systems and processes. Training, development, teamwork and cross-functional communication allowed individuals to gain a broader perspective of the organisational goals and objectives. With a sense of pride and belonging in the firm, employees became dedicated and adaptive to change. This behaviour evident in the firms can be compared with the literature. Cordery (1989) writes that with proper training, education and support, employees can undertake a wider range of tasks and respond to changes in the workplace. Similarly, by allowing employees to give feedback, suggestions and participate in decision making, they experience an exciting challenge to their abilities to improve and innovate the processes in which they work (Pietenpol and Gitlow, 1996). Therefore, it can be concluded that the prevalence of adaptiveness to change was present for employees at the firms.
8.2.8 Competency 7 – Role of management

8.2.8.1 Translating strategy into innovative activities

Apart from the qualities and competencies of individuals in organisations, management should possess competencies to set the example for the firm. Their role for a successful innovative organisation is to deploy corporate strategies and translate them into innovative and improvement activities. Most of the managers interviewed were involved in setting goals into action plans for constant review. What the firms intended to achieve were translated top-down, or filtered down the structure. It was conspicuous that policies and decisions were spearheaded at senior management level. These were documented and cascaded down throughout to the managers, supervisors and team leaders, who assisted in setting action plans or departmental goals for innovative activities.

Firm J for example, had an Annual Quality Improvement Plan (AQIP). This overall objective of innovation and improvement was split according to different departments. The departments in turn, classified their own objectives, targets and measures to be achieved annually. They were assessed and monitored in monthly departmental meetings and bi-annual company-wide meetings. Management tried not to get involved in the supervision of this, and left it to self-driven employees and supervisors. In this way, the motivational levels were maintained. When this was achieved, incentives and reward schemes were given to employees in the respective departments.

Innovation plans were also set, considering the views and feedback of employees. For instance, Firm A encouraged employees and supervisors to furnish new ideas and suggestions. Their ideas and suggestions were always considered, discussed at meetings, and put to trial before implementation. In Firm D, management was not confined to the office only, but assisted in the Distribution Centre. The general manager elucidated:

“The managers provide some labour support such as assisting in the loading/unloading and unpacking of cartons. This is to have a more hands-on experience and discover the issues pertinent to employees. Management should be multi-skilled, gaining rapport, confidence and trust from employees.”

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8.2.8.2 Developing and diffusing knowledge for innovation

Besides setting policies, guidelines and guiding actions, the role of management is also fundamental in developing and diffusing innovative activities in employees. When interviewed, the managers reported different strategies adopted to encourage innovative activities. Firm A management diffused innovation through empowering employees. The administration manager explained:

“For instance the person who initialised the suggestion or idea for improvement will be placed in charge of implementing and managing the idea. Such leadership opportunities for employees help develop their motivation and skills. It equips them with knowledge to perform better. In turn, the fellow colleagues and even supervisors can learn from them.”

Other forms of empowerment also occurred in the other firms such as in Firm C. Team leaders were empowered and as a result, became more focused on improving and innovating in work aspects. Management believed that empowerment and information given to teams helped in developing and improving processes. This was because they felt responsible for managing the process. They were encouraged to experiment and come up with new ideas.

Other strategies deployed for increasing the innovativeness of employees was through training, upgrading of skills, as well as providing recognition. The management in Firm G ensured that employees were adequately trained, given opportunities to excel and be promoted. In addition, the human resource manager in Firm F believed that communication at the workplace was crucial to improving innovativeness. He explained that there was flow of information and feedback received. Other managers spoke about encouraging informal sessions, social activities and regular get-togethers to create a harmonious working environment. This environment could induce innovative activities to occur. A summary of strategies deployed to diffuse knowledge and innovation is depicted in Figure 8.3.
Figure 8.3 Diffusing knowledge in employees for innovation

In the above graph, some interesting differences are portrayed between the two countries. The firms in Australia generally placed more emphasis on empowerment for developing employees. The managers in Singaporean firms however did not mention much about empowerment. This as analysed in Section 8.2.5.3, implied that they were more conservative than the Australian managers. The Singaporean managers focused more towards training, development, having formal meetings and conducting social activities as a way for knowledge diffusion. There was an equal belief that providing recognition and rewards was necessary to motivate employees for innovation.

8.2.8.3 Discussion

Managers were involved in goal setting and translating strategies into action plans. They partook in innovative activities, supporting and guiding employees as depicted in the findings. Innovative plans were set, taking in to account employees’ views, suggestions and feedback in the firms. Different methods were deployed throughout the firms, in attempts to diffuse knowledge and develop employees. The Australian firms placed more emphasis on bestowing decision making as a means to motivate and enhance skills. The Singaporean managers drew attention to training, development, incentives and recognition as means to increase innovativeness. Some managers also stressed the importance of communication and informal interaction because the work environment determined the effectiveness of employee output. From the strategies and views of managers, it can be concluded that these firms had the necessary competency of managers to facilitate Continuous Innovation.
The research question attempted to seek the competencies present in individuals to operationalise behaviours and capabilities needed for Continuous Innovation to occur. Seven competencies were highlighted and investigated during the interviews. Based on the positive feedback from managers, it is postulated that their employees possessed such competencies. Table 8.3 following highlights the main points of competencies as explained in this section.
### Competencies for innovation

<table>
<thead>
<tr>
<th>Competencies</th>
<th>General comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Creativity</strong></td>
<td></td>
</tr>
<tr>
<td>• Evident in all firms</td>
<td></td>
</tr>
<tr>
<td>• Creativity surfaced during teamwork or small group improvement activities</td>
<td></td>
</tr>
<tr>
<td>• More informal communication when in teams (Firms D, E, F)</td>
<td></td>
</tr>
<tr>
<td>• Suggestion schemes, open-door policy, open to new ideas (Firm C)</td>
<td></td>
</tr>
<tr>
<td>• Established environment for motivation (Firm E)</td>
<td></td>
</tr>
<tr>
<td>• Allowing employees to set own goals (Firm J)</td>
<td></td>
</tr>
<tr>
<td><strong>Effective Communication</strong></td>
<td></td>
</tr>
<tr>
<td>• Evident in all firms</td>
<td></td>
</tr>
<tr>
<td>• Had open-office concept (Firms A, B, D, E, F, J)</td>
<td></td>
</tr>
<tr>
<td>• Managers’ offices located in warehouse (Firms B, D, E)</td>
<td></td>
</tr>
<tr>
<td>• Problem of segregation of employees at warehouse and office (A, C, E, G, I, J)</td>
<td></td>
</tr>
<tr>
<td>• Provided for informal interaction area in Distribution Centre (Firms G, I, J)</td>
<td></td>
</tr>
<tr>
<td>• Cross-functional improvement teams (Firms A, I, F)</td>
<td></td>
</tr>
<tr>
<td>• Communication difficulties encountered in MNCs (Firms C, G, H, J)</td>
<td></td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>Diffusing knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>• All managers have knowledge and aptitude of innovation themselves before diffusing. Employees demonstrated new knowledge from external sources</td>
<td></td>
</tr>
<tr>
<td>• New employees brought in new knowledge (Firms A, C, D, E, F, I)</td>
<td></td>
</tr>
<tr>
<td>• <strong>Upgrading Skills and knowledge</strong></td>
<td></td>
</tr>
<tr>
<td>• All employees had external training (all firms except Firms A and E)</td>
<td></td>
</tr>
<tr>
<td>• Singaporean firms had more training than Australian firms</td>
<td></td>
</tr>
<tr>
<td>• <strong>Problem Solving and Work Improvement</strong></td>
<td></td>
</tr>
<tr>
<td>• Relied mainly on teams</td>
<td></td>
</tr>
<tr>
<td>• Improvements arose on an ongoing basis (Firms A, B, D, E, F, H, I), ad hoc basis (Firms C, G, J)</td>
<td></td>
</tr>
<tr>
<td>• When problem solving</td>
<td></td>
</tr>
<tr>
<td>o Employees understand root causes and prevent reoccurrence to problems (Firms A, C, D, E, F, G, I)</td>
<td></td>
</tr>
<tr>
<td>o Employees create new knowledge or quantum leaps (Firms B, H, J)</td>
<td></td>
</tr>
<tr>
<td><strong>Teamwork and Empowerment</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>Teamwork</strong> evident in all firms</td>
<td></td>
</tr>
<tr>
<td>• Normal work teams used (Firms A, B, D, E), QCC used (Firms F, G, H, I), Work Improvement Teams (Firms F, G, I), Quality Improvement Teams (Firm J)</td>
<td></td>
</tr>
<tr>
<td>• <strong>Empowerment</strong> evident in all firms. Slightly evident in Firm A</td>
<td></td>
</tr>
<tr>
<td>• Singaporean firms more conservative in empowering employees than Australian firms.</td>
<td></td>
</tr>
<tr>
<td>• Empowerment only occurred in middle management (Firm I)</td>
<td></td>
</tr>
<tr>
<td><strong>Skill Flexibility</strong></td>
<td></td>
</tr>
<tr>
<td>• Evident in all firms</td>
<td></td>
</tr>
<tr>
<td>• Employees were cross-trained. (Minimal resistance from Firm A)</td>
<td></td>
</tr>
<tr>
<td>• Singaporean firms had more training and multi-skilling than Australian firms</td>
<td></td>
</tr>
<tr>
<td>• Job rotation (Firms G and H)</td>
<td></td>
</tr>
<tr>
<td><strong>Adaptiveness to Change</strong></td>
<td></td>
</tr>
<tr>
<td>• Evident in all firms</td>
<td></td>
</tr>
<tr>
<td>• Difficult to measure or gauge resistance</td>
<td></td>
</tr>
<tr>
<td>• Employees need to share same objectives and provide feedback</td>
<td></td>
</tr>
<tr>
<td><strong>Role of Management</strong></td>
<td></td>
</tr>
<tr>
<td>• <strong>Translating strategy into innovative activities</strong></td>
<td></td>
</tr>
<tr>
<td>• Managers were involved in setting goals into action plans for constant review</td>
<td></td>
</tr>
<tr>
<td>• Annual Quality Improvement Plan (Firm J), Considered views and feedback of employees (Firm A)</td>
<td></td>
</tr>
<tr>
<td>• Management provided labour support in warehouse activities (Firm D)</td>
<td></td>
</tr>
<tr>
<td>• <strong>Developing and diffusing knowledge for innovation</strong></td>
<td></td>
</tr>
<tr>
<td>• Through empowerment of employees (Firm A, B, C), training and development (Firm C, D, F, G, J), social activities (Firm F), recognition and reward (Firms B, E, H, J), formal meetings (Firms G, I)</td>
<td></td>
</tr>
</tbody>
</table>

Table 8.3 Summary of competencies for innovation
8.3 Research Question 5

*What are the performance measures adopted by the selected firms to sustain Continuous Innovation?*

---

### 8.3.1 Introduction

Upon establishing the capabilities, behaviours and competencies of firms for innovation, there is also a necessity to measure performances of strategies and operations to uphold continuous innovative efforts. An innovative firm takes measures of outcomes to ensure that systems and processes allow for continual improvement. The ongoing monitoring systems which emphasise indicators and analyses linked to improvement, can help track and improve results over time. Performance measurement identifies potential areas or problem areas that need more attention. They can pinpoint areas or functions repeatedly faced with backlogs, slipping deadlines, high turnover or complaints. On the other hand, performance measurement is significant in evaluating evidence of progress, timely data, cost savings, service levels, customer satisfaction and reductions in waiting or processing times. Overall, the demand for measures of outcomes is imperative for firms to examine effectiveness of innovative efforts to assure that they remain competitive.

#### 8.3.2 Measuring strategic performance (F2)

**8.3.2.1 Assessing leadership (F2.1)**

All the managers interviewed affirmed the periodic assessment of management and leadership in their firms. They agreed that middle and senior management needed to be assessed. This was because it involved the ability to run the organisation and be actively involved in creating, leading and sustaining the work environment to achieve organisation goals. The production manager at Firm G illustrated this point:
“It is crucial for management setting the strategic direction of the firm. It is important that some form of appraisal be conducted to ensure the firm is spearheaded and led on the right track for innovation. We have annual appraisals, and managers are required to update on targets, goals and achievements for the year.”

Furthermore, the managers interviewed were supportive and positive of their senior management being committed and fervent about achieving quality services, satisfying customers and continuously improving processes. Table 8.4 shows the various areas of review for management. There were six main areas identified. Managers were asked to indicate if these were assessed in their firms.

<table>
<thead>
<tr>
<th>Areas of assessment</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Communicating and implementing organisation goals and objectives</td>
<td>Y</td>
</tr>
<tr>
<td>Guiding and achieving various departmental goals</td>
<td>Y</td>
</tr>
<tr>
<td>Effectively communicating and promoting values of</td>
<td></td>
</tr>
<tr>
<td>Continuous Innovation, quality and customer focus</td>
<td>Y</td>
</tr>
<tr>
<td>Involved in the activities of Continuous Innovation, quality</td>
<td>Y</td>
</tr>
<tr>
<td>and customer focus</td>
<td></td>
</tr>
<tr>
<td>Enriching leadership skills through training and development</td>
<td>Y</td>
</tr>
<tr>
<td>Recognising and rewarding employees for achievements</td>
<td>Y</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 8.4 Areas of assessment for leadership and management

The above table shows the areas of assessment in the ten firms. The Singaporean firms displayed more assessment areas for leadership generally. Firms C, F and H show the most areas of assessment. The managers indicated that all six areas of evaluation were present in their firms. The second highest areas of assessment were evident in Firms G and J. It is possible to correlate this fact that Firms C, G, H and J were subsidiaries of multinational corporations, as depicted in Figure 6.3. The managers in these firms had to report to parent firms or higher authority. As a result, it could be implied that this was a possible reason for the management in these firms to be evaluated in more areas for the efficient operations of the subsidiary firm.
Firm E had the least areas of management evaluation. This could be due to the fact that it was a private business mainly run by family members. The senior management personnel were known to be family related. There were little areas of assessing leadership skills, apart from communicating and implementing organisational goals and objectives, and guiding and achieving various departmental goals. Similarly, Firms D and I were single privately owned businesses as reported in Figure 6.4. They had relatively low levels of management assessment. It can be seen that there was some relation between the ownership of the firms and the assessment of leadership skills. The single or privately owned businesses paid less attention to evaluating management when compared to larger multinational corporations.

Based on Table 8.4, there were more Singaporean firms where management effectively communicated and promoted the values of Continuous Innovation, quality and customer focus. Only two Australian firms (Firms C and D) indicated that this was evident. A point of significance is that all the Singaporean firms had assessment on management for enriching the skills of employees, and for being actively involved in Continuous Innovation, quality and customer focus projects. Not all Australian Firms had this. It could be due to the fact previously mentioned in Section 8.2.4.2 that training was an integral aspect in many Singaporean organisations due to government funding. Only one Australian firm (Firm C) considered this factor. It can be also be implied that the Singaporean firms interviewed generally had more areas of assessment than the Australian firms, as depicted in Table 8.4.

Leadership assessment focuses on senior management’s leadership and involvement in the Distribution Centres. They play a major role in creating, sustaining, integrating, implementing and fostering a climate in the firm for values on Continuous Innovation. It is important for management to be committed, well-versed and personally involved in the objectives, strategies and operations of the firm. The employees can then be directed to centre their endeavours on innovative efforts, quality and customer focus in the firm. The leadership assessment in the ten firms interviewed varied significantly. The differences could be attributed to the nature of the firm and its ownership structure.
Some authors such as Guinn (1996), Rausch, Sherman and Washbush (2002) have criticised the assessment of management. Guinn (1996) argued that barriers to management assessment are a growing concern. Top executives most often have had many years of highly successful performance and do not perceive a need to change. Furthermore, there is seldom someone within the company who has both the skills and the credibility to give such feedback for management to create this insight and awareness. Similarly, Rausch, Sherman and Washbush (2002) write that there is insufficient attention given to managing people and communications skills. Most of the assessment places emphasis on analytical techniques. They suggest that assessing the quality of decisions may have significant benefits over skills-based approaches. The reason is that, after all, decisions are key because they provide foundations for all plans and actions (Rausch, Sherman and Washbush; 2002). In relation to the firms studied, it was apparent that management assessment was conducted in this manner, rather than skills-based approach. Managers were asked to indicate if the identified factors were assessed in their firms, and they clarified that evaluation was based on the outcomes and results.

8.3.2.2 Assessing strategic planning (F2.2)

All the firms had a long-term business objective set by senior management. For instance, Firm H had a 5-year strategic plan which was reviewed every year by top executives at the headquarters. They set the yearly business plan in each subsidiary which the CEO translated with management into smaller individual departmental plans. The general manager explained that the strategic planning process was necessary for both the short-term and long-term objectives.

All ten firms had some form of constant assessment or review of their plans to reflect customer satisfaction, quality, operational performance and Continuous Innovation. The plans were periodically adjusted to reflect changes in business conditions, customer requirements and the competitive environment. The operations manager at Firm E mentioned:

"There is emphasis on the importance of top-down, as well as bottom-up approaches in our strategic planning. There is constant appraisal of plans and evaluation of the planning process to ensure the organisation is
adaptable to changing market conditions, and to strive for Continuous Innovation."

Additionally, the managing director in Firm J stressed the use of data and inputs from external sources such as suppliers and customers in the strategic planning process. All the managers in the firms interviewed indicated that they ensured resources were in place to support the effective execution of strategic plans. The human resource manager from Firm B added that employees were adequately trained, empowered and skilled to be competent. The assessment of strategic plans was conducted periodically to ensure that firm objectives were appropriately set and achieved.

McDonald (1996) suggests strategic planning encompasses the following elements: a focus on long-term direction of the organisation; matching the activities of the business to the environment in order to minimise the threats and maximise opportunities; as well as matching the organisation's activities to the resources available (McDonald, 1996). All these points had surfaced and had been taken into consideration during the interviews, implying that management was focusing on the right aspects.

Furthermore, O'Regan and Ghobadian (2002) argued that ownership and the capital structure of firms influenced strategic planning. Firms that are wholly owned subsidiaries of larger organisations can fall back on the expertise of the parent company. O'Regan and Ghobadian found that strategic planning tends to have access to the necessary resources as well as a greater capacity to bear any risks associated with innovation. This view however, was not the case in the firms interviewed. The managers of all firms portrayed similar strategies, regardless of size or ownership.

8.3.2.3 Assessing the use of information and analysis (F2.3)

The managers highlighted that measures were taken to collect information and data. They indicated these were reviewed for improvement in operations and performance of the business. The data and information were considered in formulating strategies in driving quality, innovation and to improve processes. For instance, Section 7.5.1.2 indicated the various methods of collection to better satisfy customers' needs. Information was collected from external sources such as the suppliers, professional
body membership and industry publications. Such information was used for performance evaluation, planning and day-to-day management. The scope for data and information collected varied in each firm, nevertheless the managers verified their importance for analysis and management in operations.

The managers pointed out that the data and information, and assessment were widely deployed and made readily accessible to all employees. They appeared in the forms of reports, newsletters, annual reports and through departmental meetings. All firms achieved beneficial results in key processes and service improvements as a result of evaluating data and information. This further supported the findings of Cauchick Miguel (2001). He asserts that firms need to appraise how information is managed with regard to the effectiveness of the collection and analysis. This is to support customer-driven performance excellence and marketplace success (Cauchick Miguel, 2001).

8.3.2.4 Assessing human resource management (F2.4)

The managers were questioned on the development and management of their workforce to pursue business objectives. The human resource managers made significant contributions to this aspect. Although not all firms had human resource departments, most of the managers admitted to having some form of human resource plan. This plan covered areas in recruitment, selection, training and development, compensation and benefits, employee recognition and employee involvement. The IT manager in Firm I reasoned that people are the most important resource of any organisation and need to be effectively managed.

Apart from assessing the performance, training and development, and output of employees, the managers realised that there was also a need to assess how they managed employees themselves. Table 8.5 shows the areas evident in assessing the management of human resource in the firms.

303
### Assessment areas for human resource management

<table>
<thead>
<tr>
<th>Areas of assessment</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Creating congenial work environment</td>
<td>Y</td>
</tr>
<tr>
<td>Maintaining a safe work environment</td>
<td>Y</td>
</tr>
<tr>
<td>Providing comparable compensation and benefits packages with industry/competitors</td>
<td>Y</td>
</tr>
<tr>
<td>Collecting informal information and conducting analysis on employee satisfaction</td>
<td>Y</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 8.5 Areas of assessing human resource management

The above table shows where the firms stand in terms of assessing the human resource management. Firms B, C, E, F, I and J all had similar results, with all the identified areas assessed. Firms A, D, G and H had slightly less areas of assessment. All firms created a congenial work environment for employees, and maintained a safe work environment. Similarly all firms (except Firm D) had comparable compensation and benefits packages with industry or competitors. According to the human resource manager in Firm E:

"It is our duty as managers to create a congenial work environment such that employees are more productive. This includes providing a good infrastructure and facilities. We also provide health and safety enhancement programmes and regular recreational activities."

In addition, Firm B was particular about maintaining a safe work environment with standard safety procedures and regular inspection facilitated by safety awareness programmes. The Quality Assessor in Firm B ensured this and confirmed that notices were pasted on the walls of the Distribution Centre to remind employees to adhere to safety procedures. The human resource manager in Firm F indicated:

"We assess the compensation and benefits packages every year, to be in line with industry standards or with competitors. This is to retain employees and give them fair remuneration."

Out of the ten Distribution Centres interviewed, only six of them had collection of formal information and conducted analysis on the satisfaction levels of employees.
This was conducted through the yearly appraisal session with supervisors or employee satisfaction survey forms, as carried out in Firm J.

All the managers reported that employees were rewarded for behaviour that supported values of Continuous Innovation, quality and customer focus. This was identified through regular appraisals, recommendation from supervisors or obvious outstanding performances. Eight of our ten firms (all except for Firms A and E) had a formal system to determine employees’ education, training and development needs to meet organisational goals. Table 8.6 shows the overall response from the managers interviewed.

<table>
<thead>
<tr>
<th>Areas of assessment</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a system to determine employee development for organisational goals</td>
<td>A B C D E F G H I J</td>
</tr>
<tr>
<td>Reviewing and evaluating impact of training and development on firm performance</td>
<td>Y Y Y Y Y Y Y</td>
</tr>
</tbody>
</table>

Table 8.6 Employee training and development in firms

Firms A and E did not have this system in place because the managers clarified that they conducted induction training at the beginning, and most of the skills were learnt on the job. Employees were sent on short management-related or computer courses only when the need arose. They did not plan for training or set aside budget for this.

The eight firms on the other hand, periodically assessed the skills of employees and tried to match them with the job, or to provide for additional training and development. Firms B, E and F had a Human Resource Training Plan or a Strategic Training Plan. This plan provided centralised coordination of employee development throughout the firm. The Human Resource manager in Firm F explained:

“We have an efficient, yet flexible employee orientation and training process. This is critical to retaining excellent employees and managing performance. Without this, employees will need more time to successfully learn their jobs. As a result, supervisors, managers and project leaders require more time and effort to train their new employees. In addition, we have a performance plan. This is a well-
designed performance management system that provides employees with clear job goals and standards, as well as a sense of how the job fits within and contributes to the overall organisation.”

The eight firms had a system to determine employees’ development needs. However out of the eight firms, only Firm I did not review and evaluate the impact of education, training and development on the overall performance. Firm I had in-house skills enhancement programmes conducted, as well as external training. The regional operations (assistant) manager acknowledged:

“The yearly budget permits and commits 4% of annual revenue for training. The frequency of training and number of people trained does not matter, so long as we utilise the stated funds allowed.”

The Singaporean firms placed more emphasis on assessing employee development than Australian firms. The firms should focus on how the overall human resource plans are integrated with overall business objectives. Performance measures should address how the needs and development of the workforce are addressed and managed. It is from this that employees are able to contribute to innovative efforts. In the literature, Brewster and Larsen (1992, p.411) also confirmed that human resource management should be integrated with the business and corporate strategy, because it affects the overall performance of the firm. An empirical study by Budhwar (2000) has realised the importance of human resources, and high practical value in integration. This is in terms of improving the quality of work, effective evaluation of business plans, and makes the implementation of plans more effective and efficient. The outcome of evaluating human resource management indicates the quality of workforce the firm possesses or any areas for improvement needed. It evaluates not only the effectiveness of employees at the individual level, but also at firm level and contribution to the development of the business and innovative strategies.

8.3.2.5 Assessing process quality and management (F2.5)

All firms had clear objectives and targets for processes which were linked to overall goals of the organisation. The managers reviewed processes to ensure consistency, quality and made improvements if necessary. Operations were streamlined
to support customer requirements as outlined in the previous chapter in Section 7.5.2. They evaluated their processes for providing customers with high quality services.

In addition, some of the firms looked beyond their key processes internally and considered the external processes in the supply chain. Cooperation with suppliers was a growing concern and firms needed to assess the quality of suppliers periodically. This was done mainly upon renewal of contracts with the suppliers’ provision of goods and services. This was apparent in eight out of the ten firms. The director of operations in Firm C expressed:

“The supplier integration or alliance is crucial for achieving competitive advantage. Undoubtedly, there is prevalence for evaluating suppliers periodically and to know if the processes are in congruence with our strategies.”

The managers highlighted several areas of assessment for suppliers in terms of their processes. They were based on the reliability such as on-time delivery, JIT capability, quick response, the geographical proximity of suppliers to Distribution Centres, costs, use of EDI, willingness to share information and volume flexibility. This approach was supported by Zink, Schmidt and Voss (1997). They advocate the evaluation of process, product and service quality. It should take into account the cooperation with suppliers as well as the methods and systems of process management. The evaluation puts the emphasis on innovative approaches for improving core processes, and realising an organisation-wide culture of learning and innovation. The second aspect deals with the processes and systems for dealing with external suppliers. It describes the approach to ensure and enhance the quality of incoming goods and services (Zink, Schmidt and Voss, 1997).

8.3.2.6 Assessing customer satisfaction (F2.6)

Section 7.5.1 in the previous chapter described the behaviours and actions that the firms took to maintain customer satisfaction. It elucidated the relationships with customers, knowledge of requirements and the expectations that firms needed to meet. The managers had indicated their proactive strategies to gather information, and to build relationships such that they maintained customer satisfaction. The section highlighted
that firms not only assessed the degree to which they were providing adequate services, but also periodically obtained knowledge on meeting customers’ needs. The managers explained that during assessment, they tended to focus on quality of services and the relationships established to determine the level of satisfaction.

The managers in Firm A for instance, maintained the ability of the sales representatives to uphold relationships with customers. Similarly, the managers in Firm E ensured the sales people have the interpersonal skills in communicating to and obtaining feedback from customers. This knowledge and feedback received was brought to the attention of management at meetings so as to develop process improvements. The managers in Firm I similarly remarked on the importance to obtain knowledge of customer requirements and expectations to assist in developing future plans. These managers explained that a relationship with customers is important because it represents far higher levels of commitment to the firm and longer customer retention.

8.3.3 Operational measures – Performance indicators (F3)

Firms need to adopt a measurement framework to link with their capabilities and competencies. One way to ascertain success is by using key performance indicators (KPIs), also known as key risk indicators. These establish a touchstone managers can use to monitor the effectiveness of the firm. Given the increasing importance of performance indicators in organisations, this section provides a review of some of the key areas assessable to improve operations in the Distribution Centres. A definition and elaboration of all the performance indicators used can be found in the appendices.

Five main areas of indicators deployed in firms are presented in this section. The managers were queried on indicators for customer service, cost management, asset management, quality and productivity. These areas were adapted from Bowersox, Closs and Stank (1999). Customer service identifies the types of value provided to the customer. The KPIs focused on satisfaction levels, service flexibility and speed of delivery. Cost management reflects the functional and integrated logistics cost components used to facilitate operations. Asset management reflects the effectiveness at using fixed assets and working capital. Quality indicates service measures used to retain customers. The quality of service draws and maintains customers. It focuses on
delivery dependability, responsiveness, order flexibility and delivery flexibility. Productivity reflects how effectively material and labour resources are used to provide service. The findings are presented as follows.
### Performance Indicators used by firms

<table>
<thead>
<tr>
<th>KPI Category</th>
<th>Specific KPIs</th>
<th>No. of firms adopting the KPI</th>
<th>Total firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Service</td>
<td>Fill rate</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Stockouts</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Despatch errors</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>On-time delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Backorders</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Cycle time</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Delivery consistency</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Response time to enquiries</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Response accuracy</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Complete orders</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Customer complaints</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Sales force complaints</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Overall reliability</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Overall satisfaction</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Cost Management</td>
<td>Total cost</td>
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<tr>
<td></td>
<td>Cost per unit</td>
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<tr>
<td></td>
<td>Cost as % of sales</td>
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</tr>
<tr>
<td></td>
<td>Inbound freight cost</td>
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<tr>
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<tr>
<td></td>
<td>Inventory carrying cost</td>
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<tr>
<td></td>
<td>Direct labour cost</td>
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<td>7</td>
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<tr>
<td></td>
<td>Cost trend analysis</td>
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<td></td>
<td>Cost of damage</td>
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<tr>
<td></td>
<td>Cost of backorder</td>
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<td>1</td>
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<tr>
<td></td>
<td>Cost of service failure</td>
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<tr>
<td></td>
<td>Cost of returned goods</td>
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<td>3</td>
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<tr>
<td></td>
<td>Actual cost vs. budget</td>
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<td></td>
<td>Warehouse order processing cost</td>
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<td>Direct product profitability</td>
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<td>2</td>
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<tr>
<td></td>
<td>Customer segment profitability</td>
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<tr>
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<td>Obsolete inventory</td>
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<td>Return on investment</td>
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<td></td>
<td>Economic value added</td>
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</tr>
<tr>
<td>Quality</td>
<td>Damage frequency</td>
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</tr>
<tr>
<td></td>
<td>Order entry accuracy</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Picking/despatch accuracy</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Information accuracy</td>
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<td>2</td>
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<tr>
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<td>Information availability</td>
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</tr>
<tr>
<td></td>
<td>Document/invoice accuracy</td>
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</tr>
<tr>
<td></td>
<td>No. of credit claims</td>
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</tr>
<tr>
<td></td>
<td>No. of customer returns</td>
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<tr>
<td>Productivity</td>
<td>Units dispatched per employee</td>
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</tr>
<tr>
<td></td>
<td>Units per labour dollar</td>
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</tr>
<tr>
<td></td>
<td>Order per sales representative</td>
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<td>Comparison with historical standard</td>
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<td>Goal programme</td>
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<td>Productivity index</td>
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<td></td>
<td>Equipment downtime</td>
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</tr>
<tr>
<td></td>
<td>Order entry productivity</td>
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</tr>
<tr>
<td></td>
<td>Warehouse labour productivity</td>
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</table>

**Table 8.7 Performance indicators used by firms**
Number of specific indicators used by firms

<table>
<thead>
<tr>
<th>KPI Category</th>
<th>No. of specific KPIs</th>
<th>No. of KPIs used in each firm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>A</td>
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<tr>
<td>Customer Service</td>
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<td>10</td>
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<tr>
<td>Asset Management</td>
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<td>2</td>
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<tr>
<td>Quality</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Productivity</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Totals</td>
<td>55</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 8.8 Number of specific KPI areas assessed by the respective firms

8.3.3.1 Assessing customer service (F3.1)

For customer service, fourteen performance indicators were identified for this area in the survey questionnaire. Managers were requested to indicate if they were used in the firms. From Table 8.7, it is evident that on-time delivery was the most used performance indicator. Nine out of ten firms adopted this measure. On-time delivery refers to the situation when a delivery was met within the stipulated or contracted time frame. It was important to meet this obligation to satisfy customer needs. Other important indicators used were cycle time, delivery consistency, customer complaints and overall reliability. Sixty percent of firms used them to assess their effectiveness in customer service. Table 8.8 shows that Firm G had measured the most number of areas. All fourteen measures were used to assess the value provided to customers. The second highest number of areas assessed was by Firms C and J, at nine KPIs for customer service. The logistics and warehouse manager at Firm G commented:

“These measurements are helpful to improve the knowledge about what customers really find important and how customers build their perceptions. By developing knowledge from the customer satisfaction data or performance indicators, we can analyse the way customers perceive quality (outside-in). It will then be possible to take more concrete actions for improvement or innovation.”

Customer satisfaction measurement is one thing, but managing for improvement is what really counts in the long-term. Firms need to transform customer satisfaction indicators into actual service improvements. Since customer satisfaction is influenced
by expectations and perceived service quality, the degree of customer satisfaction and
loyalty consequently becomes an indication of customer orientation.

8.3.3.2 Assessing cost management (F3.2)

For cost and profitability seventeen indicators were identified. The two main
indicators used were total cost and inventory carrying cost. These were indicated by
70% of the firms as shown in Table 8.7. Inventory carrying cost refers to the cost
associated with holding one unit of an item in stock for a period of time. It
incorporates the cost elements born by firms such as capital costs for stock, taxes,
insurance, storage, handling, administration, shrinkage, obsolescence and deterioration.
Most firms want to have a quick stock turnover, where they keep them for the shortest
possible time. The second most used indicator was inbound freight cost. This refers to
the cost of prepaid goods not delivered by vendors. These firms order stock from
suppliers and sometimes need to pay in advance. They may have little control over the
inflow of stock. The cost could be attributed to production delays, stock shortages, late
deliveries, unhappy customers, leading to overall higher costs. The least used measure
was cost of backorder and administrative costs. Only one firm indicated assessing these
areas. Cost of backorder refers to the cost associated with customer demand, for which
no stock is available and where the customer is prepared to wait for the item to arrive in
stock.

Table 8.8 shows that Firms A, G and J had the highest number of areas assessed
at ten KPIs. This was followed by Firm C (second highest), and Firm I (third highest).
Firms D, E, F and H had a relatively low number of assessment areas for cost. The
availability of useful information such as cost performance indicators and the firm's
planning processes is critical to enhancing cost competitive strategies. The
identification of costs and its components are essential for management to effectively
manage logistics operations in warehousing and distribution. Based on assessing and
tracking such costs, management can plan for budgets, develop strategic plans and set
standards to judge performance. Firms aim to minimise total costs through reducing the
unproductive processes. Cost considerations drive a host of strategic decisions such as
outsourcing of infeasible operations and downsizing. Firms should seek to reduce
labour and materials costs. By increasing speed and certainty of operation, service can
be improved with total costs reduced.

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8.3.3.3 Assessing asset management (F3.3)

The asset management indicators identified were mainly targeted at inventory utilisation and management. They helped firms to identify how efficient they were in storage, maintenance and control of stock. The returns on assets and investment helped in tracking and achieving cost control for the firms. From Table 8.7, the most used indicators were inventory turn and return on investment, with 60% of firms using them. Inventory turn and ROI referred to the number of times inventory turned over during a one-year period and the value that the business receives above the total amount that was put into a venture respectively. The next most used measure was economic value added (EVA). EVA captures the true economic profit of the firm, most directly linked to the creation of shareholder wealth over time. Only two firms adopted inventory classification where stock was grouped by classes or categories.

Table 8.8 shows that Singaporean firms placed more emphasis on assessing the management of assets than the Australian firms. Firms C and J had the highest number of indicators as compared to the other firms. Firms B and E did not assess any of the performance indicators identified, whilst Firms D and F only indicated one area, and Firm A, two areas. As companies seek ways to operate more efficiently, the management of assets is considered to be of increasing importance. One aspect is inventory management performance. Since inventories represent a significant investment by many firms, and with annual carrying costs typically ranging from 20 to 40 percent of inventory value, managing them well is a top-management priority (Ballou, 2000). The alternative is to reduce inventory levels. Reducing inventory levels without an accompanying core business change can result in increased logistics costs that can offset the benefit of inventory improvements. Firms improving financial performance mandate the return on assets. There is a need to predict how managerial changes will influence the return a firm will earn on its assets and how it impacts net worth (Stapleton et. al., 2002).

8.3.3.4 Assessing quality (F3.4)

Quality examines an output or the process by which an output is produced. Quality is indicated by attributes such as accuracy (or error rate), thoroughness and complexity. Eight performance indicators were identified in Table 8.7. They focused
on some of the important operational aspects of firms. The quality of some processes could be quantified and measured. The most common indicator used by firms was picking and despatch accuracy. 80% of firms assessed how able they were to correctly pick and deliver the right orders to customers. Table 8.8 depicted again that the Singaporean firms assessed more areas than Australian firms. Firm G assessed more for quality than the other firms. They used all eight performance indicators identified. Firm D on the other hand, had the least indicators for quality assessed. To measure quality, both hard and soft measures should be adopted. This study did not attempt to analyse the quality aspects in detail, although some of the firms adopted quality systems and quality management practices. Only some operational aspects of the warehousing and distribution processes which could be quantified were analysed. There is a need to obtain information on quality performance from the customer perspective, to assess if satisfaction levels can be attained. Quality indicators are relatively important for innovation, and help to improve the overall effectiveness of the firm.

8.3.3.5 Assessing productivity (F3.5)

Productivity quantifies the outputs and inputs of an organisation and expresses the two as a ratio. Generally, the indicators were expressed as output to input. Nine performance indicators for productivity were established and investigated. From Table 8.7, majority of the firms measured warehouse labour productivity. This refers to the efficiency of employees at the Distribution Centre. Labour productivity is the ratio of output to labour input (hours worked). The second most used indicator was order entry productivity, measuring productivity in terms of the time taken to act upon a customer’s order once received. From Table 8.7, it can be seen that there were not many firms assessing productivity aspects in the warehousing and distribution functions. Most of the indictors that were identified had only three or fewer firms adopting them. The Singaporean firms had a relatively higher number of indicators to assess productivity than the Australian firms. Table 8.8 shows that Firm G has the more areas assessed for productivity than the other firms. Firms C and J had some five indicators, whilst the other firms only used two or fewer indicators. Productivity measurement is relevant for the internal control of firms. Productivity measures can help to set benchmarks for assessing operations and to improve the utilisation of resources. Firms can then accomplish improvements for competitiveness. They are tools to guide in using resources more efficiently for the overall performance and innovation of the firm.
8.3.4 Discussion

The analysis has found that Singaporean firms placed more prominence in evaluation, measurement and use of performance indicators. Performance measurement is encountering increasing interest in firms. This is due to the broadening spectrum of performances required by the present-day competitive and dynamic environment of logistics. There is the need to support and verify the performance improvement agendas. Firms are required to be pursuing several performances at the same time. This could refer to the increase in the service quality with lower costs and shorter lead times. By using a multi-faceted approach, adopting a mixture of cost and non-cost, quantitative and qualitative measures, firms can develop an appropriate measurement system to enable them to link their capabilities, competencies and performance for innovation. The different areas of assessment should not be viewed as divergent and contradictory, but supplementing each other. Authors in the literature have supported the application of performance measures as useful diagnostic tools. It allows for better decision making, providing management with information to better monitor and control functions, systems and processes in Distribution Centres. In conclusion, this research question has identified that the ten firms have engaged in performance assessment to ensure that Continuous Innovation can be implemented extensively, given the capabilities, behaviours and competencies.
8.4 Research Question 6

*What links do firm contingencies have with the drivers, performance measures, capabilities, behaviours and competencies?*

![Contingencies affecting Innovation diagram]

8.4.1 Introduction

The ten Distribution Centres selected for this study were different in nature. Each firm displayed individual characteristics which influenced its operations, strategy and innovative capabilities. As highlighted in previous sections, all the firms possessed capabilities, behaviours and individual competencies for innovation in logistics, but they were distinct. There is a need to determine whether the differences in performance improvements can be explained based on selected firm characteristics. For instance, there may be a possibility that the differences in logistical performance can be attributed to size. Larger firms might be able to commit more resources and demonstrate more commitment to innovation. According to the model proposed in Sections 4.6 and 5.4.8, contingencies are firm specific, and may have an effect on firm innovation at a point in time. All contingency factors, drivers and performance measures were included in the survey questionnaire. Information pertaining to the capabilities, behaviours and competencies were obtained during the interviews.

This section analyses if the contingencies had any influence on firm approaches to Continuous Innovation. It identifies the differences in some factors and the possible links and influences between them. This was analysed using NVivo software to organise and present the data in a comprehensible fashion. In NVivo, node attributes were created pertaining to the data. The column attributes comprised Firms A to J, whilst the row attributes comprised all the contingency factors, drivers, capabilities, behaviours, competencies and performance measures. The node explorer presented the data in the form of a matrix. The information was keyed in as 1 (if present) and 0 (if
absent). This transformed the information into quasi-quantitative data for analysis. From this matrix, analysis was conducted to detect any links or relationship between the factors. The matrix allowed the firms to be conveniently grouped according to different factors such as size, function, ownership or extent of globalisation. For some aspects, firms were also ranked and arranged correspondingly in the spreadsheet to identify any links to other factors. In addition, the firms were clearly segregated to distinguish between the countries and to identify any important issues. This matrix was subsequently downloaded into a Microsoft Excel spreadsheet for printing and attached as Appendix 8A.

Pattern matching was carried out manually to investigate any co-occurrence of the factors elsewhere in the spreadsheet. Each factor of the contingencies was carefully scrutinised and pattern-matched with the drivers, capabilities, behaviours, competencies and performance measures. For example, Firms D, E and I were the only three firms that were single privately owned businesses. The spreadsheet segregated the three firms into a separate column. A manual pattern match was conducted to analyse if these three firms had unique behaviours, capabilities, competencies, drivers or performance measures which made them different from the other firms. This is presented according to some important factors where significant differences, similarities or deductions were formed in this section.

8.4.2 Function of firms

The ten firms comprised five different functions. This was illustrated previously in Section 6.6. There was only one firm (Firm G) that dealt with manufacturing, assembling, warehousing and distribution of raw materials. The matrix depicted the relationship of this function between other contingencies such as ownership, inter-firm relationships, knowledge accessibility and some behaviours in the model.

Firm G was the only publicly owned independent company. It relied heavily on many inter-firm relationships including technology joint ventures, R&D partnerships and other strategic alliances. Apart from that, the firm was the one that accessed new knowledge developed at universities, research centres, government organisations, professional institutions and other companies most frequently, as compared to other firms. Firm G regarded these institutions as important partners and was actively
involved in joint research activities with them. The firm also had the most performance indicators for Customer Service, Cost Management, Quality and Productivity.

The firm identified new and different ways of satisfying customers through pricing, quality and delivery of products and services. It was unique from other firms by customising the production schedule and Vendor Management Inventory system to suit customer needs. In addition, it engaged in joint investments with partners for this system. The organisational policies and procedures targeted manufacturing as one of the key areas. These points were not evident in any of the other firms interviewed. Because there were manufacturing facilities at the location, Firm G had the second most areas of automation among all the firms.

The second type of function was warehousing and distribution of raw materials and finished goods possessed by Firms H and I. The only apparent correlation was that these two firms did not indicate customer focus as their drivers for innovation, whilst all the other eight firms did. This could be attributed to the fact that these two firms set up a service department or competency centre within the firm, with competent staff to handle customer issues. This behaviour was highlighted in Section 7.5.1.2. Secondly, Firms H and I dealt only with warehousing and distribution. They had mediocre automation evident in their operations, as compared to other firms. They were not involved in any assembling, import or export functions. Both firms reported three areas of automation, as elucidated in Section 7.5.4.1.

Firms B and F were involved in assembling, warehousing and distribution of finished goods. Both firms had been in operation for five years and were the only ones to use international standards as benchmarks. The other functions did not show any correlation between the other contingencies or factors.

It may be possible to link the fact that since Firm G was the only company that included manufacturing in its functions, the managers regarded knowledge and information from external sources to be extremely important for their operations and efficiency. It also explains the fact that they had many inter-firm relationships for this purpose. Secondly, it might be indicative that manufacturing firms may need to have more accurate and thorough performance measurement system, since they are involved
in production methods. They needed to ensure maintenance, speed and efficiency in the various areas. As a result, cost, quality and productivity were crucial and had to be evaluated. It is concluded here that the firm function had some correlation with the innovative capacity of firms. The more functions a firm was engaged in, the more relationships it needed with other organisations or institutions for collaboration, knowledge and information. In addition, more functions could possibly require more automation to be innovative, and eventually more performance indicators.

8.4.3 Ownership of firms

The different types of ownerships in firms did not show any correlation between the other contingencies or factors examined. Only Firm G which was a single company in public ownership showed some co-occurrence with its function, performance measures used, and behaviours supporting customer satisfaction. The ownership structure had no impact on the innovative capacity of firms in this study.

8.4.4 Annual turnover

The annual turnover figures of the firms were ranked from lowest to highest, to analyse if there were any patterns or trends with the other factors or contingencies. Only the firms with the most and least turnover had some apparent correlation in this study. The firm with the least turnover was Firm D. It correlated with other contingencies such as size, years of operation, knowledge accessibility and labour turnover. The matrix also depicted the lowest ranking for Firm D in those contingencies. It was the smallest firm with 11 employees, and had been in operation for only six months. In addition, the firm had yet to access any knowledge from universities, research centres, government organisations, professional institutions and other companies. The managers indicated nil contacts with external organisations and had the lowest labour turnover. This might be due to the fact that Firm D was relatively new in operations, and had not established contacts and relationships with external organisations yet.

The contingencies of Firm D showed other links with some of the behaviours supporting firm capabilities for innovation. Based on the Section 7.5.3.6, the firm did not have any form of operational synchronisation or interface with their suppliers and customers. Firm D still maintained the traditional method of receiving orders through
telephone and facsimile. There is no doubt that the firm was still in its initial stages and had not reached maturity. Due to this fact, the company vision focused on growth as most important when compared to the other firms. The firm used the least number of performance indicators for assessing customer service and quality in its operations. For the assessment of human resource management, the manager indicated that they did not provide comparable compensation and benefits packages as with industry or competitors. Once again, this could be due to the fact that the firm was relatively inexperienced. Nevertheless, Firm D had a relatively wide area of technology deployed. The managers rated the average rate of depreciation for the equipment and facilities to be the lowest at 5% per annum.

In comparison, Firm C had the highest turnover of stock among all the firms interviewed. The only co-occurrences discovered were that it had the highest number of employees and the most years of operations. It was also evident that Firm C had the most areas of automation in its operations. With large revenues every year, the firm could afford to deploy more effort in maintaining customer satisfaction. The managers disclosed the imperative of cultivating and perpetuating relationships with customers for continued services. This was done by staying constantly in touch with them and monitoring them, as illustrated in Section 7.5.1.2. The managers in Firm C stated that to provide for future growth and expansion in operations, they were prepared to relocate the Distribution Centre to another location. Firm C was the only firm that had the resources for this provision. This fact could be attributed to its large revenues, high number of employees and saturation of land space at the existing site.

With the pattern links and correlation of this contingency to the factors of Firms D and C, it might be indicative that the turnover of firms was affected by the firm size and the experience of the firm in the industry. Firms with high turnover were able to invest in automation, or spend more resources for satisfying customers, operational growth, efficiency and innovation.

8.4.5 Globalisation

This section is grouped into five areas. The globalisation of firms included where the logistics services were provided; where the Distribution Centres were located;
where innovative efforts normally took place; where the firms obtained their plant, machinery and equipment; and from where the employees were recruited.

8.4.5.1 Where the logistics services were provided

There were some correlations in the contingencies depicted by the matrix. Firm A was the only firm that provided logistics services limited to one particular state. It showed association with other factors in the globalisation contingency. It was obvious that Firm A had its Distribution Centre located at a single site, where its innovative efforts took place as well. It obtained its plant, machinery and equipment from a limited part of the country. There was a link with this to customer interface complexity for Firm A. It was the only firm that indicated a complex customer interface. Although it had customers from one region of the country, there was high specificity of expectations with some subtle and equivocal dimensions of significant importance. This meant putting in more endeavours to satisfying them. The firm was relatively small at 36 employees. This could be the reason why it confined the services and operations to a limited area. Similarly, since the firm was serving a small area, its company mission focused on market leadership. The firm had intentions to dominate competitors and become the preferred supplier of hardware, timber and appliances to project homebuilders and construction builders in the area.

A co-occurrence that arose from the matrix was the capability on technology. Firm A was the only firm without automation at its Distribution Centre. The operations were still employing manual labour and dealt with a lot of paperwork. It was also the only firm where stock location was possible for employees to know and assign products according to their knowledge and familiarity with the Distribution Centre. Other firms used product code, random sequencing via computer, or barcoding for instance for location assignment. This point was further linked to Firm A’s driver for change. The most important factor causing the firm to embark on change was to keep up with technology. This was clarified in Section 7.5.5.1. Furthermore, the customers and suppliers were exerting pressure on the firm to upgrade using technology. Section 7.5.3.1 indicated the general manager’s comment of being compelled to stay abreast with some large suppliers in terms of automation and computerisation.
Another capability that was significant in Firm A was collaborating with its suppliers. Only Firm A jointly invested in marketing projects as compared to other firms. Since the firm only served a small area, the managers could understand the needs and wants of customers better. They provided advice and assistance to their suppliers with the advertising of building materials and new product launch. Firms B, D, E and H provided logistics services throughout the country. It was also indicated that innovative efforts took place at more that one Distribution Centre in the country. The only common behaviour among these firms was that all four firms purchased extra or adjoining land space to provide for future growth and expansion of the Distribution Centre. Firms C, G, I and J provided logistics services globally. These four global firms had a relatively higher assessment for Asset Management. There were more performance indicators in this area, as depicted by the matrix. It can be inferred that such firms dealing with global customers, needed more assets. As a result greater endeavours were required to manage them efficiently.

8.4.5.2 Where the Distribution Centres were located

The analysis of this factor showed that firms with Distribution Centres located at more than one site within a country used less performance indicators for Cost Management. The importance of cost management was to provide business control and radical improvement of the firm's processes, analyse and manage a wide range of cost and risk-related issues. There may be a possibility that Firms B, D, E, F and H capitalised on providing efficient services. They located their Distribution Centres throughout the country, and possibly had been particularly effective in managing costs. They did not have many complex issues such as those dealing overseas. As a result, these firms did not require assessing as many areas when compared to other firms. The other firms (apart from Firm A) had Distribution Centres located in more than one country. There were more performance indicators used to assess cost. This might be indicative that there were more cost issues to consider and evaluate when operating Distribution Centres in more than one country or globally. These may include issues such as communications, transportation management, shipment tracking, tracing or event management, import, export, freight-forwarding and customs clearance.

Firms G, I and J had Distribution Centres located globally. The correlation that was highlighted is that all these three firms needed to facilitate the competency of
effective communication within the Distribution Centres. As reported in Section 8.2.3, the managers indicated that employees at the Distribution Centre did not have many opportunities to communicate with other employees because of different locations. They tried to improve communication internally within the Distribution Centre by providing interaction areas and organising more activities to increase morale, participation and interaction between employees. Another correlation of this factor was on the resistance to change. All three firms faced resistance to change mainly from middle management. (However, there was also the exception from Firm D which stated this. But with only 11 employees, it did not pose a conclusive significance). The similarity between Firms G, I and J is that they were all Singaporean firms. A possible reason for the resistance by middle managers could be the level of motivation and empowerment given. Section 8.2.5.3 discussed the conservatism and bureaucracy in Singaporean firms for empowerment. Being global firms, top management may have maintained some autocracy since they were located overseas. As a result middle managers may be less involved in decision making or strategic issues, causing some resistance.

It is possible to infer that those Distribution Centres operating in more than one country require additional measures for cost management and control. Innovation is an organisation-wide process involving employees at all levels. Resources, systems, processes and investments are deployed most of the time. One of the important aspects is to effectively manage cost for successful innovation to enjoy competitive advantage.

8.4.5.3 Where the innovative efforts took place

There was a direct correlation between where the Distribution Centres were located and where innovation occurred. Those firms that had innovative efforts occurring at a single site, had Distribution Centres located within the country. Firms such as B, D, E and H which provided logistics services throughout the country, had innovative efforts occurring at more that one site within the country. Similarly, Firms G, I and J had innovation efforts occurring globally because the Distribution Centres were located globally. It is possible to conclude that innovative efforts took place at the Distribution Centres regardless of where they were located. The only exception was for Firm F. It had Distribution Centres located throughout the country, but indicated the
innovative efforts taking place mainly at one site only. This was because management and senior personnel were located at the site, as clarified by the managers.

8.4.5.4 Where the plant, machinery and equipment were obtained

Nine firms obtained their plant, machinery and equipment from various sources except for Firm B which did not obtain any plant, machinery or equipment. Firm A obtained plant from a limited part of one country, whilst Firms D and E sourced plant from throughout the country. Firms C, I and J sourced from a few different countries and Firms F, G and H globally. There were no correlations apparent on other factors based on this. It could be concluded that there was no effect of where the firm obtained plant, machinery and equipment on innovative efforts.

8.4.5.5 Where the people were recruited

The firms that recruited their employees from within the country did not have meaningful correlations. The managers in Firms F, G and J indicated they had employees recruited from overseas, with some of them on temporary or contract basis as part of maintaining a flexible workforce. The other firms did not adopt such an approach.

Firm I was a large, private business operating worldwide in 70 countries, and the only firm employing people globally. They faced a rather complex customer interface. It was moderately difficult to define those expectations and there was variation in customer expectations. This can be explained by the fact that Firm I was a Swiss company and served many global customers and suppliers. Many of them were from Europe and communicated in foreign languages such as German, French and Dutch. There was variety of expatriates on secondment at the firm to assist in dealings with various countries. This is confirmed by the fact that a competency centre with specialised staff was set up to handle each customer account. (See Section 8.5.1.1). Moreover, Firm I had the second highest turnover and size.

In the assessment of leadership, it was indicated that management did not communicate and implement organisational goals and objectives adequately. This posed an area for concern that perhaps by operating globally, it was difficult to communicate goals and objectives effectively among subsidiaries. The recruitment of
foreign employees could contribute to miscommunication due to different cultures, work practices, or language barriers. This might have caused the perception that management did not communicate the business strategies effectively in Firm I.

Overall it can be conclusive that where the firm recruited its people had some effect on its innovativeness. Firms that recruit employees globally normally served global customers. By recruiting employees that were familiar with such customers, the firm would be better able to satisfy customers' needs and enhance this capability.

8.4.6 Process complexity

There was a direct correlation between process complexity and the annual turnover of firms. Firms B, D and G had a very simple process for their warehousing and distribution functions. There were few steps, and the relations between them were simple and clear. It also showed co-occurrence that these three firms had the lowest annual turnover among the ten firms. With reference to Figure 6.4, these three firms did not earn much revenue in relation to their size. It might be indicative that Firms B, D and G were not efficiently utilising their resources. It may be postulated that the firms operating with more demanding systems and processes may be able to reap higher returns for the effort and risk they put in, whilst effectively deploying human resources to their fullest potential.

The other seven firms however indicated a rather complex process with several steps needed. Some of them were inter-related and not at all straightforward. Concurrently all these firms accessed knowledge occasionally from external sources such as universities, research centres, government organisations, professional institutions and other companies. The firms had sporadic contacts with such institutions and occasionally received some useful information from them. It might be concluded that the firms operating with complex processes felt the need to constantly obtain information and knowledge from external sources to maintain efficiency and innovate. In addition, these seven firms had a higher turnover in relation to size as depicted previously in Figure 6.4.
8.4.7 Technological complexity

This section examined the possibility that technological complexity could influence the performance or results of firms. Perhaps the use of advanced or complex technology can be attributed to differences in firm size or ownership such as multinational companies, or firms with high turnover. Surprisingly, the analysis showed that there were no correlations found based on this. Four firms (Firms A, B, D and H) used a few closely related core technologies, whilst the other six firms used many core technologies, of which some are similar. There were no co-occurrences in the other contingencies or factors.

8.4.8 Customer interface complexity

Customer interface complexity referred to the extent where different customers had different expectations, and how easy it was to define those expectations. Seven firms indicated that their customer interfaces were simple with little variation in customer expectation existing. Almost all performance dimensions were easily measurable. The fact associated with these seven firms was that they all constantly reviewed and evaluated the impact of training and development on performance. It can be inferred that since it was easy to define and meet customer expectations in these seven firms, employees could be adequately trained and developed to satisfy customer needs. As a result, the assessment in the management of human resource in these firms corresponded with how well they could meet customer expectations.

Firm I faced a rather complex customer interface, where there was variation in customer expectations. This meant that the employees had to put in more effort to maintain customer satisfaction and accommodate to their needs. Chapter Seven previously indicated their unique strategy, whereby they designed focused attention on their customers by assigning specialised staff from a competency centre to handle each customer and obtain information from them. (This was highlighted in Section 7.5.1.1). A correlation to this could be the high turnover that Firm I reaped as a result. It had the second highest turnover amongst all the ten firms. Firms A and E faced complex customer interface, with high specificity of expectations. However there were no correlations with the other factors for this.
8.4.9 Inter-firm relationships

This section analysed the extent the firm relied on inter-firm relationships, and if there were any consequences of that. There were no co-occurrences among the firms in this regard, except for Firm G which relied heavily on other organisations. The firm indicated extensive relationships, including technology joint ventures, R&D partnerships and other strategic alliances. This correlated with the other contingency where the firm accessed knowledge very frequently as compared to other firms. Firm G regarded these organisations as important partners and was actively involved in joint research activities with them. As a result, the management could assess more areas in Customer Service, Cost Management, Quality and Productivity. The firm had the highest number of performance indicators in those areas. It might be indicative that the more relationships the firm had with external organisations, the more they collaborated with them to engage in improvements and innovative efforts.

8.4.10 Knowledge accessibility

Knowledge accessibility measured the contacts with external organisations to obtain new or useful knowledge from these sources. Seven of the firms had occasional relations. This point correlated with process complexity in Section 8.4.6 and was highlighted there. Only Firm D had no contacts due to its short time of operations in the logistics industry. Firm B rarely had contacts with external organisations to obtain knowledge, as correlated with Section 8.4.5.4, where it did not obtain any plant, machinery or equipment. Only Firm G had the most frequent contact, and the correlations with other factors were elucidated in Section 8.4.9. It may be inferred that the knowledge accessibility of the firm depended on the extent of relationships it had with other firms. The more knowledge the firm accessed, the more it was inclined towards innovative efforts.

8.4.11 Labour turnover and trade unions

These two contingencies had no correlations with any other factors as analysed. Therefore, it may indicate that there was no impact of these contingencies on innovative efforts of the firms.
8.4.12 Discussion

Based on the above analysis, there were limited influences of some of the firm contingencies on various factors. Contingencies are firm characteristics that may influence the strategies, behaviours and competencies of firms, all of which contribute to innovative capabilities and performance measures. Though some of the performance measures showed correlations, the analysis was unable to establish any correlations with the drivers for innovation with firm contingencies.

There was also some limitation in measuring the correlation between the firm contingencies with the factors. This was because some of the information pertaining to capabilities, behaviours and competencies could not be easily quantified or ranked among firms, due to the qualitative nature. There was limitation in measuring the magnitude or extent of behaviours. Much information pertaining to the factors was only illustrated with examples cited from managers during the interviews and survey questionnaire. Nevertheless, there were some useful findings that arose from this analysis based on the existing information.

From the analysis, it can be concluded that certain contingencies had an effect on the capabilities, behaviours, competencies and performance measures of the firms interviewed. The firm function had apparent correlations to the innovative capacity of firms. The more functions a firm was engaged in, the more relationships it had with other organisations or institutions for collaboration, knowledge and information. In addition, more functions possibly required more automation to be innovative, and eventually more performance indicators. The ownership structure had no impact on the innovative capacity of firms. However the turnover of firms was affected by the firm size and the experience of the firm in the industry. The firms with high turnover were able to invest in automation, or spend more resources for satisfying customers, operational growth, efficiency and innovation.

The extent of globalisation apparently had some impact on the innovativeness of the firms interviewed. Where logistics services were provided to a limited area, the Distribution Centre was located in the area and innovative efforts occurred there, with minimal automation. It may have caused the firms’ mission to attain market leadership and dominate the area. Globalisation inferred more assets, larger firm size, and more
Distribution Centres located in various countries. It possibly implied that more cost management was required in those firms. In addition, effective communication was needed throughout the organisation, with more empowerment to increase morale, and minimise resistance to change.

The analysis showed that innovative efforts occurred in all the Distribution Centres regardless of where they were located. Also, there was no effect of where the firm obtained plant, machinery and equipment on innovative efforts. However where the firm recruited its people affected the capability to satisfy customers. Those firms that served global customers, recruited employees globally who were trained and competent to achieve the capability to satisfy customers.

There was a direct correlation between **process complexity** and the annual turnover of firms. The more complex processes the firms had, apparently the more revenues they had in relation to size. Secondly, the firms with more complex processes seemed to have more relationships with external organisations for knowledge, collaboration and resources to innovate. **Technological complexity** did not affect the innovativeness of the firms. There was a correlation between **customer interface complexity** and the ability to train and develop employees to satisfy customers. The analysis showed that the less complex it was to satisfy customers, the more firms assessed training and development of employees which could lead to innovativeness in the firm. It might be indicative that the more **inter-firm relationships** the firms had with external organisations, the more they collaborated with them to engage in improvements and innovative efforts. Similarly, greater **knowledge accessibility** could mean more inclination towards innovative efforts. **Labour Turnover and Trade Unions** had no correlations with the firms’ performance or strategies, and therefore may not affect innovation.

The correlations of the contingencies with the other factors were important as they provide some insight as to how firms differed in strategies and effectiveness to innovate. In addition, these posed some significance for management in considering and assessing innovative efforts. It supplements a thorough understanding and in setting goals and strategies.
8.5 Conclusion

This chapter looked at the final three research questions. It investigated the competencies, performance measures and contingencies of firms and answered the corresponding research questions. Once again the analysis has established that they were present in the firms interviewed. Each firm possessed the factors, but to varying extents.

Managers verified all the competencies as existent in their firms. They established this through examples and issues pertinent to their firms. It was clear that management had the mindset of innovation, equipped with the knowledge and aptitude to set goals. These were translated into strategies. They assisted in fostering an environment conducive to exploiting the skills and abilities of employees such that competencies were apparent. These complemented innovative efforts. In addition, all the firms had flexible structures, allowing for communication and diffusion of information and new knowledge. Employees enhanced their skills and abilities through training and development, especially in Singaporean firms. Cross-functional teams were more prominent there, whilst empowerment appeared more in the Australian firms. All employees demonstrated flexibility and multi-skilling to better cope with changes and work demands. They participated by providing feedback and suggestions for improvement.

The analysis in this chapter also established that appropriate measurement systems were evident in the firms. Performance measures were carried out to support and verify innovative activities. This was to enable them to link their capabilities, behaviours and competencies for innovation. Management reviewed their strategy continuously. Most of the firms indicated using better quality data and an improved system over the years. They were used to tracking operations, develop corrective actions, and prevent future mistakes. The analysis found that there were relatively more areas of assessment and the use of performance indicators in the Singaporean firms.

The last research question established the correlations between contingencies and the other factors. It was important to understand the influence on strategies, behaviours and competencies of firms. Contingencies had some impact on innovation in the firms. The difference in firm capabilities, behaviours, competencies and
performance measures could be attributed to the differences in firm characteristics. It can be concluded that each of the ten firms selected in this study was diverse in nature, faced differing situations and environments, had different extent of competencies, capabilities, behaviours and performance measures and as a result, engaged in various strategies for innovation.
CHAPTER NINE
CONCLUSION

~ The challenge is not to keep your eye on big competitors. It is to pay attention to the innovators. (Dave Duffield) ~

9.1 Introduction

This study set out to explore how Distribution Centres providing logistics services improved through Continuous Innovation. The term ‘Continuous Innovation’ has been used to describe the process of how firms successively applied new ideas and methods of improvement in processes and systems throughout the organisation. It was a concept that required a methodical, programmed, incremental and/or radical approach involving employees at all levels in the organisational structure. The study was carried out by adopting concepts from innovation theories in the literature and through the exploratory CIMA model. It incorporated some important concepts that various authors have written on logistics capabilities and behaviours. In addition, a new model evolved in this study incorporating some variables from the CIMA model. The CIMA model could not be readily applied to this study, due to its development for manufacturing organisations, mainly within new product development. Its focus was on manufacturing process and innovation. Furthermore, the use of the CIMA model possessed some limitations, in that there was not enough attention placed on the specific activities needed to form firm capabilities. A set of pre-identified behaviours was used in the CIMA model to investigate if firms possessed them for improvement activities. There was a need to explore more deeply into the competencies of individuals which may affect such behaviours.

This study identified, evaluated, and contrasted the factors in the selected ten Distribution Centres in Australia and in Singapore. By adopting the model, it identified how these firms were able to put into practice the concepts and factors for Continuous Innovation in their operations and processes of warehousing and distribution. A set of capabilities, behaviours and competencies were identified pertaining to service industries, and used to investigate firms in this study. In the analysis, observations and comparisons were made between individual firms and in the two countries.
The central research question was formulated and discussed. To complement in answering the central research question, six research sub-questions were constructed to investigate the findings based on the model framework. Each of them identified with one of the six components in the model respectively. A reflection on the research questions and findings is covered in Section 9.2. Subsequently, Section 9.3 reflects on the proposed model. Section 9.4 reflects on the limitations of the study and design of the methodology. Many lessons can be drawn from this study, both for theory and for practice. Section 9.5 discusses the contribution of this research to the theory and practice of service innovation, and points for further research.

The results of this study lead to the conclusion that although the model and methodology are not perfect and there is a need for further research, they offer worthwhile as gateways towards validation of the model as a management and analysis tool. The model offers the opportunity to describe and analyse the process of how service firms can engage in Continuous Innovation by deliberating on the prescribed variables. The model could also initiate future research in service sector organisations with some improvements and modifications. Firms possessing the necessary competencies, behaviours and capabilities for Continuous Innovation could also be directly compared with other firms.

9.2 Reflections on the findings

9.2.1 Drivers of Continuous Innovation

The first research question was aimed at providing insight into factors causing firms to embark on innovative strategies. To provide the answer, the strategy was to analyse data from the survey questionnaire. Managers were requested to fill in the questionnaire and rank the drivers of innovation in the firms. The factors that were highlighted could be grouped into seven categories due to their similarities. It was discovered that the Australian and Singaporean firms embarked on innovative strategies mainly for customer satisfaction, financial motives and to become more competitive. These three factors were the highest in priority for the firms interviewed and were mentioned most frequently.

However, the drivers of innovation among the firms varied because each firm had its own motives or underlying aspects causing the desire to improve. The analysis
also showed that the firms embarked on innovation projects for a variety of reasons. These could be grouped as internal and external motives, as well as push and pull factors. The drivers of innovation identified were mainly pull factors, rather than push factors. Further analysis depicted that the Australian firms innovated more for external motives, whilst the Singaporean firms chose to innovate for internal reasons. Overall, it was found that all the Distribution Centres had some form of inducement or encouragement and engaged in innovative activities.

### 9.2.2 Capabilities for Continuous Innovation

The strategy of this research question was to identify and evaluate the organisational capabilities of the selected firms. Capabilities are considered hard to imitate and distinguish an organisation from its competitors. Ultimately, they are visible to customers who can identify suppliers as the most prosperous and reliable in providing good quality and value in services. The analysis found that all the ten firms identified with the six capabilities necessary for Continuous Innovation. They had been based on what was found in the literature. No additional capabilities were mentioned or brought up by the managers during the interviews. They supported these capabilities as being present and gave examples of such instances in their Distribution Centres.

All ten firms possessed the capability of satisfying customers. The managers maintained the need to continuously satisfy customers and took the necessary measures to achieving it. It concerned understanding the end customers, how to provide value and efficient services in order to retain customers. The issue of customer segmentation arose, as managers reinforced the need to provide the different types and levels of logistics services required by different customers. Additionally, the firms had innovatively kept up with such changing needs to maintain customer satisfaction because of rising affluence, competition, market conditions and other factors. These were highlighted in the analysis in Chapter Six.

The firms also integrated their internal operations to support customer requirements. This was revealed through the various strategies deployed by the firms as reported in the analysis. Managers illustrated attempts where the firms synchronised processes, systems and functions, taking into account the industry and customers' needs. The firms coordinated their resources and efforts using a holistic approach so as
to achieve competitiveness. It was also found that cross-functional structures gave rise to more empowerment, use of teams, better communication and information sharing. Operations were streamlined, where firms redesigned work processes and systems to allow for coordinated efforts and internal integration.

Besides focusing on the internal strategies and operations of firms, the Distribution Centres also displayed evidence of external synergy. The firms reached beyond their organisational boundaries, and utilised the resources of suppliers and customers to be more effective in their service provision. The firms demonstrated integration, cooperation and collaboration with partners in the supply chain. Managers explained this through sharing information and resources. The issue of trust arose since the firms depended on collaborative linking externally with partners. It was highlighted in the analysis that the firms took specific actions to develop networks, invest in capital and make strategic decisions. Such a strategy enforced competitive advantage and scope for innovation.

The fourth capability identified was the ability to manage technology for more efficient operations. Some managers recognised that technology could be a source for innovation to occur. By using feasible and affordable automation, they can meet customer satisfaction, satisfy management and provide a competitive advantage for the firm in industry. The analysis found the common forms of automation to be EDI, barcoding, systems for order entry, order processing, inventory management, vehicle routing and scheduling, and real time communications. On the other hand, some managers stated that complex or advanced technology was not necessary to guarantee outstanding performance or innovation in logistics. However, they agreed with the view that technology does contribute as a key competitive factor in logistics based on comparisons with major players in the logistics industry.

The ability to change is another capability for Continuous Innovation. It involves the realignment of strategies and operations to provide creative ideas for improvement. Issues that arose concerned the mindset of employees. The firms were positive towards change management. All the ten Distribution Centres had experienced some form of change within the last five years, with most of them experiencing a change in the organisation structure. The managers reaffirmed that they were able to
effectively implement new procedures, processes or systems with the acceptance and cooperation from employees.

Finally, all the firms reviewed their performances periodically. This capability allowed them to monitor their operations, systems and processes to ensure efficiency and customer satisfaction. There were measurement systems in place which enabled the firms to constantly evaluate areas of performance. Only one firm adopted a Balanced Scorecard approach which was considered an extremely comprehensive methodology. It facilitated the communication and understanding of business goals and strategies at all levels which contributed to the firm’s success. The other firms adopted different approaches to evaluate the operations. The managers clarified this and gave examples such as adopting standards of comparison or benchmarks, or following ISO guidelines.

The six capabilities were therefore present in all the firms to varying extents, based on the different strategies and approaches adopted. During the interviews managers also imparted their views and concerns as to the capabilities based on their experiences and perceptions. The issues facing firms had been highlighted in the analysis to form a valid conclusion that although the firms possessed capabilities, each firm was unique in its own way and adopted different approaches to achieving Continuous Innovation. The capabilities could be evaluated by imposing a ranking system or measured in terms of their extent in the firms. This would provide a benchmarking tool that would be useful across logistics and distribution firms worldwide.

9.2.3 Behaviours supporting capabilities for Continuous Innovation

The behaviours supporting capabilities varied to some extent between the firms. The analysis found that not all predicted behaviours were present in all the firms. For customer satisfaction, eight behaviours were identified and investigated. All the firms, except for Firm F, showed those behaviours to be evident. Although each firm showed differences in practices, actions and strategies, customer satisfaction was achieved in some way. The firms confronted the challenges of meeting the needs of customers not only to stay competitive, but probably also to become innovative. Six behaviours were identified for integrating internal operations. Not all the behaviours were present in all
firms. Firms G and I did not provide for growth and expansion. Similarly, Firms E and J did not recently restructure the organisation. The managers of firms believed in the coordination of activities among departments, taking into account the firm’s objectives when integrating internal operations.

The collaboration with partners involved bringing together the resources so as to benefit from cooperative relationships, integration of processes and information systems, and inter-organisational problem solving. The analysis demonstrated that by working together, firms were better able to serve the end customer, and at the same time enhance their own profitability. Also, six behaviours were identified and investigated. A number of firms did not conduct joint investments or share processes with partners. More than half of the firms interviewed did not consider the need to go beyond the contracted responsibilities and clearly defined operations and functions. The management of technology involved two behaviours. Firm A was the only firm that did not automate operations, but maintained information and communication system with the rest of the firms. In the analysis, it was shown that technology may be a strategic tool although not necessary to guarantee innovation. Most of the firms effectively deployed and managed technology to their competitive advantage and to add to customer satisfaction.

In change management, three behaviours were identified which were evident in all the firms. The analysis found that employees were generally receptive to change, with a minority posing varying degrees of resistance. The resistance was however manageable with strategies adopted to minimise such situations. Managers explained the importance of training, communication, feedback, effective leadership and participation to overcome resistance. All firms also reviewed performance and demonstrated the behaviours of developing and maintaining measurement systems. This was to allow for continuous evaluation and improvements throughout the firm.

In the course of the study, the analysis could only conclude if certain behaviours were identified in the firms or not. In future work, the behaviours should also be measured further in terms of frequency and extent of diffusion by ranking on a Likert scale to obtain a more detailed explanation and analysis.
9.2.4 Competencies evident in individuals

Managers reported that employees possessed the identified competencies. They spelt out instances of individuals being experienced, qualified, capable, skilled and trained for innovation. However, based on the analysis, it can be concluded that each firm was distinctive, with stronger emphasis placed on certain areas. They were disparate, given the different strategies and operations firms were involved in. There were several prominent points that surfaced, highlighting differences in firms and particularly the different approaches taken by Singaporean and Australian firms. It was established that Singaporean firms tended to be more conservative in empowering employees and placed greater emphasis on teamwork, formalities and meetings. Training was more widespread in the Singaporean firms. Managers placed greater emphasis on the development of employee skills when compared to the Australian firms.

During the interviews, managers were knowledgeable on the competencies inherent in their employees to create the innovative capabilities in the firm. The biggest challenge facing Distribution Centres was the efficient orientation of employees and demonstration of competencies, especially in this rapid and dynamic logistics industry. Management was conscious of the need to determine and prioritise core skills of employees and ensure that they are competent to perform job responsibilities. From these skills, the analysis revealed that employees could then use innovative strategies. Further research needs to be undertaken to investigate the views of operational employees on the competencies that they possess. Managers tend to give a somewhat optimistic and possibly biased view most of the time, portraying their firms to be successful and innovative. This could further be ranked on a Likert scale as well.

9.2.5 Performance measures to sustain Continuous Innovation

In the proposed model, measuring performances of strategies and operations was necessary for continuous innovative efforts. Performance measurement was apparent in all the ten firms that there was leadership assessment to gauge the control, direction and involvement of management. This was to ensure that managers created, fostered and sustained a climate for Continuous Innovation in the firm. The analysis found that the Singaporean firms conducted leadership assessment more than the Australian firms. Similarly, there were more areas of assessing human resource management, especially
in employee development. The analysis indicated that training and development of staff was more prevalent in the Singaporean firms.

The outcome of strategies, process quality and management, and customer satisfaction were also measured in the selected firms. Performance indicators were adopted for various areas as shown in Chapter Seven. These firms agreed with the importance of measuring across dimensions such as customer service, cost management, asset management, quality and productivity. They pursued and measured several performances at the same time. They developed appropriate measurement systems to enable them to link their capabilities, behaviours, competencies and performance for innovation. Based on the analysis, it was revealed that the Singaporean firms placed more prominence in evaluation, measurement and use of performance indicators. As warehousing and distribution functions in logistics are mainly based on just-in-time management, they should be underpinned by an efficient measurement system for evaluation, planning and improvement. These can then ensure that systems and processes always allow for ongoing improvement and Continuous Innovation.

9.2.6 Firm contingencies affecting Continuous Innovation

The purpose of the last research question was to evaluate if the contingencies or firm characteristics had any effect on the other factors for Continuous Innovation. The research into the relationships between the factors was essentially exploratory, in the sense that the main objective was the refinement of a research idea to facilitate further research. This concept had been previously supported by Kervin (1992). The analysis found that some of the contingencies had some impact on firm innovativeness. Besides the different competencies, capabilities, behaviours and performance measures indispensable in firms, the contingencies also had some effect on the differences in strategies among the firms. The analysis of this provided further insight to the nature of innovation in the selected firms. However, further statistical methods need to be used such as regression analysis to obtain more detailed findings in this aspect and extend the area of research.

9.3 Reflection on the proposed model

The objective of this study was to investigate how service firms providing warehousing and distribution functions in logistics were able to continuously innovate.
Theories and models of innovation were analysed in the literature. It was predicated that specific characteristics of service firms did not allow direct application of traditional models of innovation on service firms. The majority of these models were constructed from the manufacturing perspective. The new model designed for this study can be used as a guide for understanding the components necessary in service firms to embark on Continuous Innovation. This model describes the process of service innovation and incorporates critical aspects.

Each component or variable is necessary for the effectiveness of the model. The drivers ensure that Continuous Innovation is not only achieved, but also sustained over time. They are the energy force within the model. If lacking, no matter how well the other factors have been addressed, there will not be long-term improvements. It is viewed on a firm-based level and also integrates competencies at the individual level. The performance of individual employees needs to be taken into account because they ultimately form the collective behaviour of the firm. It is therefore a dynamic, integrative and holistic model for analysing the current status of Continuous Innovation within logistics organisations.

The analysis has demonstrated that the achievement of Continuous Innovation is far from easy. There are many complex issues within an organisation and it is essential that there is a robust framework against which to assess the success of innovation. Each firm was found to be unique. As a result, there must be a systematic, planned and integrated approach. The proposed model in this study has some scope for improvement. Nevertheless, the use of the model advocated by this study is seen as a first step for, and complementary to, more complex models for service innovation. It is recommended in Section 9.5.3 that further work should be carried out to expand on this research and refine the model to meet the needs of a wider range of organisations in various service industries.

9.4 Evaluation of the research

9.4.1 Evaluation of the methodology

Chapter Five addressed the methodology adopted for this study. It was exploratory in nature, adopting a preliminary approach to collect and analyse primary empirical data. Section 5.5 thoroughly discussed the issues of validity and reliability.
Although all the various methods used had certain limitations, they were carefully reviewed and justified accordingly. It was argued that the construct validity and reliability was satisfactory.

9.4.2 Limitations of the research

As explained in earlier sections, the magnitude of the factors was not taken into account in this study. It was an exploratory study and as such, only investigated if firms possessed them or not, and examples were given to illustrate their application. The responses from managers limited the results to descriptive statistics and some quasi-quantitative data. From the analysis, it was concluded that the ten firms had all the capabilities, most of the behaviours, carried out performance measures, and some employees possessed all the competencies required for Continuous Innovation. It was through the examples given, that the researcher was able to gauge the extent of these factors. It was difficult to compare across organisations in some aspects because the scope of a particular behaviour or capability or competency was not well known. It was difficult to assess which firms were more innovative or successful, and this was not an aim of the study.

Secondly, the data comprised of managers’ perceptions instead of verifiable figures. There was no concrete evidence and the views were taken to be representative. It was also felt that some managers tended to be biased in their standpoint. They were reluctant in divulging pessimistic facts or weaknesses in their organisations. They might have avoided giving the researcher a perception of their inability to manage such activities. Another possible reason could be the managers were rather conservative and maintained the firm’s reputation to be successful. This was despite the fact that they were reassured of the focus of this study being purely academic, and of the anonymity of the organisation. Thirdly, the study of firms was a cross-sectional view and used purposive sampling. The selection of firms was based on the researcher’s judgement as to typicality or interest. There was difficulty in securing firms for this study. Nevertheless, the researcher ensured that there was reasonable cross-sectional view of firms providing warehousing and distribution in logistics. Longitudinal analysis would give a better picture of firm activity. However, such analyses are almost impossible to conduct successfully within the time constraints of a PhD programme. These limitations are acknowledged, but they do not detract from the significance of the
findings. The strengths of the study remain and add to the body of knowledge on Continuous Innovation, for the limitations do not detract from them, but merely provide platforms for future research.

9.5 Implications for firms, theory and future research

9.5.1 Contribution to theory

This study is arguably the first of its kind to investigate Continuous Innovation in Distribution Centres. It contributes to the literature on service innovation. It acknowledges that some of the variables from the proposed model have been adopted from the CIMA model. They were altered to tailor the model for the service sector. The concepts are based in the literature from distinct research areas such as capabilities of logistics. The verification of relationships was limited to the identified capabilities, behaviours, competencies and performance measures. Based on the plethora of literature and innovation models reviewed, only important and original aspects have been included in the model to investigate Continuous Innovation.

The theoretical framework in Chapter Four justified the focus of this study. It highlighted key issues and demonstrated that the literature on logistics was insufficient and lacking in empirical research. The few studies of service innovation did not provide a deeper understanding to innovation as a whole. Issues of concern were found in isolated sections in the literature. Undoubtedly, organisations function within systems and processes encompassing a myriad of factors. More research was needed to examine a broader perspective, comprising organisation structure, strategy, culture, climate, knowledge management, learning behaviours, management, leadership and individual proficiencies.

The findings from this study and the model proposed can address some of the limitations of the CIMA model. This was done by incorporating a more thorough set of behaviours and adding to the body of knowledge. Besides looking at the firm level, the model investigated competencies at the individual level. This proposed model provides a more holistic approach, and serves as a more practical guide for logistics managers than the CIMA model. The findings of this study have added to the literature by providing some insight on the factors that caused and affected innovation in logistics.
firms. The relationship between the factors was also discovered and serves to provide more information on the topic.

9.5.2 Contribution to practice

There are recommendations which flow from this study that will be of particular use in industry. Firms need to assess all factors required for innovation. As stated earlier, each factor is important and should be treated in connection with the other factors. Based on the analysis, results show that firms embark on innovative strategies for a combination of reasons. By using the model as a guide, firms can gauge what their main drivers for innovation are, if they are push or pull factors, internal or external to the organisation. Secondly, they are able to identify the prescribed capabilities, behaviours, competencies and performance measures and determine if they are present in their firms or not. Thirdly, they are able to understand the nature and relationship between these factors, and how they can impact on innovation and the firm's competitiveness. Fourthly, some form of measurement could be developed in measuring the scope and extent of innovation.

Recommendations can be addressed to senior management, who typically take the lead in implementing innovation programmes within the organisation. Firstly, management should address innovation through an integrated approach, taking into account the many factors interplaying with one another. To achieve effectiveness, they have to spearhead efforts, leading the way and be actively involved in all activities. Innovative efforts require individual competencies, motivation and empowerment at all levels in the organisation. It is important for management to acknowledge these and encourage the participation of their personnel. Secondly the resources, especially people, must be matched to the innovation strategy. Be it further training and development, more empowerment, or better communication, management should allocate their resources to sustaining the long-term improvements in the firm.

This model serves as a management and analysis tool, and contributes to industry practice. From this model, a clearer picture is drawn to guide management into the process of innovation within logistics firms with an understanding of the factors and considerations. Managers are able to carry out strategic decisions, observation, analysis and implementation of innovative plans to steer the direction of their firms in achieving
a competitive advantage. There is a possibility of facilitating a benchmarking exercise with more quantitative and statistical data to complement the qualitative findings. This could benefit organisations and help them assess their standing in the logistics industry.

9.5.3 **Scope for further research**

During the course of the research, a number of areas were identified that would merit further investigation. This study was exploratory using case studies as a first hand approach to gain some understanding of Distribution Centres.

9.5.3.1 **Refinement of the model**

The theoretical model can still be used for further research because it encompasses the elements necessary for innovation. However, it is proposed that the methodology deployed be changed, due to the limitations set out in Chapter Five. Instead of relying solely on a qualitative approach, the proposed model should incorporate quantitative, statistical information as well. This is to assist in measuring the extent of innovation to some degree. With a modification to the administration of research instruments and data collection methods, the units of data analysis would then integrate both qualitative and quantitative data that are rich and detailed as possible. There is scope for more research in the following areas as elucidated in the next few sub-sections.

9.5.3.2 **Obtaining statistical data**

In the analysis, there was difficulty comparing across organisations because of the limitations of comparative qualitative data. There is a need to assess the extent of factors in terms of capabilities, behaviours, competencies and performance measures. It is recommended that the variables be measured on a Likert-type scale from 1 to 5, with 1 representing the basic level of practice or performance, and 5 representing world-class
practice or performance. In addition, more data were needed on business performance in terms of competitive success. The profitability, customer satisfaction and market share increase would serve as a gauge on which firms could be assessed as being more or less innovative or successful.

9.5.3.3 Carrying out a positivist research

The survey itself in this study was not designed with the intention of statistical analysis. Since only ten case studies were used as a cross-sectional view, there may be a need for a positivist survey research to generalise findings for Distribution Centres. Firms could be investigated on a larger scale in future. This would facilitate the use of statistical methods to obtain more quantifiable findings in this aspect. The last research question on firm contingencies investigating any correlation could be carried out using computer-aided software, incorporating a larger number of companies. It is suggested that a trial run be conducted, so as to refine the survey questionnaire, the data and scales of measures that are relevant and required for statistical analysis.

Further work still needs to be done to increase the degree of understanding of Continuous Innovation in Distribution Centres. The major activities and factors have been identified. It is possible to develop the understanding of these issues further by looking at the specialised literature. A start has been made with this study, but many issues can be developed further. For instance, this study has only taken into account the viewpoints of some senior managers and middle managers. Perhaps personnel at the shopfloor level should be surveyed as well to obtain their perception and understanding of where the firm stands.

9.5.3.4 Obtaining longitudinal data

The study investigated firms at a particular point in time. External factors such as economic conditions, market fluctuations or government policies were disregarded. By using longitudinal data, further analysis can be undertaken to reflect the firm’s innovative capabilities and competitiveness. For example comparisons can be made with regard the firm’s turnover, profits and key performance indicators over a few years to reflect its true operations and management.
9.5.3.5 Expansion on other service industries

By investigating firms on a larger scale, more scope could be possible to investigate firms in different regions, countries or industries, taking into account the views of different levels of employees in the organisation. It is recommended to expand this research to consider a wider range of organisations in various service industries. The proposed model may need some refinement and expansion. The drivers, capabilities, competencies and some performance measures may be generic and applied to other service industries. However, the behaviours supporting the capabilities may be specific to Distribution Centres providing warehousing and distribution functions. As a result, there is a need to modify the model to suit the exact nature of operations within the industry studied. Preliminary data would have to be collected using observation, field studies, and interviews to gain an understanding of the processes and operations before designing the survey questions and applying the relevant behaviours.

9.6 Conclusion

This original study has gained new knowledge, adding to the body of innovation literature. It has explored how Distribution Centres with warehousing and distribution services are able to continuously innovate, an area that previously was relatively unchartered. Innovation is a complex process, one easily identified as being of critical importance for organisational success, yet not easily managed. The main implication of the study for practising managers is that a continuous incremental improvement strategy is the major driving force behind any improvement effort. With an appropriate framework and strategy in place, managers will be well on their way to achieving an integrated approach for innovative efforts.

This study has provided a framework and an analytical model to guide service organisations embarking on Continuous Innovation. It draws some conclusions concerning the scope and extent of innovation within firms, and establishes that each firm had its own combination of factors, making it distinctive in its own way, being complex enough to avoid easy imitation. The challenge facing Distribution Centres is the need to become more responsive, with high levels of flexibility in delivery. The emphasis should be on the processes and performance which complements profit and market share in logistics. The competitive battleground of the future will be in the fields of quality, productivity, speed and Continuous Innovation.
Appendices

Appendix 2A – Components of the Innovative Organisation

<table>
<thead>
<tr>
<th>Component</th>
<th>Key Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared vision, leadership and the will to innovate</td>
<td>Clearly articulated and shared sense of purpose. Stretching strategic intent. Top management commitment</td>
</tr>
<tr>
<td>Appropriate structure</td>
<td>Organisation design which enables creativity, learning and interaction. Not always a loose 'skunk works' model; key issue is finding appropriate balance between 'organic and mechanistic' options for particular contingencies</td>
</tr>
<tr>
<td>Key individuals</td>
<td>Promoters, champions, gatekeepers and other roles which energise or facilitate innovation</td>
</tr>
<tr>
<td>Effective teamworking</td>
<td>Appropriate use of teams (at local, cross-functional and inter-organisational level) to solve problems. Requires investment in team selection and building</td>
</tr>
<tr>
<td>Continuing and stretching individual development</td>
<td>Long-term commitment to education and training to ensure high levels of competence and the skills to learn effectively</td>
</tr>
<tr>
<td>Extensive communication</td>
<td>Within and between organisation and outside. Internally in three directions – upwards, downwards and laterally</td>
</tr>
<tr>
<td>High involvement in innovation</td>
<td>Participation in organisation-wide continuous improvement activity</td>
</tr>
<tr>
<td>External focus</td>
<td>Internal and external customer orientation. Total quality culture</td>
</tr>
<tr>
<td>Creative climate</td>
<td>Positive approach to creative ideas, supported by relevant reward systems – a ‘winners culture’</td>
</tr>
<tr>
<td>Learning Organisation</td>
<td>High levels of involvement within and outside the firm in proactive experimentation, finding and solving problems, communication and sharing of experiences and knowledge capture and dissemination</td>
</tr>
</tbody>
</table>

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## Appendix 2B – Characteristics/Attributes of innovative employees

### Attributes of Innovators

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Attributes of innovative people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need orientation</td>
<td>Inventors tend to be achievement oriented and lacking resources finds it pays to develop with customer demand, approach potential customers early and adapt designs rapidly (Quinn, 1985)</td>
</tr>
<tr>
<td>Ambivert</td>
<td>A balance of extrovert and introvert, although tending toward introversion (Adair, 1990)</td>
</tr>
<tr>
<td>General interests</td>
<td>A wide range of interests (Adair, 1990)</td>
</tr>
<tr>
<td>Experts and fanatics</td>
<td>Initiators of companies tend to be pioneers in their technologies and fanatics at problem solving (Quinn, 1985)</td>
</tr>
<tr>
<td>Intelligence</td>
<td>Higher general intelligence, information storage, recall and analysis (Adair, 1990)</td>
</tr>
<tr>
<td>Independence</td>
<td>A high degree of independence and self-sufficiency (Adair, 1990)</td>
</tr>
<tr>
<td>Independent Judgement</td>
<td>Autonomy of judgement and resilience to peer pressure on conformity in thinking (Adair, 1990)</td>
</tr>
<tr>
<td>Vivid representation</td>
<td>An ability to draw attention to the unrecognised or unobservable (Adair, 1990)</td>
</tr>
<tr>
<td>Achievement</td>
<td>A particular interest in achievement on problems where their own ability can be a deciding factor (Adair, 1990)</td>
</tr>
<tr>
<td>Curiosity</td>
<td>Prolonged curiosity, observation and listening abilities (Adair, 1990)</td>
</tr>
<tr>
<td>Intuitive and imaginative Conscientiousness</td>
<td>An ability to tune into intuitive feelings and let fantasy in (Adair, 1990)</td>
</tr>
<tr>
<td>Creative tension</td>
<td>Capable of holding many ideas together in creative tension without making a premature resolution or ambiguity and sometimes providing synthesis from disparate notions (Adair, 1990)</td>
</tr>
<tr>
<td>Long time horizons</td>
<td>The time horizons for radical innovation make them tend to underestimate the length of time for success (Quinn, 1985)</td>
</tr>
<tr>
<td>Low early costs</td>
<td>Innovators tend to work with low costs and try to decrease their early risks (Quinn, 1985)</td>
</tr>
<tr>
<td>Multiple approaches</td>
<td>The innovator can tolerate the unpredictable interactions between the discoverer and the outside world, and cope well with unencumbered and informal development (Quinn, 1985)</td>
</tr>
<tr>
<td>Flexibility and quickness</td>
<td>The inventor-entrepreneur can design, test and recycle speedily consequently yielding timing and performance advantages over slow-moving competitors (Quinn, 1985)</td>
</tr>
<tr>
<td>Incentives</td>
<td>The inventor-entrepreneur can envisage tangible benefits and personal rewards if they are successful (Quinn, 1985)</td>
</tr>
<tr>
<td>Availability of capital</td>
<td>If entrepreneurs are turned down by one source, other sources are sought sometimes in creative combinations (Quinn, 1985)</td>
</tr>
</tbody>
</table>
Source: Quinn (1985), and Adair (1990)

Appendix 5A - Pre-interview questionnaire

SURVEY QUESTIONNAIRE
Section A. Company Background and Business Operations

1. Please indicate what best describes your business unit.
   - Manufacturing, Assembling, Warehousing and Distribution
   - Assembling, Warehousing and Distribution
   - Warehousing and Distribution of finished goods
   - Warehousing and Distribution of raw materials
   - Import and Export only of finished goods
   - Import and Export of raw materials

2. What does the ownership structure of the company look like?
   - Single, privately owned business
   - Single company in a public ownership
   - Part of a small company group
   - Part of a large company group
   - Subsidiary of a multi-national corporation

3. Please indicate your position in the company

4. Please name the primary product/product line of the business unit.

5. What was the business unit’s annual turnover for the last fiscal year?

6. What is the number of employees in the business?
   _______ (direct) _________ (indirect)

7. What is the average Stock Keeping Units (SKUs)?

8. How long has this warehouse been in operation?

9. What are the hours of operations?
   Weekdays From _______ to _______
   Weekends From _______ to _______
Section B: Contingencies

B1 Globalisation

10. Where are the logistics services provided?
☐ In a particular State only (e.g. NSW)
☐ Throughout Australia/Singapore
☐ In a few different countries within the same region (Southeast Asia, Asia Pacific)
☐ In a few different countries on different continents
☐ Globally, in many countries on different continents

11. Where are the firm’s Distribution Centres located?
☐ At a single site in Australia/Singapore
☐ At more than one site in Australia/Singapore
☐ At sites in different countries within the same region
☐ At a few different sites in countries of different continents
☐ At many sites globally, in countries of different continents

12. Where do innovative efforts usually take place?
☐ At a single site in Australia/Singapore
☐ At more than one site in Australia/Singapore
☐ At sites in different countries within the same region
☐ At a few different sites in countries of different continents
☐ At many sites globally, in countries of different continents

13. Where does the firm obtain its machinery and equipment?
☐ From a limited part of a single country
☐ From throughout one single country
☐ From a few different countries within the same region
☐ From a few different countries on different continents
☐ Globally, from many countries on different continents

14. Where does the firm recruit its people?
☐ From a limited part of Australia/Singapore
☐ From throughout the country
☐ From a few different countries within the same region
☐ From a few different countries on different continents
☐ Globally, from many countries on different continents
B2  Process Complexity

15. How complex is the distribution process?
☐ Very simple with few distinct steps needed; and the relations between them are simple and clear
☐ Rather complex with several steps needed. Some of them are interrelated and not all of them are straightforward
☐ Complex. A large number if distinct steps are needed. Many of them are interrelated and difficult to understand
☐ Very complex with a large number of steps needed. They are closely interrelated and difficult to understand.

Additional comments if any:

B3  Technological Complexity

16. How many core technologies are involved in delivering the services?
☐ Only one core technology
☐ Few (2-3) closely related core technologies
☐ Few (2-3) core technologies of different character
☐ Many (more than three) core technologies, of which some are rather similar
☐ Many (more than three) dissimilar core technologies

Additional comments if any:

B4  Customer interface complexity

17. To what extent do different customers have different expectations and how easy is it to define those expectations?

☐ Very simple with no variation in customer expectations
☐ Simple with little variation in customer expectations existing. Almost all performance dimensions are easily measurable
☐ Rather complex customer interface. There is some variation in customer expectations. There are subtle and equivocal dimensions of some importance.
☐ Complex with high specificity of customer expectations, some subtle and equivocal dimensions are of significant importance
☐ Very complex with very high specificity of customer expectations, subtle and equivocal dimensions are of great importance

Additional comments if any:
B5  Inter-firm Relationships

18. To what extent does the company rely on inter-firm relationships?
   □ Not at all, or almost not at all. Except for manufacturing, choice of products distributed, marketing, etc. The company handles everything internally
   □ Only to a limited extent. A few relationships with other companies, mainly concerned with manufacturing, choice of products distributed, marketing, transportation, etc. But they are not of strategic importance to the company
   □ Some inter-firm relationships exist. A few of these are seen as important and are allowed to have some influence on the company.
   □ The company has several inter-firm relationships, some of which concern strategically important activities, such as R&D and technology development.
   □ The company relies heavily on many inter-firm relationships, including technology joint ventures, R&D partnerships and other strategic alliances.

Additional comments if any:

B6  Knowledge accessibility

19. How often does the company access new knowledge developed at universities, research centres, government organisations, professional institutions and other companies?
   □ Never. The company has no contact with such organisations leading to access to new knowledge
   □ Rarely. The company is seldom in touch with such organisations and has difficulties getting useful knowledge from these sources.
   □ Sometimes. The company has sporadic contacts with these organisations and occasionally receives some useful knowledge from them.
   □ Rather frequently. The company has continued contacts with these organisations, which function as continuous knowledge providers.
   □ Very frequently. The company regards these institutions as important partners and is actively involved in joint research activities with them.

Additional comments if any:

B7  Labour turnover

20. How high is the labour turnover in the organisation per annum?
   □ Very low - under 2%
   □ Low   - 2 to 5%
   □ Normal - 5 to 8%
   □ High  - 8-15%
   □ Very high - over 15%
Additional comments:

21. Does the organisation recruit temporary/contract workers?
   - Yes
   - No

B8 Trade unions

22. What percent of the firm’s workforce unionised?
   - 0
   - less than 25%
   - between 26 and 50%
   - between 51 and 75%
   - More than 75%
   - 100%

Section C. Organisational Capabilities and Individual Competencies

C1 Satisfying Customers

- Able to build lasting distinctiveness with customers
- Able to distinguish practices uniquely different from competitors

C1.1 Safety Stock

23. How do you forecast future demand?

24. How much safety stock does the warehouse keep to prevent out-of-stock situations?

25. Does the organisation consider the order quantity of customers to ensure safety stock levels?
   - Yes
   - No

26. Does the organisation determine the value of active item inventory in planning for safety stock?
   - Yes
   - No
C1.2  Time Pressure
27. Do you have different lead times for different customers?
   □ Yes
   □ No

28. What is the average lead time for despatching goods to KEY customers upon receipt of orders?
   □ Within the same day
   □ The next day
   □ 2 – 3 days
   □ 4 – 6 days
   □ One week or more
   □ Other ____________________

29. What is the average lead time for despatching goods to normal customers upon receipt of orders?
   □ Within the same day
   □ The next day
   □ 2 – 3 days
   □ 4 – 6 days
   □ One week or more
   □ Other ____________________

C2  Integrating internal operations

- Able to perform operations with efficiency
- Able to link processes to support customer requirements

C2.1  Receiving and despatching
30. How many receiving and despatching docks does the warehouse have?

31. How much time on average is spent on counting and inspection per pallet of receipt?

32. How long does it take to unload when receiving goods?
   □ Less than 5 minutes
   □ 5-10 minutes
   □ 10-15 minutes
   □ 15-20 minutes
   □ 20-25 minutes
   □ 25-30 minutes
   □ More than 30 minutes
   □ Other ____________________
33. How long does it take to load when despatching goods?
   □ Less than 5 minutes
   □ 5-10 minutes
   □ 10-15 minutes
   □ 15-20 minutes
   □ 20-25 minutes
   □ 25-30 minutes
   □ More than 30 minutes
   Other ____________________

34. When are the peak periods normally encountered in the warehouse and at what time of the day?

C2.2 Defective/Damaged Goods
35. What is the percentage or value of defective, damaged or soiled goods received from suppliers?

36. What is the percentage or value of defective, damaged or soiled goods from the warehouse as a result of handling, storage and despatching?

37. What failsafe methods are implemented to prevent defective, damaged or soiled goods to customers?

C2.3 Stock Location
38. What is the location control system implemented for stock positioning?
   □ Personal knowledge
   □ Logical sequence (product code sequence)
   □ Stock location information system (random sequence)
   □ Other ____________________

C2.4 Order Picking
39. Which method is used for order picking in the warehouse by employees?
   □ Picking one order at a time according to customer
   □ Picking half the day’s order at a time
   □ Picking the whole day’s order at a time
   □ Other ____________________

C2.5 Stocktaking
40. Does the warehouse conduct
   □ physical inventory taking OR
   □ cycle counting (according to usage value)
41. How often is this carried out?
- Whenever stockkeeper has opportunity
- During normal stocking/ issuing
- When items are at their lowest stock level
- Quarterly
- Semi-annually
- Annually
- Other ________________

C2.6 Inventory Shrinkage
42. What is the cost of inventory shrinkage per annum?

43. What are the main reasons for inventory shrinkage?
- Pilferage/theft
- Stock item incorrectly recorded
- Stock items not recorded
- Other ________________

44. How does the organisation minimise inventory shrinkage?
- Automated storage and retrieval system software
- Barcoding
- Personal accountability/ Stockkeeper identification for items handled
- Cycle Counting
- Physical Inventory Counting
- Other ________________

C2.7 Space Utilisation
45. Do you have racks and shelves flexible enough to be modified and adjusted to fit goods of odd shapes and sizes?
- Yes
- No

46. If yes, are the racks and shelves able to add
- Extra shelves
- Dividers
- Bin inserts
- Other ________________

C2.8 Growth and Expansion
47. Is there any scope/provision for growth and expansion in the warehouse and distribution facilities?
- Yes
- No
48. If yes, how has the structure and layout of the warehouse been designed to accommodate for this?
   (e.g. extra landscaping for future construction, convertible sheds, extendable shelves for greater height.)

49. Has the organisational structure been reviewed or changed in the last 5 years?
   - Yes
   - No

50. Has this change benefited the organisation and streamlined internal operations?
   - Yes
   - No

C2.9 Organisational Policies and Procedures

51. Do all the departments here have standardised policies and procedures?
   - Yes
   - No

52. What areas are those policies and procedures targeted mainly at?
   - Human Resource
   - Operations
   - Planning
   - Management
   - Other ______________________

53. What areas do the company mission/vision target at?
   - Employees
   - Service Delivery
   - Safety
   - Innovation
   - Customer Focus
   - Costs
   - Quality
   - Profit
   - Growth
   - Others ______________________

54. Do you exchange departmental information across the organisation?
   - Yes
   - No

55. How is this done?
   - Notice Boards
   - Emails
   - Memos
   - Newsletter
   - Other ______________________
56. What information is shared across departments?

C3 Managing Technology

- Able to maintain information systems to support operations and processes
- Able to maintain automation for improved operations

57. Is the use of Information and Communication technology necessary or important for innovation to occur?
  □ Yes
  □ No

58. Please list the areas where automation is evident.
  □ Conveyance systems
  □ Conveyance devices
  □ Storage and retrieval systems
  □ Computer controllers
  □ Handheld and in-transit barcode readers and scanners
  □ Lift and transport equipment

59. What is the average depreciation rate of your automated equipment and facilities?

60. Do you have the computer softwares/technology to share standardised and customised information internally?
  □ Yes
  □ No

61. Do you
  □ Provide own transportation in despatching
  □ Contract out to transport companies

C4 Reviewing Performance

- Able to develop and maintain measurement systems to facilitate strategies and processes

C4.1 Overall performance measurement
62. Has the overall performance measurement system improved in the last three years?
  □ Yes
  □ No
63. Has the number of performance measures tracked increased in the last three years?
   - Yes
   - No

64. Has the accuracy of performance tracking methods increased in the last three recent years?
   - Yes
   - No

65. Has the quality of performance data improved in the last three years?
   - Yes
   - No

C4.2 Benchmarking, KPIs and maintaining standards

66. Does the organisation use standards of comparisons in measuring its performance?
   - Yes
   - No

67. If yes, are they based on
   - International Standards
   - National standards
   - Industry Standards
   - Organisational Standards
   - Other ______________________

C4.3 Assessing leadership

68. Does the organisation carry out periodic assessment of management and leadership?
   - Yes
   - No

69. If yes, which of the following areas of management are reviewed?
   - Communicating and implementing organisation goals and objectives
   - Guiding and achieving various departmental goals
   - Effectively communicating and promoting the values of Continuous Innovation, quality and customer focus
   - Involved in the activities of Continuous Innovation, quality and customer focus
   - Enriching leadership skills (thru education, training and development)
   - Recognising and rewarding employees for achievements

C4.4 Assessing strategic planning

70. Are there constant review and evaluation of plans to reflect customer satisfaction, quality, operational performance and Continuous Innovation?
   - Yes
   - No
71. Are the plans periodically adjusted to reflect changes in business conditions, customer requirements and the competitive environment?
   □ Yes
   □ No

72. Does the organisation ensure that the resources such as financial and human resource are in place to support effective execution of strategic plans?
   □ Yes
   □ No

C4.5 Assessing the use of information and analysis
73. Does the organisation use data and information on suppliers and customers for performance evaluation, planning and day-to-day management?
   □ Yes
   □ No

74. Are the data and information made readily accessible to all employees?
   □ Yes
   □ No

75. Has the organisation achieved beneficial results in key processes, service improvements from evaluating such data and information?
   □ Yes
   □ No

C4.6 Assessing Human Resource
76. Is there a human resource plan covering all areas in recruitment, selection, training and development, compensation and benefits, employee recognition and employee involvement?
   □ Yes
   □ No

77. Does the organisation reward employee behaviour that supports values of Continuous Innovation, quality and customer focus in the organisation?
   □ Yes
   □ No

78. Does the organisation have a system to determine employee’s education, training and development needs to meets organisation’s goals and objectives?
   □ Yes
   □ No

79. Does the organisation review and evaluate the impact of education, training and development on the overall performance of the firm?
   □ Yes
   □ No
80. Which areas are evident in the organisation’s human resource programme?
   □ Creating congenial work environment
   □ Maintaining safe work environment
   □ Comparable compensation and benefits packages as with industry or competitors
   □ Collecting information and conducting analysis on employee satisfaction

C4.7 Assessing Processes quality and management
81. Does the organisation have clear objectives and targets for processes which are linked to overall business goals and strategies?
   □ Yes
   □ No

82. Does the organisation review and continuously improve processes such that they are in line with meeting customer requirements?
   □ Yes
   □ No

83. Does the organisation assess the quality of goods and services provided by suppliers?
   □ Yes
   □ No

C4.8 Assessing customer satisfaction
84. Does the organisation periodically assess the ability to maintain relationships with customers?
   □ Yes
   □ No

85. Does the organisation review the knowledge obtained on expectations and requirements of customers and develop improvement plans?
   □ Yes
   □ No

C4.9 Assessing operational results
86. Which of the following performance indicators does the organisation deploy most of the time for Customer Service?
   □ Fill rate           □ Cycle time            □ Customer Complaints
   □ Stockouts          □ Delivery consistency    □ Sales Force complaints
   □ Despatch errors    □ Response time to enquiries
   □ On-time delivery   □ Response Accuracy      □ Overall reliability
   □ Backorders         □ Complete Orders       □ Overall satisfaction
87. Which of the following performance indicators does the organisation deploy most of the time for Cost Management?
- [ ] Total cost
- [ ] Inbound freight
- [ ] Inventory carrying cost
- [ ] Cost of damage
- [ ] Cost of returned goods
- [ ] Direct product profitability
- [ ] Cost per unit
- [ ] Outbound freight
- [ ] Direct labour
- [ ] Cost of backorder
- [ ] Comparison of actual vs budget
- [ ] Customer segment profitability
- [ ] Cost as % of sales
- [ ] Admin
- [ ] Cost trend analysis
- [ ] Cost of service failures
- [ ] Warehouse order processing

88. Which of the following performance indicators does the organisation deploy most of the time for Quality?
- [ ] Damage frequency
- [ ] Order entry accuracy
- [ ] Info accuracy
- [ ] Info availability
- [ ] No. of credit claims
- [ ] Picking/despatch accuracy
- [ ] Document/invoice accuracy
- [ ] No. of customer returns

89. Which of the following performance indicators does the organisation deploy most of the time for Productivity?
- [ ] Units despatched per employee
- [ ] Order per sales representative
- [ ] Goal programme
- [ ] Equipment downtime
- [ ] Warehouse labour productivity
- [ ] Units per labour dollar
- [ ] Comparison with historical standard
- [ ] Productivity Index
- [ ] Order entry productivity

90. Which of the following performance indicators does the organisation deploy most of the time for Asset Management?
- [ ] Inventory turn
- [ ] Return on net assets
- [ ] Return on investment
- [ ] Economic Value Added (EVA)
- [ ] Obsolete inventory
- [ ] Inventory levels (no of days supply)
- [ ] Inventory classification

91. Have the KPIs shown positive improvement trends over the last three years and met the targets set previously?
- [ ] Yes
- [ ] No

92. How do the results for the KPIs compare with those of competitors and/or benchmarks?
- [ ] Better
- [ ] Worse
- [ ] The same
C5 Managing Change

Able to realign operations and strategies to result in creative ideas, improved service and lower costs

93. Has the organisation had a change in operations or strategies in the last 5 years?
   □ Yes
   □ No

94. What were the main reasons for a change? (Pls rate according to priority e.g. 1 = most important, 2 = second most important, 3 = third most important)
   □ To operate more efficiently
   □ To reduce costs/ increase profits
   □ To increase the value of services for customer satisfaction
   □ To keep up with competition
   □ To keep up with technology
   □ To adhere to external push (e.g. supplier, customers, parent organisation, HQ, etc)
   □ To allow for Continuous Innovation or improvements

Additional comments:

________________________________________________________________________

95. Are the employees generally adaptive to changes in processes and operations?
   □ Yes
   □ No

Additional comments:

________________________________________________________________________

96. What is the rate of resistance to change in the organisation?
   □ Less than 10% of the workforce
   □ 10-25% of the workforce
   □ 25-50% of the workforce
   □ more than 50% of the workforce

97. Where does most of the resistance come from?
   □ Warehouse floor
   □ Supervisors and middle management
   □ Senior Management
   □ All levels

98. What measures have been taken to minimise such resistance?

________________________________________________________________________
Section D. Individual Competencies

D1. Effective Communication

99. Is the structure flexible enough to allow communication to all levels quickly?
   ■ Yes
   ■ No

100. Does the structure of the organisation allow for cross-functional communication to occur?
   ■ Yes
   ■ No

101. Does cross-functional communication enable employees to be more innovative in the organisation?
   ■ Yes
   ■ No

102. Does the communication system openness, sharing and knowledge transfer for the purpose of organisational innovations?
   ■ Yes
   ■ No

D2. Learning

D2.1 Upgrading skills and knowledge

103. Are the employees given formal training to increase their skills? (besides on the job training)
   ■ Yes
   ■ No

104. How often are employees at the warehouse trained on average?
   ■ Annually
   ■ Semi annually
   ■ Quarterly
   ■ Monthly
   ■ Ad hoc
   ■ Depending on the performance of employee

105. What areas of formal training are they given?
   ■ Safety
   ■ Operations Management
   ■ Personal Improvement and Development
   ■ Leadership Skills
   ■ Human Resources
   ■ Quality and Productivity Concepts
106. How often are employees at management level trained on average?
   - Annually
   - Semi annually
   - Quarterly
   - Monthly
   - Ad hoc
   - Depending on the performance of employee

107. What areas of formal training are they given?
   - Safety
   - Operations Management
   - Personal Improvement and Development
   - Leadership Skills
   - Human Resources
   - Quality and Productivity Concepts
Section A. Drivers of Innovation

1. What are the most important factors causing your organisation to constantly improve/innovate?
   ☐ Lower Cost
   ☐ Higher Quality
   ☐ More Reliability
   ☐ Flexibility
   ☐ Speed of Responsibility
   ☐ Supplier Push
   ☐ Technological Leadership
   ☐ Timely delivery for customer
   ☐ Value for price
   ☐ Performance and conformance
   ☐ Other ______________________

2. Please rank the factors in order of importance to the firm.
   Most important ______________________
   Second most important ______________________
   Third most important ______________________

Section B. Organisational Capabilities

B1 Satisfying Customers
- Able to build lasting distinctiveness with customers
- Able to distinguish practices uniquely different from competitors

3. What are the issues and importance of satisfying customers?

4. How do you maintain customer satisfaction?

B1.1 Identifying Customer Needs
5. Does the organisation perform customer segmentation?
   ☐ Yes
   ☐ No

6. If yes, do the services provided differ for each segment?
   ☐ Yes
   ☐ No
7. How do you collect information to anticipate the future needs of your customers, and keep up with customers’ changing expectations?

8. How does your organisation identify new and different ways to satisfy customers?

9. Are you flexible and adaptive to unique requests?

10. How do you accommodate unexpected situations?

B1.2 Service Customisation
11. To what extent are the services customised to the customer and how are they customised?

B2 Integrating internal operations
- Able to perform operations with efficiency
- Able to link processes to support customer requirements

12. What are the issues and importance of integrating the operations in the organisation?

13. Is there any form of cross-functional unification across departments in the organisation? How is this evident and facilitated?

14. Do you
- Provide own transportation in despatching
- Contract out to transport companies
B3 Collaborating with partners in Supply Chain

Able to link external operations harmonious with internal processes

15. What are the issues and importance of linking with external partners in the supply chain?

16. Do you have standardised operations with suppliers and customers?
   □ Yes
   □ No

17. How do you maintain standardised operations with suppliers and customers?

18. Do you have joint planning with suppliers and customers?
   □ Yes
   □ No

19. On what issues do you joint plan with suppliers and customers and how frequently?
    (e.g. production schedules from supplier, shipment release schedules, promotional items, new product introduction, marketing plans, sales forecasts, sales inventories, customer expectations.

20. Do you share information with suppliers and customers?
    □ Yes
    □ No

21. What information is exchanged?
    (e.g. about strategic information, forecasts, sales, inventories, costs, promotional plans)

22. How do you share such information and how frequently?
    (e.g. through integrated databases, periodic meetings, updates, letters, memos, email)

23. Do you share processes with suppliers and customers?
    □ Yes
    □ No
24. What are the processes and how are they shared?  
(e.g. pallet supply and return, loading/unloading of goods)

25. Do you link operational synchronisation and interface with suppliers and customer?  
☐ Yes  
☐ No

26. How is it linked?  
(e.g. by EDI, Local Area Network, Wide Area Network)

27. Do you engage in joint investments with suppliers and customers?  
☐ Yes  
☐ No

28. What are the investments?  
(eg capital equity, R&D, Information Technology)

B4 Reviewing Performance

- Able to develop and maintain measurement systems to facilitate strategies and processes

29. How does the organisation identify problems and suggest ways of improving?  
☐ through quality circles  
☐ through work improvement teams  
☐ through suggestion schemes  
☐ through periodic meetings  
☐ others

30. How often are these improvements implemented and what are the main issues?
Section C: Individual Competencies

C1. Creativity
31. Is the organisation able to tap into the creative abilities of employees? If yes, how is this done?

32. Is management encouraged to foster an environment for creativity? If yes, how is this done?

33. Do creative outcomes from employees are linked to productive and competitive success in the organisation?
   □ Yes
   □ No

C2. Learning

C2.1 Diffusing Knowledge
34. How is the knowledge shared and diffused to other employees? Is this made readily available to all employees?
   (e.g. through databases, reports, process standards)

35. Do the employees consider using innovation as an opportunity to develop their knowledge?
   □ Yes
   □ No

36. Are there opportunities for employees to demonstrate knowledge/innovative methods from external sources?
   (e.g. from previous workplaces, other organisations, external training)
   □ Yes
   □ No

C2.2 Problem solving and work improvement
37. Does the organisation have a system for problem solving and work improvement? If yes, what methods are used?

38. Are these improvements in line with strategic goals and objectives?
39. What is the average outcome of problem solving in the organisation?

☐ Making corrections to problems and errors
☐ Understanding root causes of problems and errors; and preventing reoccurrence
☐ Creating new knowledge or quantum leaps

Additional comments:

C3. Teamwork & Empowerment

40. Do you use team-based approaches to improvement and problem solving?

☐ Yes
☐ No

41. Are there any forms of empowerment given to employees in their scope of work?

☐ Yes
☐ No

Additional comments:

C4 Flexibility and multi-skilling

42. Do employees cross-trained, widening their job areas so as to ensure flexibility?

☐ Yes
☐ No

43. Do you employ additional/temporary staff during peak or seasonal periods? (e.g. summer, school vacations, Christmas, public holidays)

☐ Yes
☐ No

Additional comments:

C5 Adaptiveness to change

44. Do you think that innovation involves a change in the mindset of employees?

☐ Yes
☐ No

45. Do employees participate enthusiastically with respect to change?

☐ Yes
☐ No

46. Do they give valuable input and feedback upon implementing change?

☐ Yes
☐ No
47. Does the organisation support or provide scope for personal development to support perception of change?

☐ Yes
☐ No

Additional comments:

C6. Role of management

48. How does management deploy corporate strategies and translate them into innovative/improvement activities?

49. What is management’s role in developing and diffusing knowledge in employees? (e.g. encouraging experimentation, accepting mistakes, empowerment)
Appendix 5C - Transcript for Firm A (Australia)

Section A. Company Background and Business Operations

1. Please indicate what best describes your business unit.
   - Manufacturing, Assembling, Warehousing and Distribution
   - Assembling, Warehousing and Distribution
   - Warehousing and Distribution of finished goods
   - Warehousing and Distribution of raw materials
   - Import and Export only of finished goods
   - Import and Export of raw materials

2. What does the ownership structure of the company look like?
   - Single, privately owned business
   - Single company in a public ownership
   - Part of a small company group
   - Part of a large company group
   - Subsidiary of a multi-national corporation

3. Please indicate your position in the company
   Administration Manager

4. Please name the primary product/product line of the business unit.
   Hardware, PC and Appliances

5. What was the business unit’s annual turnover for the last fiscal year?
   480 million

6. What is the number of employees in the business?
   36 (direct) 600 (indirect)

7. What is the average Stock Keeping Units (SKUs)?
   8000

8. How long has this warehouse been in operation?
   25 years

9. What are the hours of operations?
   Weekdays From 6:00am to 6:00pm
   Weekends From 8:00am to 1:00pm
Section B: Contingencies

B1 Globalisation

10. Where are the logistics services provided?
- In a particular State only (e.g. NSW)
- Throughout Australia/Singapore
- In a few different countries within the same region (Southeast Asia, Asia Pacific)
- In a few different countries on different continents
- Globally, in many countries on different continents

11. Where are the firm’s Distribution Centres located?
- At a single site in Australia/Singapore
- At more than one site in Australia/Singapore
- At sites in different countries within the same region
- At a few different sites in countries of different continents
- At many sites globally, in countries of different continents

12. Where do innovative efforts usually take place?
- At a single site in Australia/Singapore
- At more than one site in Australia/Singapore
- At sites in different countries within the same region
- At a few different sites in countries of different continents
- At many sites globally, in countries of different continents

13. Where does the firm obtain its machinery and equipment?
- From a limited part of a single country
- From throughout one single country
- From a few different countries within the same region
- From a few different countries on different continents
- Globally, from many countries on different continents

14. Where does the firm recruit its people?
- From a limited part of Australia/Singapore
- From throughout the country
- From a few different countries within the same region
- From a few different countries on different continents
- Globally, from many countries on different continents

B2 Service Customisation

15. To what extent are the services customised to the customer and how are they customised?

In this business, we deal with major customers. They are the top 50 builders who build large volumes of houses in Australia. Their orders become more repetitive - and we construct our services around that. The smaller builders have more diverse needs for products. In that sense they are harder to manage and satisfy. We need to have the right products at the right time. The price.
B3 Process Complexity

16. How complex is the distribution process?
   - Very simple with few distinct steps needed; and the relations between them are simple and clear
   - Rather complex with several steps needed. Some of them are interrelated and not all of them are straightforward
   - Complex. A large number if distinct steps are needed. Many of them are interrelated and difficult to understand
   - Very complex with a large number of steps needed. The are closely interrelated and difficult to understand.

B4 Technological Complexity

17. How many core technologies are involved in delivering the services?
   - Only one core technology
   - Few (2-3) closely related core technologies
   - Few (2-3) core technologies of different character
   - Many (more than three) core technologies, of which some are rather similar
   - Many (more than three) dissimilar core technologies

B5 Customer Interface Complexity

18. To what extent do different customers have different expectations and how easy is it to define those expectations?
   - Very simple with no variation in customer expectations
   - Simple with little variation in customer expectations existing. Almost all performance dimensions are easily measurable
   - Rather complex customer interface. There is some variation in customer expectations. There are subtle and equivocal dimensions of some importance.
   - Complex with high specificity of customer expectations, some subtle and equivocal dimensions are of significant importance
   - Very complex with very high specificity of customer expectations, subtle and equivocal dimensions are of great importance

B6 Inter-firm Relationships

19. To what extent does the company rely on inter-firm relationships?
   - Not at all, or almost not at all. Except for manufacturing, choice of products distributed, marketing, etc. The company handles everything internally
   - Only to a limited extent. A few relationships with other companies, mainly concerned with manufacturing, choice of products distributed, marketing, transportation, etc. But they are not of strategic importance to the company
   - Some inter-firm relationships exist. A few of these are seen as important and are allowed to have some influence on the company.
   - The company has several inter-firm relationships, some of which concern strategically important activities, such as R&D and technology development.
   - The company relies heavily on many inter-firm relationships, including technology joint-ventures, R&D partnerships and other strategic alliances.
B7 Knowledge accessibility

20. How often does the company access new knowledge developed at universities, research centres, government organisations, professional institutions and other companies?

☐ Never. The company has no contact with such organisations leading to access to new knowledge
☐ Rarely. The company is seldom in touch with such organisations and has difficulties getting useful knowledge from these sources.
☐ Sometimes. The company has sporadic contacts with these organisations and occasionally receives some useful knowledge from them.
☐ Rather frequently. The company has continued contacts with these organisations, which function as continuous knowledge providers.
☐ Very frequently. The company regards these institutions as important partners and is actively involved in joint research activities with them.

B8 Labour turnover

21. How high is the labour turnover in the organisation per annum?

☐ Very low - under 2%
☐ Low - 2 to 5%
☐ Normal - 5 to 8%
☐ High - 8-15%
☐ Very high - over 15%

22. Does the organisation recruit temporary/ contract workers?

☐ Yes
☐ No

B9 Trade unions

23. What percent of the firm’s workforce unionised?

☐ 0
☐ less than 25%
☐ between 26 and 50%
☐ between 51 and 75%
☐ More than 75%
☐ 100%
Section C. Drivers of Innovation

24. What are the most important factors causing your organisation to constantly improve/innovate?
We strive to attain competitive advantage. To go down the road of technology and assume e-business. It is ultimately to improve and deliver efficiency to customers. Our customers want faster delivery and better prices. Furthermore, our suppliers want to use Electronic Data Interchange to increase the speed of the system. *Firms in the supply chain compete on this basis using web-based orders and communication via the internet. It is a growing trend and has gained popularity in logistics firms. Many Distribution Centres are automating as well using technology such as barcoding, radio-frequency communication and automated systems. We need to overcome competition and to keep up with rival firms. I feel that innovating is a means of sustaining competitive advantage.*

25. Please rank the factors in order of importance to the firm.
Most important   To have a leading edge in industry
Second most important   Competition
Third most important   Achieve customer satisfaction

Section D. Organisational Capabilities

D1 Satisfying Customers
- Able to build lasting distinctiveness with customers
- Able to distinguish practices uniquely different from competitors

26. What are the issues and importance of satisfying customers?
There are many issues for customer satisfaction. The most important one facing firms is being familiar and knowing your customers. We have to be confident in meeting their levels of satisfaction. To know this, we aim at building lasting relationships with customers. We treat them as partners so as to understand them.

27. How do you maintain customer satisfaction?
To have on time delivery and in full, in this industry, we need to be very flexible. We also build very strong relationships and listen to customers so as to maintain satisfaction. The flexibility and efficiency of delivery is important. We have to ensure that the goods are on hand when the orders come in. Our staff must be made readily available to listen and resolve customer issues. In addition, we also organise social events to maintain relationships.
D1.1 Identifying Customer Needs

28. Does the organisation perform customer segmentation?
   ☑ Yes
   ☐ No

29. If yes, do the services provided differ for each segment?
   ☑ Yes
   ☐ No

30. How do you collect information to anticipate the future needs of your customers and keep up with customers’ changing expectations?
   We collect information all the time - by looking for new innovative products in the market, we look for any new manufactured products by keeping up with suppliers constantly. Recently we decided to enter into electronic coding and e-business to cater to particular projects. In addition, we need to possess skilled and knowledgeable employees to obtain such information.

31. How does your organisation identify new and different ways to satisfy customers?
   There are not many sales representatives in our company here. We have two account managers and a General Manager in charge of that. We conduct regular meetings with customers for direct feedback. In addition, we constantly benchmark against competitors. This is to identify the strategic direction of customers and their demand patterns. Other methods are ensuring that deliveries run smoothly, contracts are accurate, all pricing are up to date and by reducing credit claims. We also organise informal activities with the customers such as go-kart days and luncheons.

32. Are you flexible and adaptive to unique requests?
   Yes. Previously, our firm faced instances where plans did not materialise and our resources allocated were not used efficiently. As a result from those experiences, we are able to plan and forecast more practically. This contributes to our efficiency.

33. How do you accommodate unexpected situations?
   The department managers consult the General Manager. They are normally problems with delivery or urgent requests. We are able to satisfy the customer 90% of the time. We accommodate to builders that do not order to our requirements. Our employees put in the extra effort to look for particular products that customers want, even if it is not on our stock list. (e.g. timber)
D1.2 Safety Stock

34. How do you forecast future demand?
   We are involved with companies in construction research. Our forecasting comes from the existing customer base, their future plans and goals. We don't plan that far in advance.

35. How much safety stock does the warehouse keep to prevent out-of-stock situations?
   4 weeks supply

36. How does the organisation ensure the level of safety stock?
   Have minimum stock levels of product by category. Daily stock counts. Budget through purchasing. Turning stock about 12X per year. Average stock on floor about 5 weeks. Daily averages, reports on sales history. Forecasting on product sales. Look at bulk purchasing break (e.g. get extra 1-2% if order in bulk), very cyclic industry. Look at trends, building and housing industry, economy interest rates, economic policy.

37. Does the organisation determine the value of active item inventory in planning for safety stock?
   ☑ Yes
   ☐ No

D1.3 Time Pressure

38. Do you have different lead times for different customers?
   ☑ Yes
   ☐ No

39. What is the average lead time for despatching goods to KEY customers upon receipt of orders?
   ☑ Within the same day
   ☐ The next day
   ☐ 2 – 3 days
   ☐ 4 – 6 days
   ☐ One week or more
   ☐ Other

40. What is the average lead time for despatching goods to normal customers upon receipt of orders?
   ☑ Within the same day
   ☐ The next day
   ☐ 2 – 3 days
   ☐ 4 – 6 days
   ☐ One week or more
   ☐ Other
D2 Integrating internal operations

- Able to perform operations with efficiency
- Able to link processes to support customer requirements

41. What are the issues and importance of integrating the operations in the organisation?

To integrate all operations within the company, there must be the commitment from all employees. This is very important and they have to be aware of this interconnectedness. It is sometimes difficult to achieve this because coming from a complex logistics industry, there are many systems and processes. Our services include handling products, customers, suppliers and numerous orders. There is a lot of work to be done all the time. This means that there is pressure for management to manage all these processes. We have over the years tried to focus on just a few and core customers and suppliers to reducing complexity. Also we operate at a single location which makes managing our facility better. In this regard, it is easier to integrate operations and work at our facility.

D2.1 Receiving and despatching

42. How many receiving and despatching docks does the warehouse have?

43. How much time on average is spent on counting and inspection per pallet of receipt?

15 minutes

44. How long does it take to unload when receiving goods?

- Less than 5 minutes
- 5-10 minutes
- 10-15 minutes
- 15-20 minutes
- 20-25 minutes
- 25-30 minutes
- More than 30 minutes
- Other

45. How long does it take to load when despatching goods?

- Less than 5 minutes
- 5-10 minutes
- 10-15 minutes
- 15-20 minutes
- 20-25 minutes
- 25-30 minutes
- More than 30 minutes
- Other
46. When are the peak periods normally encountered in the warehouse and at what time of the day?
   The peak periods occur normally when loading vehicles for delivery from 6:00 am to 8:30 am

D2.2 Defective/Damaged Goods
47. What is the percentage or value of defective, damaged or soiled goods received from suppliers?
   About 10%

48. What is the percentage or value of defective, damaged or soiled goods from the warehouse as a result of handling, storage and despatching?
   About 5%

49. What failsafe methods are implemented to prevent defective, damaged or soiled goods to customers?
   All staff understand that all goods must be 100% free of defect, if it is damaged, it does not get delivered.

D2.3 Stock Location
50. What is the location control system implemented for stock positioning?
   ☑ Personal knowledge
   ☐ Logical sequence (product code sequence)
   ☐ Stock location information system (random sequence)
   ☐ Other

D2.4 Order Picking
51. Which method is used for order picking in the warehouse by employees?
   ☑ Picking one order at a time according to customer
   ☐ Picking half the day's order at a time
   ☐ Picking the whole day's order at a time
   ☐ Other

D2.5 Stocktaking
52. Does the warehouse conduct
   ☑ physical inventory taking OR
   ☐ cycle counting (according to usage value)

53. How often is this carried out?
   ☐ Whenever stockkeeper has opportunity
   ☐ During normal stocking/issuing
   ☐ When items are at their lowest stock level
   ☑ Quarterly
   ☑ Semi-annually
   ☐ Annually
   ☐ Other

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D2.6 Inventory Shrinkage

54. What is the cost of inventory shrinkage per annum?
   
   Up to 5% per annum

55. What are the main reasons for inventory shrinkage?
   ☐ Pilferage/theft
   ☐ Stock item incorrectly recorded
   ☐ Stock items not recorded
   ☐ Other  Damaged goods not written off

56. How does the organisation minimise inventory shrinkage?
   ☐ Automated storage and retrieval system software
   ☐ Barcoding
   ☐ Personal accountability/ Stockkeeper identification for items handled
   ☐ Cycle Counting
   ☐ Physical Inventory Counting
   ☐ Other __________________________

D2.7 Space Utilisation

57. Do you have racks and shelves flexible enough to be modified and adjusted to fit goods of odd shapes and sizes?
   ☐ Yes
   ☐ No

58. If yes, are the racks and shelves able to add
   ☐ Extra shelves
   ☐ Dividers
   ☐ Bin inserts
   ☐ Other __________________________

D2.8 Growth and Expansion

59. Is there any scope/provision for growth and expansion in the warehouse and distribution facilities?
   ☐ Yes
   ☐ No

60. If yes, how has the structure and layout of the warehouse been designed to accommodate for this?
   Extra shelving and bulk storage __________________________

61. Has the organisational structure been reviewed or changed in the last 5 years?
   ☐ Yes
   ☐ No

62. Has this change benefited the organisation and streamlined internal operations?
   ☐ Yes
   ☐ No
   ☐ Other  Occupational health and Safety, Security.
D2.9 Organisational Policies and Procedures
63. Do all the departments here have standardised policies and procedures?
- Yes
- No
- Other Some departments. Our broad corporate policies come from Headquarters, and they are updated 2x a year.

64. What areas are those policies and procedures targeted mainly at?
- Human Resource
- Operations
- Planning
- Management
- Other Occupational health and safety, Security.

65. What areas do the company mission/vision target at?
- Employees
- Service Delivery
- Safety
- Innovation
- Customer Focus
- Costs
- Quality
- Profit
- Growth
- Others Market Leadership.

To become the preferred or first choice supplier of building industry materials to a chosen market sector (i.e., project housing). To gain market leadership. Also to achieve satisfaction to staff, customers and profits to shareholders. Have upgraded from manual entries to computers. Explore opportunities for growth and expansion.

D2.10 Cross-functional unification
66. Is there any form of cross-functional unification across departments in the organisation? How is this evident and facilitated?
Yes there is. This is facilitated by giving employees more freedom and authority. We trust them to make decisions at times and to work with other departments.

67. Do you exchange departmental information across the organisation?
- Yes
- No

68. How is this done?
- Notice Boards
- Emails
- Memos
- Newsletter
- Other ______________
69. What information is shared across departments?
   All types of information are exchanged.

D3 Managing Technology

- Able to maintain information systems to support operations and processes
- Able to maintain automation for improved operations

70. Is the use of Information and Communication technology necessary or important for innovation to occur?
   ☑️ Yes
   ☑️ No
   I think there is no doubt that our Distribution Centre has a long way to go in terms of technology and automation. But firms can be efficient, through proper integration and coordination of systems and processes. The existing technology here is sufficient enough. It is how we manage it, which matters, in the sense that it should efficiently support our systems and processes... Technology is just one capability among others that gives rise to competitiveness or innovation in the firm.

71. Please list the areas where automation is evident.
   ☑️ Conveyance systems
   ☑️ Conveyance devices
   ☑️ Storage and retrieval systems
   ☑️ Computer controllers
   ☑️ Handheld and in-transit barcode readers and scanners
   ☑️ Lift and transport equipment
   ☑️ Others Nil

72. What is the average depreciation rate of your automated equipment and facilities?
   Not applicable

73. Do you have the computer softwares/technology to share standardised and customised information internally?
   ☑️ Yes
   ☑️ No

D4 Collaborating with partners in Supply Chain

- Able to link external operations harmonious with internal processes

74. What are the issues and importance of linking with external partners in the supply chain?
   It is essential to rely on partners' trust and credibility, when collaborating with them. There are some forms of joint financial ventures, decision making and strategic planning when integrating operations with partners. For instance, the cost to change over to a new hardware system to interface with a particular supplier is with our major supplier. This information system will
establish a common infrastructure. In addition, there will be unified management practices and measures, apart from just better communication with the supplier. This instance of increased operational efficiency offsets the initial cost of installation and implementing the information system.

75. Do you have standardised operations with suppliers and customers?
☐ Yes for some
☐ No

76. How do you maintain standardised operations with suppliers and customers?
For our customers, we try and keep it as simple as possible. This is because they may not be organised. For our suppliers, they are very automated. They have processes and systems in place. Many of them are computerised.

77. Do you have joint planning with suppliers and customers?
☐ Yes
☐ No

78. On what issues do you joint plan with suppliers and customers and how frequently?
With suppliers, we joint plan on the availability of timber products and issues such as business-to-business electronic communication, the use of Electronic Data Interchange, and business-to-customer. With our customers, we joint plan on advertising and promotion programmes for relationship building. There are other issues such as growth, profits, and relationships. We plan for a win-win situation basically.

79. Do you share information with suppliers and customers?
☐ Yes to selected suppliers
☐ No

80. What information is exchanged?
For suppliers, there is swapping of information on market trends, new products, sales, forecasting, promotional plans. For customers, we exchange information on new products and services. Strategic information is shared with suppliers as to the customers' orders so as to know how much stock to produce. We send out letters to all suppliers about promotion plans in advance so they can allocate money towards that. They share the promotion.

81. How do you share such information and how frequently?
The information is shared at our regular supplier meetings, during promotional events, buying group seminars, and conferences or written communication. In addition, we can access some supplier databases through their internet website. We meet with customers twice per week; but for suppliers, we meet monthly or on an ad hoc basis.
82. Do you share processes with suppliers and customers?
☐ Yes
☐ No

83. What are the processes and how are they shared?
We have integrated training with customers. For example, we organise and coordinate training on roof installation. Customers can gain full understanding on what our requirements are, or use the right terminology in their orders. Suppliers come in to see if we are doing fine or how they can help. It is a win-win situation. Currently, we are implementing an EDI and Internet system in our operations.

84. Do you link operational synchronisation and interface with suppliers and customer?
☐ Yes to some suppliers only
☐ No

85. How is it linked?
We link to some by the internet. Internally, we are linked by email, computer, and telephone. By interfacing with partners in the supply chain, we can simplify the process, and save a lot of time and reduce order cycle time, to have a quicker turnover.

86. Do you engage in joint investments with suppliers and customers?
☐ Yes to some
☐ No

87. What are the investments?
We have a partnership for EDI in future. Currently, we are working and developing account plans with major suppliers. We plan on how to allocate and spend on joint advertising. There are also joint promotion programmes to build relationships. Some shareholders own shares in our supplier companies. We joint invest in R&D projects such as flooring systems. We help the suppliers to get product into the marketplace. Suppliers, in designing new products, often seek information and advice from us in their planning.

88. Do you
☐ Provide own transportation in despatching
☐ Contract out to transport companies
D5 Reviewing Performance

Able to develop and maintain measurement systems to facilitate strategies and processes

D5.1 Overall performance measurement

89. Has the overall performance measurement system improved in the last three years?
   ☑ Yes
   ☑ No

90. Has the number of performance measures tracked increased in the last three years?
   ☑ Yes
   ☑ No

91. Has the accuracy of performance tracking methods increased in the last three recent years?
   ☑ Yes
   ☑ No

92. Has the quality of performance data improved in the last three years?
   ☑ Yes
   ☑ No
   "We have not produced an efficient measurement system in place yet. But through attending external seminars and courses, we are able to identify the important areas to monitor. The quality of data that arise is far superior than what we used before."

D5.2 Benchmarking, KPIs and maintaining standards

93. Does the organisation use standards of comparisons in measuring its performance?
   ☑ Yes
   ☑ No

94. If yes, are they based on
   ☑ International Standards
   ☑ National standards
   ☑ Industry Standards
   ☑ Organisational Standards
   ☑ Other ___ nil __________

D5.3 Assessing leadership

95. Does the organisation carry out periodic assessment of management and leadership?
   ☑ Yes
   ☑ No

96. If yes, which of the following areas of management are reviewed?
   ☑ Communicating and implementing organisation goals and objectives
   ☑ Guiding and achieving various departmental goals
Effectively communicating and promoting the values of Continuous Innovation, quality and customer focus
- Involved in the activities of Continuous Innovation, quality and customer focus
  - Enriching leadership skills (thru education, training and development)
  - Recognising and rewarding employees for achievements

D5.4 Assessing strategic planning
97. Are there constant review and evaluation of plans to reflect customer satisfaction, quality, operational performance and Continuous Innovation?
  - Yes
  - No

98. Are the plans periodically adjusted to reflect changes in business conditions, customer requirements and the competitive environment?
  - Yes
  - No

99. Does the organisation ensure that the resources such as financial and human resource are in place to support effective execution of strategic plans?
  - Yes
  - No

D5.5 Assessing the use of information and analysis
100. Does the organisation use data and information on suppliers and customers for performance evaluation, planning and day-to-day management?
  - Yes
  - No

101. Are the data and information made readily accessible to all employees?
  - Yes
  - No

102. Has the organisation achieved beneficial results in key processes, service improvements from evaluating such data and information?
  - Yes
  - No

D5.6 Assessing Human Resource
103. Is there a human resource plan covering all areas in recruitment, selection, training and development, compensation and benefits, employee recognition and employee involvement?
  - Yes
  - No

104. Does the organisation reward employee behaviour that supports values of Continuous Innovation, quality and customer focus in the organisation?
  - Yes
  - No
105. Does the organisation have a system to determine employee’s education, training and development needs to meets organisation’s goals and objectives?
☐ Yes
☒ No

106. Does the organisation review and evaluate the impact of education, training and development on the overall performance of the firm?
☐ Yes
☒ No

107. Which areas are evident in the organisation’s human resource programme?
☒ Creating congenial work environment
☒ Maintaining safe work environment
☒ Comparable compensation and benefits packages as with industry or competitors
☐ Collecting information and conducting analysis on employee satisfaction

D5.7 Assessing Processes quality and management

108. Does the organisation have clear objectives and targets for processes which are linked to overall business goals and strategies?
☒ Yes
☐ No

109. Does the organisation review and continuously improve processes such that they are in line with meeting customer requirements?
☒ Yes
☐ No

110. Does the organisation assess the quality of goods and services provided by suppliers?
☒ Yes
☐ No

D5.8 Assessing customer satisfaction

111. Does the organisation periodically assess the ability to maintain relationships with customers?
☒ Yes
☐ No

112. Does the organisation review the knowledge obtained on expectations and requirements of customers and develop improvement plans?
☒ Yes
☐ No

We maintain the ability of the sales representatives to uphold relationships with customers.
D5.9 Assessing operational results

113. Which of the following performance indicators does the organisation deploy most of the time for Customer Service?
- ☐ Fill rate
- ☐ Stockouts
- ☐ Despatch errors
- ☐ On-time delivery
- ☐ Backorders
- ☐ Cycle time
- ☐ Delivery consistency
- ☐ Response time to enquiries
- ☐ Response Accuracy
- ☐ Complete Orders
- ☐ Customer Complaints
- ☐ Sales Force complaints
- ☐ Overall reliability
- ☐ Overall satisfaction

114. Which of the following performance indicators does the organisation deploy most of the time for Cost Management?
- ☐ Total cost
- ☐ Inbound freight
- ☐ Inventory carrying
- ☐ Cost of damage
- ☐ Cost of returned goods
- ☐ Direct product profitability
- ☐ Cost per unit
- ☐ Outbound freight
- ☐ Direct labour
- ☐ Cost of backorder
- ☐ Comparison of actual vs budget
- ☐ Customer segment profitability
- ☐ Cost as % of sales
- ☐ Admin
- ☐ Cost trend analysis
- ☐ Cost of service failures
- ☐ Warehouse order processing

115. Which of the following performance indicators does the organisation deploy most of the time for Quality?
- ☐ Damage frequency
- ☐ Order entry accuracy
- ☐ Info accuracy
- ☐ Info availability
- ☐ No. of credit claims
- ☐ Picking/despatch accuracy
- ☐ document/invoice accuracy
- ☐ No. of customer returns

116. Which of the following performance indicators does the organisation deploy most of the time for Productivity?
- ☐ Units despatched per employee
- ☐ Order per sales representative
- ☐ Goal Programme
- ☐ Equipment downtime
- ☐ Warehouse labour productivity
- ☐ Units per labour dollar
- ☐ Comparison with historical standard
- ☐ Productivity Index
- ☐ Order entry productivity

117. Which of the following performance indicators does the organisation deploy most of the time for Asset Management?
- ☐ Inventory turn
- ☐ Return on net assets
- ☐ Return on investment
- ☐ Economic Value Added (EVA)
- ☐ Obsolete inventory
- ☐ Inventory levels (no of days supply)
- ☐ Inventory classification

118. Have the KPIs shown positive improvement trends over the last three years and met the targets set previously?
- ☑ Yes
- ☐ No
119. How do the results for the KPIs compare with those of competitors and/or benchmarks?
- Better
- Worse
- Same

120. How does the organisation identify problems and suggest ways of improving?
- through quality circles
- through work improvement teams
- through suggestion schemes
- through periodic meetings
- others: teams at management level

121. How often are these improvements implemented and what are the main issues?
They occur all the time. The issues include Occupational health and Safety issues for the warehouse, planning, operational and strategic issues for management, (e.g. purchasing, inventory control, goods in transit, damaged returns). We try to improve systems all the time, how to fix customer problems, improving systems and processes.

D6 Managing Change
- Able to realign operations and strategies to result in creative ideas, improved service and lower costs

122. Has the organisation had a change in operations or strategies in the last 5 years?
- Yes
- No

123. What were the main reasons for a change? (Pls rate according to priority e.g.
1 = most important, 2 = second most important, 3 = third most important)
- To operate more efficiently
- To reduce costs/ increase profits
- To increase the value of services for customer satisfaction
- To keep up with competition
[1] To keep up with technology
[2] To adhere to external push (e.g. supplier, customers, parent organisation, HQ, etc)
[3] To allow for Continuous Innovation or improvements

124. Are the employees generally adaptive to changes in processes and operations?
- Yes
- No
125. What is the rate of resistance to change in the organisation?
   ☑ 10-25% of the workforce
   ☐ 25-50% of the workforce
   ☐ more than 50% of the workforce

126. Where does most of the resistance come from?
   ☐ Warehouse floor
   ☐ Supervisors and middle management
   ☑ Senior Management
   ☑ All levels

127. What measures have been taken to minimise such resistance?
   By having more communication and feedback from employees.

Section E. Individual Competencies

E1. Creativity

128. Is the organisation able to tap into the creative abilities of employees? If yes, how is this done?
   Yes. We need to encourage or motivate them. In general, creativity normally occurs when motivational levels are high.

129. Is management encouraged to foster an environment for creativity? If yes, how is this done?
   As managers, we try to be open and more receptive to our employees. We encourage suggestions and views from employees. Nobody gets turned down or laughed at when they suggest some things. We encourage learning and sharing, so that employees become more motivated. All the managers are respectful and perceptive of their subordinates.

130. Do creative outcomes from employees are linked to productive and competitive success in the organisation?.
   ☑ Yes
   ☐ No

E2. Effective Communication

131. Is the structure flexible enough to allow communication to all levels quickly?
   ☑ Yes
   ☐ No

132. Does the structure of the organisation allow for cross-functional communication to occur?
   ☑ Yes
   ☐ No
133. Does cross-functional communication enable employees to be more innovative in the organisation?
☐ Yes
☐ No

134. Does the communication system openness, sharing and knowledge transfer for the purpose of organisational innovations?
☐ Yes
☐ No

E3. Learning

E3.1 Diffusing Knowledge

135. How is the knowledge shared and diffused to other employees? Is this made readily available to all employees?
Through staff meetings, email. The new processes are "locked" in and become standards. Employees diffuse knowledge was upon return from external training. They are asked to share with their respective departments the new knowledge gained. We use this as a means of pulling out new ideas and constructive criticisms: and ultimately decided as a group, if we should take any action. Secondly, we diffuse innovation through empowering employees. For instance the person who initialised a suggestion or idea for improvement will be placed in charge of implementing and managing the idea. Such leadership opportunities for employees help develop their motivation and skills. It equips them with knowledge to perform better. In turn, the fellow colleagues and even supervisors can learn from them.

136. Do the employees consider using innovation as an opportunity to develop their knowledge?
☐ Yes
☐ No

137. Are there opportunities for employees to demonstrate knowledge/innovative methods from external sources?
Yes, from previous workplaces and external training. New employees are encouraged to share about previous experiences, systems used. It is a means of pulling out new ideas and constructive criticisms - and ultimately decide as a group if we should action it or file it. Management will listen to any new idea suggested. We encourage staff to contribute whenever they can. For example the drivers came up with log schedule of deliveries in a run order. This has been implemented as a standard procedure now. Also an employee suggested how to handle products with heavy weights. It was previously an issue of manual lifting into the truck. Other examples demonstrated include the use of signage for improved safety, electrical and lighting issues. We have our systems in place, but we are always open to new ideas.
E3.2 Upgrading skills and knowledge

138. Are the employees given formal training to increase their skills? (besides on the job training)
   ☐ Yes
   ☑ No

139. How often are employees at the warehouse trained on average?
   ☐ Annually
   ☐ Semi annually
   ☐ Quarterly
   ☐ Monthly
   ☑ Ad hoc
   ☐ Depending on the performance of employee

140. What areas of formal training are they given?
   ☐ Safety
   ☐ Operations Management
   ☐ Personal Improvement and Development
   ☐ Leadership Skills
   ☐ Human Resources
   ☐ Quality and Productivity Concepts
   ☑ Other Mainly on-the-job as required, forklifts, shelving system

141. How often are employees at management level trained on average?
   ☐ Annually
   ☐ Semi annually
   ☐ Quarterly
   ☐ Monthly
   ☑ Ad hoc
   ☐ Depending on the performance of employee

142. What areas of formal training are they given?
   ☐ Safety
   ☐ Operations Management
   ☐ Personal Improvement and Development
   ☐ Leadership Skills
   ☐ Human Resources
   ☐ Quality and Productivity Concepts
   ☑ Other Not often. Mainly for computer software application and General Manager for management. Employees normally get external training on their own time and expenses in leadership, taxation.

E3.3 Problem solving and work improvement

143. Does the organisation have a system for problem solving and work improvement? If yes, what methods are used?
   They are mainly conducted at management level. There is always constant attention on improving systems and processes and fixing customer problems.
144. Are these improvements in line with strategic goals and objectives?
   Yes

145. What is the average outcome of problem solving in the organisation?
   □ Making corrections to problems and errors
   ☒ Understanding root causes of problems and errors, and preventing reoccurrence
   □ Creating new knowledge or quantum leaps

**E4 Teamwork & Empowerment**

146. Do you use team-based approaches to improvement and problem solving?
   These occur mainly at managerial or supervisory level for decision making because we have only 34 employees. There are several teams evident here in administration, order processing and warehousing. The teams are grouped according to work functions.

147. Are there any forms of empowerment given to employees in their scope of work?
   Yes, we have a rather flat structure apparent at the organisation. Everyone tries to do things right making their own decisions. There are some forms of empowerment given to employees but this is not very evident because of our size and flat structure. All the employees here are assigned set responsibilities.

**E5 Flexibility and multi-skilling**

148. Do employees cross-trained, widening their job areas so as to ensure flexibility?
   Yes, because through multi-skilling, we allow employees to take on additional responsibility for other areas of the business operations as well as to generate new ideas for improvement. But it should be mentioned that there is resistance from some employees in this regard, because they are adamant to change.

149. Do you employ additional/ temporary staff during peak or seasonal periods?
   Yes in the warehouse for forklift drivers. There is not much such staff in the office because of complex processes in some areas. They are employed during peak periods from July till December.

**E6 Adaptiveness to change**

150. Do you think that innovation involves a change in the mindset of employees?
   ☒ Yes
   □ No

151. Do employees participate enthusiastically with respect to change?
   ☒ Yes
   □ No
152. Do they give valuable input and feedback upon implementing change?
☐ Yes
☐ No

153. Does the organisation support or provide scope for personal development to support perception of change?
☐ Yes
☐ No

E7. Role of management

154. How does management deploy corporate strategies and translate them into innovative/improvement activities?
At the strategic level, we have a 5-year business plan. There is also a 1-year plan for SBUS in line with the 5-year plan. In addition, we have job description and personal goals for the SBus and each level of management leaders. We try to be innovative through implementing e-business. The improvements in systems and processes are initiated at managerial level supervising think tanks among employees. We also allow employees to come up with new ideas and suggestions for further review at meetings. We translate these improvement activities through regular meetings, where managers put strategies forward such as OHEs throughout the whole company. We also encourage employees and supervisors to furnish new ideas and suggestions. Their ideas and suggestions are always considered, discussed at meetings, and put to trial before implementing.

155. What is management’s role in developing and diffusing knowledge in employees?
To have more people cross-trained, After management’s approval, the person who suggested the improvement will be in charge of implementing and managing the idea. There is also empowerment, where we accept mistakes. It feels that it is a great opportunity to develop staff and equip them with knowledge so as to perform work functions better. We have plans for future training in OHEs. We conduct induction training with a review after 3 months.
Appendix 5D - Transcript for Firm I (Singapore)

Section A. Company Background and Business Operations

1. Please indicate what best describes your business unit.
   - [ ] Manufacturing, Assembling, Warehousing and Distribution
   - [ ] Assembling, Warehousing and Distribution
   - [x] Warehousing and Distribution of finished goods
   - [ ] Warehousing and Distribution of raw materials
   - [ ] Import and Export only of finished goods
   - [ ] Import and Export of raw materials

2. What does the ownership structure of the company look like?
   - [x] Single, privately owned business
   - [ ] Single company in a public ownership
   - [ ] Part of a small company group
   - [ ] Part of a large company group
   - [ ] Subsidiary of a multi-national corporation

3. Please indicate your position in the company
   
   Regional Assistant Manager, Business Development, Asia Pacific

4. Please name the primary product/product line of the business unit.
   
   varied products in a few industries

5. What was the business unit’s annual turnover for the last fiscal year?
   
   A$320 million

6. What is the number of employees in the business?
   
   320 (direct) 12000 (indirect)

7. What is the average Stock Keeping Units (SKUs)?
   
   1800

8. How long has this warehouse been in operation?
   
   6 years

9. What are the hours of operations?
   
   Weekdays From 9:00am to 6:00pm
   Weekends From 9:00am to 1:00pm
Section B: Contingencies

B1 Globalisation

10. Where are the logistics services provided?
   - In a particular State only (e.g. NSW)
   - Throughout Australia/Singapore
   - In a few different countries within the same region (Southeast Asia, Asia Pacific)
   - In a few different countries on different continents
   - ☑ Globally, in many countries on different continents

11. Where are the firm’s Distribution Centres located?
   - At a single site in Australia/Singapore
   - At more than one site in Australia/Singapore
   - At sites in different countries within the same region
   - At a few different sites in countries of different continents
   - ☑ At many sites globally, in countries of different continents

12. Where do innovative efforts usually take place?
   - At a single site in Australia/Singapore
   - At more than one site in Australia/Singapore
   - At sites in different countries within the same region
   - At a few different sites in countries of different continents
   - ☑ At many sites globally, in countries of different continents

13. Where does the firm obtain its machinery and equipment?
   - From a limited part of a single country
   - From throughout one single country
   - From a few different countries within the same region
   - ☑ From a few different countries on different continents
   - ☑ Globally, from many countries on different continents

14. Where does the firm recruit its people?
   - From a limited part of Australia/Singapore
   - From throughout the country
   - From a few different countries within the same region
   - ☑ From a few different countries on different continents
   - ☑ Globally, from many countries on different continents

B2 Service Customisation

15. To what extent are the services customised to the customer and how are they customised?
   We have a concept and a project division within the regional logistics team to provide consultancy and supply chain modelling services for very unique and specific projects. All these efforts are just a step towards supply chain optimisation and strategic business partnerships. We establish a matrix project team comprising geographic stakeholders, who are also specialists that are highly trained in looking at project scope, defining implementation
timelines, what are the deliverables and resource requirements, and to
analyse the financial aspect of it - if it is a money spinning business or if it
is a business not worth pursuing. We try to customise our IT applications
and operating procedures to suit the needs of customers.

B3 Process Complexity
16. How complex is the distribution process?
☐ Very simple with few distinct steps needed; and the relations between them
   are simple and clear
☐ Rather complex with several steps needed. Some of them are interrelated and
   not all of them are straightforward
☐ Complex. A large number if distinct steps are needed. Many of them are
   interrelated and difficult to understand
☐ Very complex with a large number of steps needed. They are closely
   interrelated and difficult to understand.

B4 Technological Complexity
17. How many core technologies are involved in delivering the services?
☐ Only one core technology
☐ Few (2-3) closely related core technologies
☐ Few (2-3) core technologies of different character
☐ Many (more than three) core technologies, of which some are rather similar
☐ Many (more than three) dissimilar core technologies

B5 Customer interface complexity
18. To what extent do different customers have different expectations and how easy
   is it to define those expectations?
☐ Very simple with no variation in customer expectations
☐ Simple with little variation in customer expectations existing. Almost all
   performance dimensions are easily measurable
☐ Rather complex customer interface. There is some variation in customer
   expectations. There are subtle and equivocal dimensions of some
   importance.
☐ Complex with high specificity of customer expectations, some subtle and
   equivocal dimensions are of significant importance
☐ Very complex with very high specificity of customer expectations, subtle
   and equivocal dimensions are of great importance

B6 Inter-firm Relationships
19. To what extent does the company rely on inter-firm relationships?
☐ Not at all, or almost not at all. Except for manufacturing, choice of products
   distributed, marketing, etc. The company handles everything internally
☐ Only to a limited extent. A few relationships with other companies, mainly
   concerned with manufacturing, choice of products distributed, marketing,
   transportation, etc. But they are not of strategic importance to the company
☐ Some inter-firm relationships exist. A few of these are seen as important and
   are allowed to have some influence on the company.
☐ The company has several inter-firm relationships, some of which concern
   strategically important activities, such as R&D and technology development.
The company relies heavily on many inter-firm relationships, including technology joint-ventures, R&D partnerships and other strategic alliances.

**B7 Knowledge accessibility**

20. How often does the company access new knowledge developed at universities, research centres, government organisations, professional institutions and other companies?
- Never. The company has no contact with such organisations leading to access to new knowledge.
- Rarely. The company is seldom in touch with such organisations and has difficulties getting useful knowledge from these sources.
- Sometimes. The company has sporadic contacts with these organisations and occasionally receives some useful knowledge from them.
- Rather frequently. The company has continued contacts with these organisations, which function as continuous knowledge providers.
- Very frequently. The company regards these institutions as important partners and is actively involved in joint research activities with them.

**B8 Labour turnover**

21. How high is the labour turnover in the organisation per annum?
- Very low - under 2%
- Low - 2 to 5%
- Normal - 5 to 8%
- High - 8-15%
- Very high - over 15%

22. Does the organisation recruit temporary/ contract workers?
- Yes
- No

**B9 Trade unions**

23. What percent of the firm’s workforce unionised?
- 0
- less than 25%
- between 26 and 50%
- between 51 and 75%
- More than 75%
- 100%
Section C. Drivers of Innovation

24. What are the most important factors causing your organisation to constantly improve/innovate?

The key factor compelling us to constantly look at new ways of doing things is the dynamics of globalisation. It drives our company to act in the manner of “thinking global and acting local”. We try to discard old ways that lead to unproductive wastage. Another factor is the increased price competitiveness across industry. Within the logistics industry, the prices of products such as ink-jet cartridges have reduced by 15-20% causing service providers to correspondingly lower operating costs to help companies to attain cost-saving benefits. Thirdly, we are affected by the diverse challenges that arise from different industries that they are serving. Such challenges refer to the different business models that they are operating in such as pharmaceutical companies, electronics industry and Fast Moving Consumer Goods (FMCG) industry. They all have varying needs and requirements with different transaction levels. We have to be up to speed to match their requirements.

25. Please rank the factors in order of importance to the firm.
Most important: To have a competitive edge
Second most important: To improve operational performance
Third most important: 

Section D. Organisational Capabilities

D1 Satisfying Customers
- Able to build lasting distinctiveness with customers
- Able to distinguish practices uniquely different from competitors

26. What are the issues and importance of satisfying customers?

It is importance to identify the long-term requirements in order to satisfy them. Companies have to know the expectations of customers- what they want ultimately and how their needs and wants are always differing. We need to keep up with them constantly and embrace changes in service provision.

27. How do you maintain customer satisfaction?

We assign a single point of contact in the organisation to manage the customer relationship. They consist of dedicated persons from the Global Account Division who are sales oriented focusing on the business relationship with a particular account. Each person may handle up to three (customer) accounts because their attention has to be very focused and specialised. We also ensure that all defined performance levels are met: not only within the countries, but across the entire logistics network that they are servicing. We have performance indicators jointly defined with the customers. We adopt and modify what the customers use to measure them. Different customers
will have different standards. We conduct performance audit annually to
assure customers of their service quality. Have a key account manager that
will coordinate all strategic issues (e.g., potential growth in particular
industry for customer)

D1.1 Identifying Customer Needs
28. Does the organisation perform customer segmentation?
☑ Yes
☑ No
We serve a range of customers coming from different industries such as
pharmaceuticals, electrical, etc., and therefore need to be segmented
accordingly.

29. If yes, do the services provided differ for each segment?
☑ Yes
☑ No

30. How do you collect information to anticipate the future needs of your customers,
and keep up with customers’ changing expectations?
We exchange and collect information through conferences, seminars, and
through a professional body membership known as the Chartered
International Transport Association. Within the organisation, we also set up
industry-based competency centres – to understand customers’ needs,
requirements and to develop expertise in those industries such as
pharmaceuticals, chemical, electronics, etc.

31. How does your organisation identify new and different ways to satisfy
customers?
We ensure that all their commitments are met, and that solutions to
customers are improved over the contractual period. There is also top-down
management attention to make sure that the relationship with customers is
strengthened over time. This is to ensure that whenever there are future
business opportunities, customers will always bear their company in mind,
and to approach us as their preferred partner.

32. Are you flexible and adaptive to unique requests?
Yes, we encourage all parties to contribute ideas during brainstorming
sessions. In the case of service delinquencies, we will register what are the
service-related and operational issues that are put forth by customers. We also
design over time, different programmes to overcome operational issues and
accommodate new requests that spawn out from customers.

33. How do you accommodate unexpected situations?
We have contingency planning – i.e., making advance preparations to
continue business activities with customers in case of a disruption such as
floods, fires, or any natural catastrophes. We make contingency plans for
customers for various scenarios using risk analysis – what if something were
to go wrong, business impact analysis – what is the magnitude of such a
disaster affecting business continuity of customers. We conduct business impact analyses to explore the magnitude of natural disasters affecting the business continuity of customers. Having several branches worldwide, we need to make advance preparations, in case of disruption such as floods, fires or any natural catastrophes.

D1.2 Safety Stock
34. How do you forecast future demand?
   We consider ourselves as a 3rd party logistics provider. So we do not do materials or inventory forecasting on behalf of our customers. Inventory demand is dependent on market demand fluctuations and also affected by shortening of product life-cycle, risk of obsolescence. However customers share their information on inventory management and purchasing. In return, if we expect some fluctuation in demand or have new product launches, we will share the information.

35. How much safety stock does the warehouse keep to prevent out-of-stock situations?
   Do not do much inventory forecasting. But help customers to keep track of their inventory based on a minimum and maximum level or parameters set.

36. How does the organisation ensure the level of safety stock?
   Nil.

37. Does the organisation determine the value of active item inventory in planning for safety stock?
   ☑ Yes
   ☐ No

D1.3 Time Pressure
38. Do you have different lead times for different customers?
   ☑ Yes
   ☐ No

39. What is the average lead time for despatching goods to KEY customers upon receipt of orders?
   ☑ Within the same day
   ☐ The next day
   ☐ 2 – 3 days
   ☐ 4 – 6 days
   ☐ One week or more
   ☐ Other ____________________

40. What is the average lead time for despatching goods to normal customers upon receipt of orders?
   ☑ Within the same day
   ☐ The next day
   ☐ 2 – 3 days
D2 Integrating internal operations

- Able to perform operations with efficiency
- Able to link processes to support customer requirements

41. What are the issues and importance of integrating the operations in the organisation?
   First of all, to integrate our operations we have to consider internally our resources, and externally the market, and customers' needs as well. From there, we can plan the coordinated efforts of all the departments and personnel. Managers cannot just be myopic and focus on their departments or work areas. They have to look at the organisation holistically. There is no doubt, our organization is growing constantly with complexity of operations and services. In the past three years alone, our services, activities and operations have changed. This is because logistics is a booming industry and there are many competitors out there. We try to standardise or streamline operations in order to achieve efficient integration.

D2.1 Receiving and despatching

42. How many receiving and despatching docks does the warehouse have?
   60 docks located on 5 levels

43. How much time on average is spent on counting and inspection per pallet of receipt?
   2 minutes

44. How long does it take to unload when receiving goods?
   - Less than 5 minutes
   - 5-10 minutes
   - 10-15 minutes
   - 15-20 minutes
   - 20-25 minutes
   - 25-30 minutes
   - More than 30 minutes
   - Other

45. How long does it take to load when despatching goods?
   - Less than 5 minutes
   - 5-10 minutes
   - 10-15 minutes
   - 15-20 minutes
   - 20-25 minutes
   - 25-30 minutes
   - More than 30 minutes
   - Other
46. When are the peak periods normally encountered in the warehouse and at what time of the day?
   The peak periods occur normally when from 9:00am to 11:00am; and there are four seasonal peaks during the year.

D2.2 Defective/Damaged Goods
47. What is the percentage or value of defective, damaged or soiled goods received from suppliers?
   0.02%

48. What is the percentage or value of defective, damaged or soiled goods from the warehouse as a result of handling, storage and despatching?
   0.06%

49. What failsafe methods are implemented to prevent defective, damaged or soiled goods to customers?
   Proper skill training and supervision by seniors. Sometimes, our stock gets damaged by natural calamities or instances beyond control such as fire, floods or accidents. We recently experienced an unpleasant loss due to a faulty sprinkler system at the Distribution Centre. A large amount of goods had to be written off because the packaging was wet and affected the quality of their products. We have posters and reminders pasted on the walls in the Distribution Centre for efficient handling. This includes aspects for machinery and equipment to handle goods such as forklifts or conveyor belts.

D2.3 Stock Location
50. What is the location control system implemented for stock positioning?
   □ Personal knowledge
   ☑ Logical sequence (product code sequence)
   □ Stock location information system (random sequence)
   □ Other

D2.4 Order Picking
51. Which method is used for order picking in the warehouse by employees?
   □ Picking one order at a time according to customer
   □ Picking half the day’s order at a time
   □ Picking the whole day’s order at a time
   ☑ Other __Batch picking of multiple orders per customer____

D2.5 Stocktaking
52. Does the warehouse conduct
   ☑ physical inventory taking OR
   ☑ cycle counting (according to usage value)

53. How often is this carried out?
   □ Whenever stockkeeper has opportunity
   □ During normal stocking/issuing
   □ When items are at their lowest stock level
D2.6 Inventory Shrinkage

54. What is the cost of inventory shrinkage per annum?
   Maximum of 0.02% of inventory worth

55. What are the main reasons for inventory shrinkage?
   ☑ Pilferage/theft
   ☑ Stock item incorrectly recorded
   ☑ Stock items not recorded
   ☑ Other

56. How does the organisation minimise inventory shrinkage?
   ☑ Automated storage and retrieval system software
   ☑ Barcoding
   ☑ Personal accountability/ Stockkeeper identification for items handled
   ☑ Cycle Counting
   ☑ Physical Inventory Counting
   ☑ Other

D2.7 Space Utilisation

57. Do you have racks and shelves flexible enough to be modified and adjusted to fit goods of odd shapes and sizes?
   ☑ Yes
   ☑ No

58. If yes, are the racks and shelves able to add
   ☑ Extra shelves
   ☑ Dividers
   ☑ Bin inserts
   ☑ Other

D2.8 Growth and Expansion

59. Is there any scope/provision for growth and expansion in the warehouse and distribution facilities?
   ☑ Yes
   ☑ No

60. If yes, how has the structure and layout of the warehouse been designed to accommodate for this?
   (e.g. extra land space for future construction, convertible sheds, extendable shelves for greater height.)
   Nil

61. Has the organisational structure been reviewed or changed in the last 5 years?
   ☑ Yes
   ☑ No
62. Has this change benefited the organisation and streamlined internal operations?
☐ Yes
☐ No
☐ Other They are based on ISO 9002

63. D2.9 Organisational Policies and Procedures
Do all the departments here have standardised policies and procedures?
☐ Yes
☐ No

64. What areas are those policies and procedures targeted mainly at?
☐ Human Resource
☐ Operations
☐ Planning
☐ Management
☐ Other

65. What areas do the company mission/vision target at?
☐ Employees
☐ Service Delivery
☐ Safety
☐ Innovation
☐ Customer Focus
☐ Costs
☐ Quality
☐ Profit
☐ Growth
☐ Others Market Leadership

66. D2.10 Cross-functional unification
Is there any form of cross-functional unification across departments in the organisation? How is this evident and facilitated?
Yes, we try to achieve cross-functional unification. This is through better communication and the sharing of information more liberally.

67. Do you exchange departmental information across the organisation?
☐ Yes
☐ No

68. How is this done?
☐ Notice Boards
☐ Emails
☐ Memos
☐ Newsletter
☐ Other

69. What information is shared across departments?
Information pertaining to operations, sales, profit, policies is exchanged.
D3 Managing Technology

- Able to maintain information systems to support operations and processes
- Able to maintain automation for improved operations

70. Is the use of Information and Communication technology necessary or important for innovation to occur?
   □ Yes
   □ No

71. Please list the areas where automation is evident.
   □ Conveyance systems
   □ Conveyance devices
   □ Storage and retrieval systems
   □ Computer controllers
   □ Handheld and in-transit barcode readers and scanners
   □ Lift and transport equipment
   □ Others ______

72. What is the average depreciation rate of your automated equipment and facilities?
   12% per annum

73. Do you have the computer softwares/technology to share standardised and customised information internally?
   □ Yes
   □ No

D4 Collaborating with partners in Supply Chain

- Able to link external operations harmonious with internal processes

74. What are the issues and importance of linking with external partners in the supply chain?
   When we link with partners, there must be some sharing of information and resources. It is inevitable sometimes where strategic information will have to be shared. There is also the importance of cooperation allocation of resources.

75. Do you have standardised operations with suppliers and customers?
   □ Yes
   □ No

76. How do you maintain standardised operations with suppliers and customers?
   Through documentation. All the offices carry a copy of the operating procedures that are relevant to the local environment. These documents are updated periodically to reflect changes in the environment and technological improvement. We conduct comprehensive audits on these standards on a regular basis whereby subcontractor adherence to such policies are also compulsory.
77. Do you have joint planning with suppliers and customers?
☐ Yes
☐ No

78. On what issues do you joint plan with suppliers and customers and how frequently?
We joint plan on the operating capacity – what are the forecasted achievement volumes, the reductions for inventory in storage, certain engineering changes, or the new product launch and negotiation on service lease.

79. Do you share information with suppliers and customers?
☐ Yes
☐ No

80. What information is exchanged?
We share information on our Human Resource movement (top management personnel changes), strategic development within the organisation such as regionalisations and acquisitions of subsidiaries or suppliers, the financial status from the annual profit and loss statements, and our international accreditation such as International Air Transport Association (IATA) rating. This rating is based on shipment volume in Asia-Europe lanes for freight forwarding and logistics provision.

81. How do you share such information and how frequently?
We share information through integrated computer systems, performance reports, key performance indicators, monthly corporate newsletters, monthly management meetings & Quarterly Business Reviews with customers and supplier separately.

82. Do you share processes with suppliers and customers?
☐ Yes
☐ No

83. What are the processes and how are they shared?
They are mainly recycling, we give incentive programmes or rebates on expenditure on expandable items. In the past, when we shipped goods out from the Distribution Centre, we often do not get back the pallets that we own. So we have introduced rebates for customers in helping the company reduce cost on purchasing the pallets. For example, out of the 150 pallets shipped out, and 120 returned, customers get to enjoy a huge discount on the service charge. This is because they have helped the organisation save on pallet cost. Other incentives given are for reverse logistics such as the refurbishment and minor rework of damaged products to get them back into saleable condition. These schemes enable customers to be more proactive to observing policies and procedures that we have set.
84. Do you link operational synchronisation and interface with suppliers and customer?
☐ Yes
☐ No

85. How is it linked?
With customers, we use EDI and provide event feasibility by feeding data from our database into customer's system. We also provide websites associated with authorised password for online shipment tracking and tracing.

86. Do you engage in joint investments with suppliers and customers?
☐ Yes mainly with customers
☐ No

87. What are the investments?
The investments are on capital equipment, storage facilities and IT application such as SAP software. We could finance the software first, SAP implementation and customisation costs, and then amortise it over the contractual period - so that customers can pay back in instalments. We do not mind sharing the investments with customers, but would prefer if suppliers could invest in them.

88. Do you
☐ Provide own transportation in despatching
☐ Contract out to transport companies

D5 Reviewing Performance

- Able to develop and maintain measurement systems to facilitate strategies and processes

D5.1 Overall performance measurement

89. Has the overall performance measurement system improved in the last three years?
☐ Yes
☐ No

90. Has the number of performance measures tracked increased in the last three years?
☐ Yes
☐ No

91. Has the accuracy of performance tracking methods increased in the last three recent years?
☐ Yes
☐ No

There are numerous performance indicators computed yearly, some of which were not fully analysed or considered for operations. It is difficult to come to a general action plan, and each area has to be looked at separately.
92. Has the quality of performance data improved in the last three years?
☑ Yes
☐ No

D5.2 Benchmarking, KPIs and maintaining standards
93. Does the organisation use standards of comparisons in measuring its performance?
☑ Yes
☐ No

94. If yes, are they based on
☐ International Standards
☐ National standards
☑ Industry Standards
☐ Organisational Standards
☐ Other __________

D5.3 Assessing leadership
95. Does the organisation carry out periodic assessment of management and leadership?
☑ Yes
☐ No

96. If yes, which of the following areas of management are reviewed?
☐ Communicating and implementing organisation goals and objectives
☐ Guiding and achieving various departmental goals
☐ Effectively communicating and promoting the values of Continuous Innovation, quality and customer focus
☑ Involved in the activities of Continuous Innovation, quality and customer focus
☐ Enriching leadership skills (thru education, training and development)
☑ Recognising and rewarding employees for achievements

D5.4 Assessing strategic planning
97. Are there constant review and evaluation of plans to reflect customer satisfaction, quality, operational performance and Continuous Innovation?
☑ Yes
☐ No

98. Are the plans periodically adjusted to reflect changes in business conditions, customer requirements and the competitive environment?
☑ Yes
☐ No

99. Does the organisation ensure that the resources such as financial and human resource are in place to support effective execution of strategic plans?
☑ Yes
☐ No
D5.5 Assessing the use of information and analysis
100. Does the organisation use data and information on suppliers and customers for performance evaluation, planning and day-to-day management?
- Yes
- No

101. Are the data and information made readily accessible to all employees?
- Yes
- No

102. Has the organisation achieved beneficial results in key processes, service improvements from evaluating such data and information?
- Yes
- No

D5.6 Assessing Human Resource
103. Is there a human resource plan covering all areas in recruitment, selection, training and development, compensation and benefits, employee recognition and employee involvement?
- Yes
- No

The people are the most important resource of any organisation and need to be effectively managed. It is most definite that we assess our human resource at all times.

104. Does the organisation reward employee behaviour that supports values of Continuous Innovation, quality and customer focus in the organisation?
- Yes
- No

105. Does the organisation have a system to determine employee’s education, training and development needs to meets organisation’s goals and objectives?
- Yes
- No

106. Does the organisation review and evaluate the impact of education, training and development on the overall performance of the firm?
- Yes
- No

107. Which areas are evident in the organisation’s human resource programme?
- Creating congenial work environment
- Maintaining safe work environment
- Comparable compensation and benefits packages as with industry or competitors
- Collecting information and conducting analysis on employee satisfaction
D5.7 Assessing Processes quality and management
108. Does the organisation have clear objectives and targets for processes which are linked to overall business goals and strategies?
☑ Yes
☐ No

109. Does the organisation review and continuously improve processes such that they are in line with meeting customer requirements?
☑ Yes
☐ No

110. Does the organisation assess the quality of goods and services provided by suppliers?
☑ Yes
☐ No

D5.8 Assessing customer satisfaction
111. Does the organisation periodically assess the ability to maintain relationships with customers?
☑ Yes
☐ No

I must stress the importance in obtaining knowledge of customer requirements and expectations, to assist in developing future plans. The relationship with customers is important because it represents far higher levels of commitment to the firm and longer customer retention.

112. Does the organisation review the knowledge obtained on expectations and requirements of customers and develop improvement plans?
☑ Yes
☐ No

We have performance indicators jointly defined with our customers. We adopt and modify what the customers use to measure them. As a result, different customers will have different standards... We conduct performance audits annually to assure customers of their service quality.

D5.9 Assessing operational results
113. Which of the following performance indicators does the organisation deploy most of the time for Customer Service?
☑ Fill rate ☑ Cycle time ☐ Customer Complaints
☐ Stockouts ☐ Delivery consistency ☐ Sales Force complaints
☑ Despatch errors ☑ Response time to enquiries
☑ On-time delivery ☐ Response Accuracy ☑ Overall reliability
☑ Backorders ☐ Complete Orders ☐ Overall satisfaction
114. Which of the following performance indicators does the organisation deploy most of the time for Cost Management?

☐ Total cost  ☐ Cost per unit  ☐ Cost as % of sales
☐ Inbound freight  ☐ Outbound freight  ☐ Admin
☐ Inventory carrying  ☐ Direct labour  ☐ Cost trend analysis
☐ Cost of damage  ☐ Cost of backorder  ☐ Cost of service failures
☐ Cost of returned goods  ☐ Comparison of actual vs budget  ☐ Warehouse order processing
☐ Direct product profitability  ☐ Customer segment profitability

115. Which of the following performance indicators does the organisation deploy most of the time for Quality?

☐ Damage frequency  ☐ Order entry accuracy  ☐ Picking/despatch accuracy
☐ Info accuracy  ☐ Info availability  ☐ Document/invoice accuracy
☐ No. of credit claims  ☐ No. of customer returns

116. Which of the following performance indicators does the organisation deploy most of the time for Productivity?

☐ Units despatched per employee  ☐ Units per labour dollar
☐ Order per sales representative  ☐ Comparison with historical standard
☐ Goal programme  ☐ Productivity Index
☐ Equipment downtime  ☐ Order entry productivity
☐ Warehouse labour productivity

117. Which of the following performance indicators does the organisation deploy most of the time for Asset Management?

☐ Inventory turn  ☐ Obsolete inventory
☐ Return on net assets  ☐ Inventory levels (no of days supply)
☐ Return on investment  ☐ Inventory classification
☐ Economic Value Added (EVA)

118. Have the KPIs shown positive improvement trends over the last three years and met the targets set previously?
☐ Yes
☐ No

119. How do the results for the KPIs compare with those of competitors and/or benchmarks?
☐ Better
☐ Worse
☐ The same

120. How does the organisation identify problems and suggest ways of improving?
☐ through quality circles
☐ through work improvement teams
☐ through suggestion schemes
☐ through periodic meetings
☐ others

121. How often are these improvements implemented and what are the main issues?
The main issues are on working hours flexibility, working overtime during peak season, and work conditions. Supervisors act as representatives of shop-floor level workers at the warehouse. They speak on behalf of them as to what issues they are facing. They give information in a bottom-up fashion as they know the shop-floor conditions best. The employees give suggestions and feedback to management.

D6 Managing Change
- Able to realign operations and strategies to result in creative ideas, improved service and lower costs

122. Has the organisation had a change in operations or strategies in the last 5 years?
☐ Yes
☐ No

123. What were the main reasons for a change? (Pls rate according to priority e.g. 1 = most important, 2 = second most important, 3 = third most important)
[2] To operate more efficiently
☐ To reduce costs/ increase profits
[3] To increase the value of services for customer satisfaction
[1] To keep up with competition
☐ To keep up with technology
☐ To adhere to external push (e.g. supplier, customers, parent organisation, HQ, etc)
☐ To allow for Continuous Innovation or improvements

124. Are the employees generally adaptive to changes in processes and operations?
☐ Yes
☐ No

125. What is the rate of resistance to change in the organisation?
☐ Less than 10% of the workforce
☐ 10-25% of the workforce
☐ 25-50% of the workforce
☐ more than 50% of the workforce

126. Where does most of the resistance come from?
☐ Warehouse floor
☐ Supervisors and middle management
☐ Senior Management
☐ All levels

127. What measures have been taken to minimise such resistance?
Employees have to be adequately informed, trained. Management needs to be more competent and effective.
Section E. Individual Competencies

E1. Creativity

128. Is the organisation able to tap into the creative abilities of employees? If yes, how is this done?
Yes, this is fostered through teamwork or group activities. It is one of the main channels to realise creative skills of employees. When they are in teams, they can interact, understand problems or situations better and be more proactive.

129. Is management encouraged to foster an environment for creativity? If yes, how is this done?
Yes, our supervisors and managers are advised to demonstrate an open-door policy. They are normally approachable and open to new ideas or suggestions. People have to be flexible and more involved in their work. Only then can they be creative.

130. Do creative outcomes from employees are linked to productive and competitive success in the organisation?.
☐ Yes
☐ No

E2. Effective Communication

131. Is the structure flexible enough to allow communication to all levels quickly?
☐ Yes
☐ No

132. Does the structure of the organisation allow for cross-functional communication to occur?
☐ Yes
☐ No

133. Does cross-functional communication enable employees to be more innovative in the organisation?
☐ Yes
☐ No

134. Does the communication system openness, sharing and knowledge transfer for the purpose of organisational innovations?
☐ Yes
☐ No
E3. Learning

E3.1 Diffusing Knowledge
135. How is the knowledge shared and diffused to other employees? Is this made readily available to all employees?
   (e.g. through databases, reports, process standards)
   Through corporate database, intranet, monthly periodicals, in-house skills enhancement programmes, and the circulation of documented operating manuals.

136. Do the employees consider using innovation as an opportunity to develop their knowledge?
   ☑ Yes
   ☐ No

137. Are there opportunities for employees to demonstrate knowledge/innovative methods from external sources?
   Yes, an example is that every new employee will have to go through an On-the-job-training (OJT). This is to help them to share with their respective department managers what are the previous skills set that they have learnt from their past workplace. This will give them a chance to clearly demonstrate what qualities they have.

E3.2 Upgrading skills and knowledge
138. Are the employees given formal training to increase their skills? (besides on the job training)
   ☑ Yes
   ☐ No

139. How often are employees at the warehouse trained on average?
   ☐ Annually
   ☑ Semi annually
   ☐ Quarterly
   ☐ Monthly
   ☐ Ad hoc
   ☐ Depending on the performance of employee
   Apart from external training, we have in-house skills enhancement programmes conducted, similar to a structured classroom environment. These programmes give them updates about trends in the logistics industry.

140. What areas of formal training are they given?
   ☐ Safety
   ☐ Operations Management
   ☐ Personal Improvement and Development
   ☐ Leadership Skills
   ☐ Human Resources
   ☐ Quality and Productivity Concepts
   ☑ Other skill enhancements include forklift driving, capital equipment operating course
141. How often are employees at management level trained on average?
- Annually
- Semi annually
- Quarterly
- Monthly
- Ad hoc
- Depending on the performance of employee

142. What areas of formal training are they given?
- Safety
- Operations Management
- Personal Improvement and Development
- Leadership Skills
- Human Resources
- Quality and Productivity Concepts
- Other courses on governmental regulations and policies affecting growth and operation conditions in the region. As often the budget permits, commit 4% of annual revenue for training. The frequency of training and number of people trained does not matter, so long as they utilise the stated funds allowed.

**E3.3 Problem solving and work improvement**

143. Does the organisation have a system for problem solving and work improvement? If yes, what methods are used?
- Quality Circles. Work improvement teams, periodic meetings. Improvements in the organisation occur mainly in a bottom-up fashion, where supervisors act as representatives of shop-floor level workers at the Distribution Centre. They speak on behalf of them, as to what issues they are facing, giving information, suggestions and feedback to management.

144. Are these improvements in line with strategic goals and objectives?
Yes. Continuous improvement is a prime concern to the organisation. We relentlessly seek improvement in certain areas such as international and domestic freight forwarding operations; warehousing, distribution and value-added services; and IT management.

145. What is the average outcome of problem solving in the organisation?
- Making corrections to problems and errors
- Understanding root causes of problems and errors, and preventing reoccurrence
- Creating new knowledge or quantum leaps

**E4. Teamwork & Empowerment**

146. Do you use team-based approaches to improvement and problem solving?
- Yes
- No

147. Are there any forms of empowerment given to employees in their scope of work?
Yes
☐ No

It is apparent that empowerment only seems to occur at middle management. It is not clearly perceptible at the supervisory or lower levels. The operational staff mainly received instructions and had to execute accordingly based on plans.

E5 Flexibility and multi-skilling

148. Do employees cross-trained, widening their job areas so as to ensure flexibility?
☐ Yes
☐ No

149. Do you employ additional/ temporary staff during peak or seasonal periods?
☐ Yes
☒ No

E6 Adaptiveness to change

150. Do you think that innovation involves a change in the mindset of employees?
☒ Yes
☐ No

151. Do employees participate enthusiastically with respect to change?
☒ Yes
☐ No

152. Do they give valuable input and feedback upon implementing change?
☒ Yes
☐ No

153. Does the organisation support or provide scope for personal development to support perception of change?
☒ Yes
☐ No

E7. Role of management

154. How does management deploy corporate strategies and translate them into innovative/improvement activities?

Top management focus more on the strategic planning, whereas regional, middle and lower management will be in charge of the operations and executing plans. They meet monthly and brainstorm on areas of improvement, productivity, staff morale and changes to reduce operating costs. An example of a strategy just implemented is the Economic Value Management. We have financial specialists travelling to different regions to educate all staff on the concept. Senior management will have to be receptive to the ideas and policies. Then we will have a meeting or announcement through the intranet to all levels of staff. Following this, the organisation will allow for feedback session from all levels on constraints faced at all levels in the implementation. At the same time, they will be told the benefits...
of the strategy and be more motivated to partake and to accept the new strategy.

155. What is management’s role in developing and diffusing knowledge in employees?
We do not encourage experimentation in the organisation because we consider that in the logistics industry, we have to work on a very thin margin. Mistakes will cost us and erode the profits made. All new ideas and suggestions will be highly evaluated first and given management’s approval before put into action. We have to strive to either save cost, enhance service level, or better satisfy customers.
Appendix 5E – Ethics Approval

Human Research Ethics Committee

Ethics Officer
Sharon Falleiro
Phone: (02) 97726785
Email: s.falleiro@uws.edu.au

Memo To : A/Prof R. Chapman, Ms Claudine Soosay

From : Debra Moodie

Date : 19.3.01

Project : Mac ERC 2000/094 “Management of continuous innovation in the service sector”, A/Prof R. Chapman, Ms Claudine Soosay

I am pleased to inform you that the Human Research Ethics Committee has granted full ethics approval for your project.

<table>
<thead>
<tr>
<th>Project</th>
<th>Management of continuous innovation in the service sector.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commencement Date</td>
<td>19.3.01</td>
</tr>
<tr>
<td>Approval valid to</td>
<td>18.3.02</td>
</tr>
<tr>
<td>Committee Approval No.</td>
<td>Mac ERC 2000/094</td>
</tr>
</tbody>
</table>

The Committee normally grants Approvals for a maximum twelve-month period. A final report should be submitted on completion of the project if this occurs within twelve months. If the research project is to continue beyond the twelve months, the principal researcher is required to submit a progress report and seek an extension.

The Principal investigator is required to report immediately anything that may affect the ethical acceptance of the project to the Committee, including any proposed modifications to the project, adverse effects on participants, unforeseen events that may affect continued ethical acceptability of the project. Should you encounter any ethical issues or dilemmas, you are encouraged to contact any member of Committee for advice.

The above approval number must be quoted in all future correspondence regarding this project.

Kind Regards,

Debra Moodie
D/Chair, Hawkesbury HREC
Appendix 7A - Document Listing in NVivo

NVivo revision 1.3.146  Licensee: Claudine Soosay
Project: Claudine's Project  User: Administrator  Date: 14/10/2002 - 9:21:31 PM
DOCUMENT LISTING

Documents in Set:  All Documents
Created:  27/06/2002 - 8:02:14 AM
Modified:  27/06/2002 - 8:02:14 AM
Number of Documents:  57
1  Firm A contingencies
2  Firm A Interview
3  Firm A intro
4  Firm A Performance indicators
5  Firm A Questionnaire
6  Firm B Contingencies
7  Firm B Interview
8  Firm B intro
9  Firm B Performance Indicators
10  Firm B Questionnaire
11  Firm C Contingencies
12  Firm C Interview
13  Firm C intro
14  Firm C Performance Indicators
15  Firm C Questionnaire
16  Firm D - Memo
17  Firm D Contingencies
18  Firm D Interview
19  Firm D intro
20  Firm D performance Indicators
21  Firm D Questionnaire
22  Firm E Contingencies
23  Firm E Interview
24  Firm E intro
25  Firm E Performance Indicators
26  Firm E Questionnaire
27  Firm F - Memo
28  Firm F Contingencies
29  Firm F Interview
30  Firm F intro
31  Firm F Performance indicators
32  Firm F questionnaire
33  Firm G Contingencies
34  Firm G Interview
35  Firm G intro
36  Firm G Performance Indicators
37  Firm G Questionnaire
38  Firm H Contingencies
39  Firm H interview
40  Firm H intro
Appendices

41  Firm H Performance Indicators  
42  Firm H Questionnaire  
43  Firm I Contingencies  
44  Firm I Interview  
45  Firm I intro  
46  Firm I Performance Indicators  
47  Firm I Questionnaire  
48  Firm J Contingencies  
49  Firm J Interview  
50  Firm J intro  
51  Firm J Performance Indicators  
52  Firm J Questionnaire  
53  Lit Review 1  
54  Lit Review 2  
55  Lit Review 3  
56  Lit Review 4  
57  reflections
Appendix 7B - Node Listing in NVivo

NVivo revision 1.3.146  Licensee: Claudine Soosay
Project: Claudine's Project  User: Administrator  Date: 14/10/2002 - 9:10:20 PM
NODE LISTING

Nodes in Set:  All Tree Nodes
Created:  27/06/2002 - 8:02:14 AM
Modified:  14/10/2002 - 8:53:19 PM
Number of Nodes:  193

1 (1) /literature review
2 (2) /context--contingencies--extent
3 (2 1) /context--contingencies--extent
4 (3) /Strategy
5 (3 1) /Strategy/positioning
6 (3 1 7) /Strategy/positioning/competition
7 (3 1 8) /Strategy/positioning/measurement systems
8 (3 3) /Strategy/re employees
9 (3 3 1) /Strategy/re employees/recruit
10 (3 3 2) /Strategy/re employees/challenge
11 (3 3 3) /Strategy/re employees/mindset
12 (3 4) /Strategy/operational
13 (3 4 1) /Strategy/operational/speed
14 (3 4 2) /Strategy/operational/efficiency
15 (3 4 3) /Strategy/operational/being at the leading edge
16 (3 4 6) /Strategy/operational/improving process
17 (3 9) /Strategy/financial
18 (3 9 4) /Strategy/financial/reducing cost
19 (3 9 5) /Strategy/financial/profits
20 (4) /Orientation
21 (4 1) /Orientation/shareholder orientation
22 (4 2) /Orientation/employee orientation
23 (4 4) /Orientation/customer orientation
24 (5) /attitudes
25 (5 1) /attitudes/respect
26 (5 2) /attitudes/standardising
27 (6) /Issues
28 (6 1) /Issues/positioning
29 (6 1 1) /Issues/positioning/competition
30 (6 2) /Issues/operational
31 (6 2 1) /Issues/operational/efficiency
32 (6 2 2) /Issues/operational/being at the leading edge
33 (6 3) /Issues/financial
34 (6 3 1) /Issues/financial/reducing cost
35 (6 3 2) /Issues/financial/profits
36 (7) /Satisfying customer
37 (7 1) /Satisfying customer/fulfil requirement
38 (7 2) /Satisfying customer/relationship and feedback
39 (7 3) /Satisfying customer/handling grievance and complaints
40 (7 4) /Satisfying customer/being flexible
41 (7 5) /Satisfying customer/quality and value of service
42 (8) /Formal questions
43 (8 1) /Formal questions/Questions from group interviews
44 (8 1 1) /Formal questions/Questions from group interviews/Drivers of Innovation
45 (8 1 1 3) /Formal questions/Questions from group interviews/Drivers of Innovation/What are the most important factors
46 (8 1 3) /Formal questions/Questions from group interviews/Capabilities
47 (8 1 3 4) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers
48 (8 1 3 4 2) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Time pressure
49 (8 1 3 4 5) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs
50 (8 1 3 4 5 6) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs/How do you maintain customer satisfaction
51 (8 1 3 4 5 7) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs/Do you collect information to anticipate future demand
52 (8 1 3 4 5 8) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs/Does your organisation identify new and different ways
53 (8 1 3 4 5 9) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs/To what extent are the services customised
54 (8 1 3 4 5 10) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs/Are you flexible and adaptive to unique requests
55 (8 1 3 4 5 11) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Identifying Customer Needs/How do you accommodate unexpected situations
56 (8 1 3 4 12) /Formal questions/Questions from group interviews/Capabilities/Satisfying Customers/Forecasting and Planning

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Appendices

57 (8 1 3 4 12 13) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Forecasting and Planning/How do you forecast future demand—
58 (8 1 3 4 14) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Safety Stock
59 (8 1 3 4 14 15) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Safety Stock/How much—percentage, dollar value of stock
60 (8 1 3 4 14 16) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Safety Stock/Does the organisation consider the order level
61 (8 1 3 4 14 17) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Safety Stock/Does the organisation determine the
62 (8 1 3 4 14 17 18) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Safety Stock/Does the organisation determine the/How do you ensure the appropriate le
63 (8 1 3 4 14 19) Formal questions/Questions from group interviews/ Capabilities/Satisfying Customers/Safety Stock/What is your annual stock turnover—
64 (8 1 3 6) Formal questions/Questions from group interviews/ Capabilities/Managing change
65 (8 1 3 7) Formal questions/Questions from group interviews/ Capabilities/Managing technology
66 (8 1 3 7 63) Formal questions/Questions from group interviews/ Capabilities/Managing technology/How is it linked—
67 (8 1 3 9) Formal questions/Questions from group interviews/ Capabilities/Reviewing performance
68 (8 1 3 20) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations
69 (8 1 3 20 1) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement
70 (8 1 3 20 1 48) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/Are there opportunities for employees
71 (8 1 3 20 1 49) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/Do you use any team-based approaches
72 (8 1 3 20 1 49 70) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/Do you use any team-based approaches/Are there team-based approaches in the organisation
73 (8 1 3 20 1 49 71) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/Do you use any team-based approaches/Do you use team-based approaches to
74 (8 1 3 20 1 50) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/What sort of teams do you use—
75 (8 1 3 20 1 51) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/How often are these improvements implemented
76 (8 1 3 20 1 52) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/Are these improvements in line with organisational goals
77 (8 1 3 20 1 54) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Problem solving and work improvement/Do the employees consider using innovation as a means
78 (8 1 3 20 3) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Role of mgt in
diffusing strategy
79 (8 1 3 20 3 53) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Role of mgt in
diffusing strategy/How does management deploy corporate strategy
80 (8 1 3 20 3 55) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Role of mgt in
diffusing strategy/What is management's role in develop
81 (8 1 3 20 3 56) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Role of mgt in
diffusing strategy/How is the knowledge shared and diff
82 (8 1 3 20 2 1) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Organisational Policies and Procedures
83 (8 1 3 20 2 1 22) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Organisational Policies and Procedure/Do the all departments have standardised policies and procedures
84 (8 1 3 20 2 1 23) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Organisational Policies and Procedure/At what areas are these policies and procedures targeted
85 (8 1 3 20 2 1 24) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Organisational Policies and Procedure/What areas do the company mission—vision target
86 (8 1 3 20 2 1 26) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Organisational Policies and Procedure/Do you have standardised operations
87 (8 1 3 20 3 7) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Employee Training and Development
88 (8 1 3 20 7 38) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Employee Training and Development/ Are the employees given formal training
89 (8 1 3 20 7 39) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Employee Training and Development/On average, how often at the warehouse
90 (8 1 3 20 7 40) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Employee Training and Development/Where does this formal training
91 (8 1 3 20 7 41) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Employee Training and Development/On average, how often are employees
92 (8 1 3 20 4 2) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Empowerment/
Empowerment/Are there any forms of empowerment given
93 (8 1 3 20 4 2 44) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Empowerment/If yes, how—
94 (8 1 3 20 4 5) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal operations/Flexibility—
Multi-skilling
95 (8 1 3 20 4 5 46) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal operations/ Flexibility—
Multi-skilling/ Are employees cross-trained, widen
96 (8 1 3 20 4 5 47) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal operations/ Flexibility—
Multi-skilling/ Do you employ additional— temporary
97 (8 1 3 20 2 7) Formal questions/Questions from group interviews/ Capabilities/Integrating Internal Operations/Culture

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Appendix 7C - Sample of search listing on creativity

NVivo revision 1.3.146  Licensee: Claudine Soosay
Project: Claudine's Project  User: Administrator  Date: 14/10/2002 - 9:10:20 PM

NVivo search results on single text lookup- Node Browser
"Creativity" from 4 docs (Lit Review 1, Lit Review 2, Lit Review 3, Lit Review 4)

Document 'Lit Review 1', 3 passages, 30 characters.

Section 3, Paragraph 23, 10 characters.
Kuhn (1985), in discussing creativity, suggests that it forms something from nothing; then innovation shapes that something into products and services (Kuhn, 1985). Another similar view from Badaway (1988) states that creativity brings something new into being and innovation brings something new into use. Other authors such as Urabe (1988) contend that innovation is the generation of a new idea and its implementation into a new product, service or process. This leads to dynamic growth of the national economy and increase in employment as well as the creation of profit for the innovative enterprise (Urabe, 1988).

Section 3, Paragraph 35, 10 characters.
It is evident that over the years, the concept of innovation has subtly changed. From the 1960s and 1970s, authors regarded innovation as a process in the induction of change, or the generation of new ideas (Cumming, 1998). However in recent years, many authors appear to agree that creativity is essential to innovation. The definitions include conditions such as success, effectiveness, profitability, satisfied customers and business competitiveness. In looking at all of these authors’ views, Cumming (1998) concluded broadly that innovation needs to have the successful application of a product, service or process in general.

Document 'Lit Review 2', 26 passages, 260 characters.

Section 1, Paragraph 15, 10 characters.
Wang and Ahmed (2002) propose that the learning approach should embody a triple-loop learning. It involves knowledge creation and is about re-evaluating all existing techniques and systems, reconsidering where the organisation should stand in the marketplace, and how to redefine existing techniques and systems, develop new concepts, and even change fundamentals of judgement. Coupled with organisational creativity, it becomes the main prescription for the creative quality process, and quantum leap in an organisation, i.e. value innovation. There is an interaction between tacit and explicit knowledge (Nonaka and Takeuchi, 1995) is critical in the triple-loop learning process. (This concept of tacit and explicit knowledge will be elaborated in section 2.12 on Knowledge Management).

Section 1.2, Paragraph 42, 10 characters.
Most countries face an increasingly diverse workforce with the changing social structures and globalisation of businesses. There are more ethnic groups, older people and women in the workforce now as compared to before. These impel organisations to employ a different perspective and to recognise the needs of a more diverse workforce. For instance, they will bring a wide range of backgrounds, interests, points of view and different ways of doing things (Abbassi and Hollman, 1991). On that account, organisations that are flexible and able to respond successfully will reap the benefits and have a competitive edge. They have to be aware and adapt existing structures and practices to develop a more open, flexible system to provide an environment conducive to learning and development. Such organisations that support diversity will facilitate approaches to problem solving, creativity in the workplace, learning and most of all innovation. There will also be lower employee turnover, greater satisfaction, productivity, better quality and organisational performance (Hyland et. al., 2000).

Section 2, Paragraph 70, 10 characters.
According to Carneiro (2000), knowledge and information technologies are the critical success factors for strategic formulation. Such strategies and their implementation should be supported by a set of informational data and a knowledge development process (Carneiro, 2000). Knowledge is befittingly seen as more important as management is taking into account the value of creativity. This creativity enables
the transformation of one form of knowledge to the next level where a new perceived value is created. Consequently, the knowledge evolution affects the innovation course to a large extent (Carneiro, 2000).

Section 2, Paragraph 74, 10 characters.
Knowledge level can be an asset if they are enhanced and efficiently used to benefit the organisation. Managers have to organise and motivate the development of the human resources to support innovation and creativity (Brooking, 1996). They should consider and focus more attention on the intellectual capital of their organisations and innovation structure, as these people could be one of the real sources of future competitiveness (Leonard-Barton, 1995). Similarly, Mowery (1983) elucidates that there are higher knowledge levels in dynamic industries, which lead to new products, services and innovative processes. Institutions such as universities and government laboratories provide an important role with their research and assistance to industries proposing incremental innovation (Mowery, 1983). Therefore, management needs to show more interest in the intellectual capital, the importance of creativity, the need to sustain a constant flow of innovation, and the new concept of the learning organisation (Carneiro, 2000).

Section 2.4, Paragraph 104, 10 characters.
According to Roffe (1999), knowledge is central to innovation activities. This was previously maintained by Leonard-Barton (1995). In her view, knowledge is a core capability, and she considered mechanisms for importing and absorbing knowledge, transferring knowledge across the organisation, and developing new knowledge bases. She also introduced the notion of creative abrasion where different knowledge bases are gathered through open discussion between individuals with different perspectives. If there is any conflict and is successfully managed, the result can be new, creative and exciting ideas. Similarly, creativity breeds innovation (Gundry et. al., 1994; Pascale et. al., 1997b; Perry, 1995; Ramsey, 1997).

Section 3, Paragraph 107, 10 characters.
The generation of ideas is a critical element of the innovation process and creativity is the thinking process that helps generate these ideas. If creativity is enhanced, then during problem solving, more alternatives, novel approaches or unique solutions are likely to emerge. Amabile (1996) categorises specific environmental factors that affect the creativity in individuals. They are namely group climate, freedom, autonomy, supervisor support and rewards. Hence the environment has to be supportive. Management, too need to stimulate creativity in their employees, originate new ideas and develop them into something of value.

Section 3, Paragraph 109, 10 characters.
Many authors have supported various methods to foster the creative talents and thinking in employees in the organisation. For instance, Buzan and Buzan (1993) came up with the concept of mind mapping. Its radiating structure enables the rapid expansion and exploration of ideas to occur. It is well suited to creative thinking because it utilises all the skills commonly associated with it, especially imagination, association of ideas and flexibility. Majaro (1998) suggested techniques that can support in generating ideas such as brainstorming, metaphorical analogy, trigger sessions, wildest ideas session, morphological analysis, scenario writing and suggestion schemes. Similarly, the fishbone diagram was developed by Ishikawa (1990) is a technique to help a group to brainstorm, identify and list all the possible causes of a problem. The problem, sub-problems and causes resemble the bones of a fish when it is complete, and the whole process of analysis and discussion can be a useful trigger point for creative thinking as it focuses the mind fully on a problem. Moreover, experience has shown that during group discussions, this method helps to keep the focus and brings each relevant factor into the open. The technique is commonly used in quality improvement groups or circles (QCCs). Indeed the work and benefits of small group improvement activities or on Continuous Improvement in organisations are pertinent to creativity and assist in the Continuous Innovation process. In addition, McAdam and McClelland (2002) regard individuals as the building blocks of the organisation. Managers should be aware that by encouraging creativity at the individual level that will ultimately improve creativity at the group level and benefit the organisation.

Section 3, Paragraph 111, 10 characters.
Amabile's (1996) theory of creativity suggests that there are three components to individual creativity. They are namely expertise, creative-thinking skill, and task

Section 3.1, Paragraph 114, 10 characters.
The environment or climate in the organisation is one of the most difficult areas to develop or change (Roffe, 1999). It needs total commitment and involvement from senior management to start with. Roffe (1999) states that a climate open to creativity is characterised by certain features of management. Firstly,
they are open-minded to encourage flexibility and group involvement. The managers need to be perceptive in seeing things from the employees' point of view, respecting everyone for their diversity. In addition, they are required to motivate the expression of ideas, encourage employees to find answers creatively, and give clear objectives and specific feedback.

Section 3.1, Paragraph 116, 10 characters.
Continuous organisational creativity can be upheld by managers and organisations through various fundamentals (Robinson and Stern, 1997). These are, firstly, alignment, whereby the focus and actions of all employees are directed toward organisational goals. Secondly, self-initiated activity refers to responsible individuals and teams that own problems and their solutions so that intrinsic motivation is raised. It includes informal activities that occur in the absence of direct official support. There is, fourthly, an element of coincidence, where sometimes fortunate accidents can result in discoveries through insights. The fifth point is the existence of diverse stimuli, important to providing fresh insight into existing or identifying new activity. Finally the last point is the internal communications of the company, both planned and unplanned, are important to provide clear lines of communication (Robinson and Stern, 1997).

Section 5, Paragraph 127, 10 characters.
The adoption of innovation requires commitment, investment, R&D and resources in general. However, becoming innovative demands a pre-conditioned set of behaviours from the employees. Buckler (1997) contends that innovation is an environment, a culture that exists in the company and drives value creation. It requires an organisational culture that constantly guides the people to strive for innovation and a climate that is conducive to creativity (Ahmed, 1996). Management should encourage change to occur throughout the organisation and back decisions with actions that create an environment comfortable enough for employees to innovate. Culture is a primary determinant of innovation. It has multiple elements and needs to be matched with the appropriate organisational context (Ahmed, 1996).

Section 5.2, Paragraph 161, 10 characters.
In the area of innovation, culture comes down to shared attitudes, values and beliefs. It determines how well people encourage creativity, risk-taking, entrepreneurship, and networks to share knowledge and ideas. Culture is reflected in the behaviour of employees such as how priorities are pursued, how they integrate themselves and relate to other organisations. Culture may exist at many levels - corporate or service organisation, sector, community, region, province or even country.

Section 5.3, Paragraph 168, 10 characters.
The organisation needs to create an atmosphere that fosters innovation by reversing it to its natural entrepreneurial state and focusing on the primary factors that effect the cycle of creativity (Brafman and Folmer, 1998). In order to do this, certain critical factors have to be taken into account. These factors are examined briefly in this section.

Section 5.3.4, Paragraph 182, 10 characters.
Continuous innovation occurs largely because senior management recognise the value of innovation and manage their companies' value system and climate to support it (Quinn, 1985). A two and a half-year international study of firms were selected to look at their innovation process. Quinn (1995) concluded that for successful innovative firms, the culture and corporate strategy are mobilised to support innovation and creativity. In addition, he found that managers take active roles in leading the innovation process. The major solution is for managers to eliminate risk-averse climates and replace them with organisational cultures in which innovation is expected and failure is accepted. His study supported that management in innovative firms envisage long-term visions for their organisations that extend beyond economic parameters. This has a practical impact in attracting quality people to the firm and provide focus to their creative drives.

Section 7, Paragraph 192, 10 characters.
The people aspect is critical. Introducing change is not just about changes in systems and processes. It is about people believing in change and wanting it to happen. Ford, Ford and McNamara (2002) write that everyone shares the same objective and initiative for successful change implementation. In addition, creativity breeds innovation (Gundry et. al., 1994; Pascale et. al., 1997; Perry, 1995; Ramsey, 1997), and that bureaucracy, hierarchical organisations are less flexible, less amenable to change and less likely to empower staff (Jacob, 1995; Jefflène, 1995; Markovich, 1997; Milakovich, 1994/95). But management still has to consider aspects such as teamwork, organisational culture and staff commitment important to
managing change (Baba, 1995; Korsgaard et. al., 1995; Mikalachki, 1994; Uhlfelder, 1994). Rather than focusing their attention and energy only on technical aspects, it is equally important for management to work with the human factors to minimise resistance and aid the change process. Intervention strategies are needed to assist employees to identify and interpret their own perceptions of change, and as a result, create greater personal awareness and understanding of the individual self. This personal growth and development is likely to alter an individual's perceptions of organisational change, thereby reducing the level of resistance (Bovey and Hede, 2001).

Section 8.2, Paragraph 221, 10 characters.
In the organisation, empowerment equips employees with the resources to make decisions and take the initiative in situations which directly affect their lives, as well as their internal and external customers (Pietenpol and Gitlow, 1996). Management needs to provide firstly, training and skills required by employees to make decisions that previously were in the domain of their supervisors. Secondly, there must be the security needed to make decisions without fear of reprisal from their supervisors (Pietenpol and Gitlow, 1996). Empowerment is the glue by which the elements of customer focus, quality process and products, Continuous Improvements, self-managing teams, quality measurement, and utilisation of the total workforce abilities are held together. Self-managing teams are one of the major keys in the innovative organisation to solving complex problems, increasing productivity, and heightening creativity (Ripley and Ripley, 1992). As a result of empowerment, employees possess the competency to provide value to the customer by ensuring creativity to create and improve processes, products, and services continuously (Pietenpol and Gitlow, 1996). This competency is made possible when employees acquire sufficient training, information on the organisation's goals and performance objectives, and the authority to make decisions which affect the organisation's performance.

Document 'Lit Review 3', 1 passages, 10 characters.

Section 8.3, Paragraph 52, 10 characters.
In the service industry, many firms are labour intensive, and their services rely on knowledge and concentrated expertise. Innovation depends on the people - their skills, experience, creativity, resourcefulness, strategic thinking, communication abilities and knowledge. Tacit knowledge, especially would enable development of new services and innovative endeavours (Nonaka and Takeuchi, 1995). This was earlier illustrated in Section 2.12 on knowledge management. Investment in human capital through continuous training and development, as well as the unfolding of a learning organisation, ensures efficient service performance in the firm conducive for innovative activities.
Appendix 8A - Matrix to investigate any co-occurrence of factors in the model

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
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<td>1</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Single company in a public ownership</td>
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<td>8</td>
<td>2</td>
<td>6</td>
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<td>4</td>
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<td>470</td>
<td>11</td>
<td>100</td>
<td>150</td>
<td>250</td>
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<td>5</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>4</td>
</tr>
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<td>5</td>
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<table>
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<th></th>
<th></th>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>In a particular state</td>
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<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
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</tr>
<tr>
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<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>In a few different countries within the same region</td>
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<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

1 = present, 0 = absent (unless otherwise stated)
2. Where are the firm's DCs located?
At a single site in Australia
At more than one site in Australia
At a few different sites in different countries in different continents
At many sites globally, in countries of different continents

3. Where do the innovative efforts usually take place
At a single site in Australia
At more than one site in Australia
At a few different sites in different countries in different continents
At many sites globally, in countries of different continents

4. Where does the firm obtain its machinery, plant and equipment?
Nil
From a limited part of a single country
From throughout one single country
From a few different countries on different continents
Globally, from many countries on different continents

5. Where does the firm recruit its people?
From a limited part of Australia
From throughout the country
From a few different countries on different continents
Globally, from many countries on different continents

PROCESS COMPLEXITY
How complex is the warehousing and distribution process?
Very simple with few distinct steps needed; and the relations between them are simple and clear

1 = present, 0 = absent (unless otherwise stated)
Rather complex with several steps needed. Some of them are interrelated and not all of them are straightforward.

TECHNOLOGICAL COMPLEXITY
How many core technologies are involved in delivering the services?
Few (2-3) closely related core technologies
Many (more than 3) core technologies, of which some are rather similar

CUSTOMER INTERFACE COMPLEXITY
To what extent do different customers have different expectations and how easy is it to define those expectations?
Simple with little variation in customer expectations existing. Almost all performance dimensions are easily measureable
Rather complex customer interface. There is some variation in customer expectations. There are subtle and equivocal dimensions of some importance.
Complex with high specificity of customer expectations, some subtle and equivocal dimensions are of significant importance
Very complex with very high specificity of customer expectations, subtle and equivocal dimensions are of great importance

INTERFIRM RELATIONSHIPS
To what extent does the company rely on inter-firm relationships?
Only to a limited extent. A few relationships with other companies, mainly concerned with manufacturing, choice of products distributed, marketing, transportation, etc. But they are not of strategic importance to the company.
Some inter-firm relationships exist. A few of these are seen as important and are allowed to have some influence on the company.
The company has several inter-firm relationships, some of which concern strategically important activities, such as R&D and technology development.
The company relies heavily on many inter-firm relationships, including technology joint-ventures, R&D partnerships and other strategic alliances

1 = present, 0 = absent (unless otherwise stated)
KNOWLEDGE ACCESSIBILITY
How often does the company access new knowledge developed at universities, research centres, government organisations, professional institutions and other companies?

Never. The company has no contact with such organisations leading to access to new knowledge. 0 0 0 1 0 0 0 0 0 0
Rarely. The company is seldom in touch with such organisations and has difficulties getting useful knowledge from these sources. 0 1 0 0 0 0 0 0 0 0
Sometimes. The company has sporadic contacts with these organisations and occasionally receives some useful knowledge from them. 1 0 1 0 1 1 0 1 1 1
Very frequently. The company regards these institutions as important partners and is actively involved in joint research activities with them. 0 0 0 0 0 1 0 0 0 0

LABOUR TURNOVER
1. How high is the labour turnover in the organisation per annum?

Very low (below 2%) 0 0 0 1 0 0 0 0 0 0
Low (2.5%) 1 1 0 0 0 1 1 0 0 1
Normal (5-8%) 0 0 1 0 1 0 0 0 1 0

2. Does the organisation employ temporary/contract workers?

No 0 1 0 0 0 0 0 0 0 0
Yes, as needed 1 0 1 1 1 0 0 1 1 0
Yes, as part of maintaining a flexible workforce 0 0 0 0 0 1 1 0 0 1

TRADE UNIONS
What percent of the firm’s workforce is unionised?

0 Nil 1 0 0 1 0 1 1 1 1 0
less than 25% 0 1 1 0 1 0 0 0 0 0
between 51-75% 0 0 0 0 0 0 0 0 0 1

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**COMPETENCIES**

**Creativity**
- More informal communication when in teams
- Allowing employees to set own goals
- Established environment for motivation

**Effective Communication**
- Had open-office concept
- Managers offices located in warehouse
- Problem of segregation of employees at warehouse and office
- Provided for informal interaction area in Distribution Centre
- Cross-functional improvement teams
- Communication difficulties encountered in MNCs

**Learning**
- New employees brought in new knowledge
- All employees had external training
- Improvements arose on ongoing basis
- Improvements on ad hoc basis
- Double loop - Employees understand root causes and prevent reoccurrence to problems
- Triple loop - Employees create new knowledge or quantum leaps

**Teamwork**
- Normal work teams used
- QCCs used
- Work Improvement Teams
- QualMy Improvement Teams

![Binary Matrix]

1 = present, 0 = absent (unless otherwise stated)
Empowerment

Empowerment only occurred in middle management

Skill Flexibility

Job rotation

Role of Management
Developing and diffusing innovation through
Empowerment of employees
training and development
social activities
recognition and reward
formal meetings

CAPABILITIES and Supporting Behaviours

Satisfying customers
Performed customer segmentation
Maintaining customer satisfaction (A1)
Training of employees on handling customers and service quality
Specialised staff to handle each customer
Building and maintaining relationships

Collecting information to anticipate future needs of customers (A2)
Maintaining relationships and monitoring customers
Regular meetings
Service department/competency centre
External sources, suppliers

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### Professional body membership

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### Identifying new and different ways to satisfy customers (A3)

- Behaviour not evident
  - Thru Pricing, delivery and quality of products
  - Thru analysing each customer separately
  - Thru analysing and benchmarking competitors

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### Being flexible and adaptive to unique requests (A4)

- Dedicated staff, fulfilling orders within a restricted time period
- Modify processes

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### Accommodating unexpected situations (A5)

- Business impact analyses
- Planned for contingencies
- Competent employees

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### Forecasting future demand (A6)

- Behaviour not evident

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### Ensuring appropriate levels of safety stock (A7)

### Customising services for customers (A8)

- Greater customisation for smaller customers
- Customised to exact specifications of each customer
- Customised production schedule and VMI
- Customised IT application and operating procedures
- Categorised customers, Class A customers had more attention
- Customised services according to countries

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## Integrating Internal Operations

Reduced complexity thru decreasing no. of suppliers
Reduced complexity thru standardised services
Imposing organisational policies and procedures (B2)

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## Having cross-functional unification across departments (B3)

Main modes of info exchange

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## Streamlining operations and managing efficiency (B4)

Control of defective/damaged goods
training/supervision

| 1 = present, 0 = absent (unless otherwise stated) | 479 |
creating awareness
proper handling and packing methods
goods layout
Stock Control method
Physical stock count
Cycle counting
Both methods

Stock location method
Random sequence
Product code sequence
Barcoding
Personal Knowledge

Order picking method
per customer order
per day's order

Provision for growth and expansion (B5)
No evident behaviour
purchased extra landspace
will relocate
change the storage structure

Restructuring the organisation (B6)
Not evident in last 5 years

Collaborating with Partners
1 = present, 0 = absent (unless otherwise stated)
Maintaining standardised operations (C1)
Joint planning with customers and suppliers (C2)
No evident behaviour
Sharing information with customers and suppliers (C3)
No evident behaviour
Sharing processes with customers and suppliers (C4)
No evident behaviour
Joint investing with customers and suppliers (C5)
No evident behaviour
Technology
Marketing
R&D
Capital Investment
VMI

Synchronising and interfacing with customers and suppliers (C6)
No evident behaviour

Managing Technology
Technology was not mandatory for innovation
too costly to invest

Automating in Operations (D1)
No of areas technology present
Depreciation rate of technology (%)

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**MEASURES OF PERFORMANCE**

**Performance measurement system**
- Performance measurement system has improved over the years
- Number of performance measures has increased over the years
- Accuracy of measures has improved over the years
- Quality of performance data has increased over the years

**What standards are used to benchmark?**
- International
- National
- Industry
- Organisation

**Assessing Leadership**
- Management communicate and implement organisation goals and objectives
- Management guide and achieve various departmental goals
- Management effectively communicate and promote the values of Continuous Innovation, quality and customer focus
- Management involved in the activities of Continuous Innovation, quality and customer focus
- Management enrich leadership skills (through education, training and development)

4 = present, 0 = absent (unless otherwise stated)
Assessing Human Resource Management
provide comparable compensation and benefits packages as with industry or competitors
collect information and conduct analysis on employee satisfaction
review and evaluate the impact of training and development on performance
have a system to determine employee development for organisational goals

PERFORMANCE INDICATORS
Number of indicators for Customer Satisfaction
Number of indicators for Cost Management
Number of indicators for Asset Management
Number of indicators for Quality
Number of indicators for Productivity

Results of KPIs
improvement as compared with competitors/benchmarks
same as compared with competitors/benchmarks

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1 = present, 0 = absent (unless otherwise stated)
Appendix 9A - List of published papers from this research


REFERENCES


References


Mauthner, N.S., Party, 0., and Backett-Milburn, K. (1998). The data are out there, or are they? Implications for archiving and revisiting qualitative data. *Sociology* 32. 733-745.


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References


CONTINUOUS INNOVATION IN LOGISTICS SERVICES -
AN EMPIRICAL STUDY OF DISTRIBUTION CENTRES

Claudine Antoinette Soosay

A thesis presented to the
University of Western Sydney
in partial fulfilment of the requirements
for the degree of
Doctor of Philosophy

University of Western Sydney

March 2003
PLEASE NOTE

The greatest amount of care has been taken while scanning this thesis,

and the best possible result has been obtained.
ACKNOWLEDGEMENTS

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Dr Keith Sloan, Southern Cross University, Australia.
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Dr Gregory Teal, School of Management, University of Western Sydney, Australia.
Associate Professor John Gray, School of Management, University of Western Sydney, Australia.
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Special friends and colleagues in Australia:
Colleagues and friends from the InCITE Research Centre and School of Management, Liselle Heap, and my dear friend, Frank Marie

This thesis is dedicated to my father.
STATEMENT OF AUTHENTICATION

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in whole or in part, for a degree at this or any other institution.

CLAUDINE SOOSAY

March 2003
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ABSTRACT

This study explores the concept and practical implementation of Continuous Innovation in logistics services, particularly in Distribution Centres. Continuous Innovation is a concept that requires a methodical, programmed, incremental and/or radical approach to business improvement involving employees at all levels in the organisational structure. Theories and models of innovation were analysed in the literature, at the outset of this research. As found by previous authors, specific characteristics of service firms did not allow direct application of traditional models of innovation. Most of these traditional models were constructed from the manufacturing perspective. As a result, a new innovation model was designed for this study. It can be used as a guide for understanding the components necessary in service firms to embark on Continuous Innovation. This model describes the process of service innovation and incorporates theories from literature, and some variables adapted from the CIMA model. The study is exploratory in nature, using primary empirical data.

The study identified, evaluated, compared and contrasted the factors in ten Distribution Centres in Australia and in Singapore that affected the use of Continuous Innovation in their operations and processes. The focus of the study investigated the drivers, capabilities, behaviours, contingencies, individual competencies and performance measures of innovation in Distribution Centres with logistics services. Therefore, the central research problem was defined as:

**How do organisations with logistics operations providing warehousing and distribution services improve through Continuous Innovation; and what are the drivers and measures of outcomes of this process?**

This central research problem has been divided into six specific research questions that together address the underlying problem:

1. *What are the main drivers of innovation in the selected Distribution Centres providing warehousing and distribution services?*

2. *What capabilities do the selected Distribution Centres have to be innovative?*

3. *What behaviours are indicative of these capabilities in the selected Distribution Centres?*
4. *What competencies are evident in individuals to operationalise the behaviours and capabilities for innovation?*

5. *What are the performance measures adopted by the selected Distribution Centres to sustain Continuous Innovation?*

6. *What links do firm contingencies have with the drivers, performance measures, capabilities, behaviours and competencies?*

The detailed analysis of qualitative data collected from the ten firms has demonstrated that the achievement of Continuous Improvement is far from easy. The analysis drew some conclusions concerning the scope and extent of innovation within firms and established that each firm had its own combination of factors, making it unique in its own way. There are many complex issues within an organisation and it is essential that there is a robust framework against which to assess the implementation of innovation.

The key findings of this study have shown that the firms embarked on innovation projects for a variety of reasons. The innovative strategies were mainly driven for customer satisfaction, financial motives and competition. All firms possessed the capability of satisfying customers and integrated internal operations to support customer requirements. Resources and efforts were coordinated using a holistic approach and the firms displayed evidence of external synergy. There was integration and collaboration with partners in the supply chain. The results showed that firms developed networks, invested in capital, and made strategic decisions to facilitate innovation. The analysis also identified that firms deployed and managed technology for more efficient operations and for competitive advantage. Performance measurement systems were set in place in all firms to review operations, systems and processes to ensure efficiency and customer satisfaction.

Overall, this study has made significant contributions in terms of the theoretical investigation adding to the body of literature. This study was exploratory, using case studies as a first hand approach in gaining an understanding of Distribution Centres. There are areas that would merit further investigation and future research. It is suggested that additional work should be carried out to expand on this research and refine the model to meet the needs of a wider range of organisations in various service industries. In addition, there are recommendations flowing from this study concerning
the practical management of logistics operations. They are addressed mainly to senior management who typically take lead in the implementation of innovative programmes within the organisation. Firms should address Continuous Innovation as a planned and integrated approach, taking into account many interacting factors that are essential for successful innovation. The challenge facing Distribution Centres is to develop efficient and flexible processes and systems, by continuously innovating to sustain a leading edge in the logistics industry.