Determinants of Successful Vendor Managed Inventory and Strategic Supply Chain Relationships in the New Zealand Food Industry

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Acknowledgements

Abstract

Supply chain initiatives are growing in popularity throughout the food industry, as organisations seek to reduce costs, to improve profitability in an increasingly competitive environment. As Whipple and Frankel (2000, p.21) suggest "… firms seeking competitive advantages are participating in cooperative supply chain arrangements, such as strategic alliances, which combine their individual strengths and unique resources." Kurt Salmon Associates (1993) estimated that in the US, continuous replenishment processes (CRP), a form of vendor managed inventory (VMI), would provide annual savings of approximately 5% of sales, with the majority of savings realised by retailers. In support of this, Clark and Hammond (1997) found that, in the UK, supplier inventory turns increased 50 to 100% when electronic data interchange (EDI) was implemented in conjunction with CRP.

In order to assist organisations in the New Zealand food industry benefit from these initiatives, this research seeks to answer the primary research question: "What are the key determinants of successful vendor managed inventory and strategic supply chain relationships in the New Zealand food industry?" In addition, a number of secondary research questions are asked including: "Why has the New Zealand food industry been slow to adopt VMI practices?" and "What supply chain efficiencies can be realised in New Zealand through VMI without EDI?"

An action research case study between a large supermarket retailer and a large food manufacturer in New Zealand was undertaken to answer these questions. Underpinning this is a literature review, which provided theoretical insights into global VMI and supply chain best practices. The output of this research is a series of three integrated frameworks covering industry, organisation and management-level aspects of VMI and strategic supply chain relationships. These frameworks, which have been justified and triangulated with the literature, are practical, working models, particularly relevant to organisations in highly concentrated food industries.

The Industry-level framework concentrates on understanding the industry, analysing the competitive environment and developing long-term relationships to facilitate adoption of global best practice supply chain initiatives. These practices lay the foundations for the organisation and Management-level frameworks.

The Organisation-level research demonstrates that successful supply chain relationships are formed between organisations which are relatively important to each other and have strong management buy-in to a shared vision. To be successful, the relationship must be supported by a number of factors including a win-win attitude, a high degree of trust, and open communication. These factors must be continuously developed and nurtured to ensure the relationship delivers the expected benefits. Documenting agreed goals and objectives, establishing formal communication channels, and reporting progress against the agreed goals and objectives can help organisations establish and develop these factors. This research investigates how these were achieved. Further, in New Zealand, it was found that these practices tend to be informal and based on verbal arrangements. This contrasts with the UK, which has formal relationships based on documented agreements and contracts (Siemienuich, Waddell, Sinclair, 1999).

The Management-level framework demonstrates that both suppliers and retailers in the New Zealand food industry can realise supply chain benefits, including higher sales, improved customer service and reduced inventory levels, by establishing VMI and supply chain relationships. The Management-level research shows how organisations can minimise the impact of the 'bullwhip' effect (Lee, Padmanabhan and Whang, 1997) through VMI practices. In this research these benefits were realised by adopting VMI practices without EDI. The extent of the VMI benefits was limited to a few key product categories because of the limited resource available to manage the process manually; however, indirect benefits were realised by other product categories as a result of system and process changes in both organisations. These findings are consistent with the international findings by Clark and Hammond (1997).

In conjunction with developing the frameworks, the research explains why the New Zealand food industry has been slow to adopt global supply chain initiatives,

particularly distribution centres (DCs), EDI and VMI. The main reason identified was the power the supermarket retailers have over the industry. Until the supermarket retailers were ready to implement supply chain initiatives, manufacturers had limited opportunity to initiate supply chain relationships. It was found that countries, such as New Zealand, with small regional populations are likely to experience industry consolidation in order to establish and operate efficient and effective DCs. This is due to the high fixed costs associated with operating DCs and the ability of larger organisations to exert their power over other industry participants, forcing them to utilise their DCs. This finding is consistent with the Australian food industry which has experienced increased usage of DCs by the two dominant supermarket retailers (Wright and Lund, 2003).

Finally this research shows how action research methods, supported by soft systems methodology, can be applied in a New Zealand VMI and supply chain relationship environment to develop general theory. Action research methods were judged appropriate to maximise the flexibility and responsiveness of the research to the rapidly changing food industry and supply chain environment, while allowing the researcher to fully participate in the study. Initial research findings were justified and applied through further action research cycles, using multiple case studies within the main case study. Critical reflection was a key component of each action research cycle and resulted in the identification of factors, such as trust and openness, which may have continued to be taken for granted rather than nurtured and developed.

In summary, this research provides the opportunity for organisations in the New Zealand food industry to move along the continuum from interdependent partnerships to strategic partnerships, and from competitive parity to sustainable competitive advantage (Mentzer, Min and Zacharia, 2000). Practitioners should consider adopting these findings to improve their supply chain relationships and increase profitability and shareholder returns. Academics should consider applying these findings to other industries and countries displaying similar characteristics to the New Zealand food industry.

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Chapter 1   Introduction

1.1   Background

According to Bowersox and Cooper (1992, p.xvii), "the development and management of efficient relationships among organisations is the critical factor in gaining and maintaining competitive success." Hill and Jones (1998, p.268) support this by claiming "recent years have seen a virtual explosion in the number of strategic alliances." Similarly, Whipple and Frankel (2000, p.21) suggest:

> There is recognition that competition is shifting from a 'firm versus firm perspective' to a 'supply chain versus supply chain perspective'. In response to this shift, firms seeking competitive advantages are participating in cooperative supply chain arrangements, such as strategic alliances, which combine their individual strengths and unique resources.

Chapman, Christopher, Juttner, Peck and Wilding (2002, p.60) define a supply chain as "a network of interrelated entities that combine to enable the satisfaction of customer demand." Building upon this, Birchfield (2002, p.52) states that, "supply chain management directs and coordinates logistics activities across interdependent organisations that together make up a complete market channel for a range of products or services." (Refer to Glossary for definitions and abbreviations used in this thesis). These definitions emphasise the growing importance of coordinating activities between multiple organisations and developing cooperative relationships to gain and maintain competitive success.

Vendor managed inventory (VMI) is one initiative, approach adopted by organisations, to improve competitiveness. As Shatzkin (1998, p.1) claims "Vendor-Managed Inventory, by which the responsibility for choosing the content and timing of shipments to each location moves from the buyer to the seller, is the best hope to improve that performance to the benefit of the entire supply chain." VMI initiatives emerged in the late 1980s when department stores such as Wal-Mart moved to automate VMI. In 1993, a study by Kurt Salmon Associates projected that the use of Continuous Replenishment Processes (CRP), a form of VMI, would provide annual savings of US$14 - $16 billon for the US grocery channel, representing approximately 5% of sales, with the majority of savings

realised by the retailers rather than the manufacturers. This report generated a large amount of interest in the industry and provided many retailers with the support needed to begin implementation of CRP with their suppliers. Since then, as a result of their examination of the facts about VMI and review of global case experiences, Saipe and Geiger (1996, p.1), claim "VMI has produced remarkable results: sales, service and profitability are better by turning the tables on which trading partner does the supply planning." Clark and Hammond (1997) found that retailer inventory turns increase 50% to 100%, for a constant level of stockouts, when Electronic Date Interchange (EDI) is implemented in conjunction with CRP. Supporting this, research findings by international consulting group, Intentia (2001, p.10) found that "Those who have embraced VMI [in conjunction with EDI] have seen the following benefits:

- Eliminated repetitive purchasing activities (85% reduction in receiving costs)
- Lowered cost of producing claims (95% reduction)
- Reduced inventory (40 – 50%)
- Increased inventory turns (from 3.1 to 5.5)
- Solidified customer-vendor relationship."

These findings are from America, Europe and Asia Pacific and cover a number of industries including automotive, paper, apparel, food and electronics. These trends in North America and Europe, where VMI has been operating for over 10 years (Saipe and Geiger, 1996), are not mirrored in the New Zealand food industry where, traditionally, there have been limited formal supply chain relationships. At the time this research was initiated, manufacturers and retailers were beginning to develop relationships and adopt open book systems in order to improve the efficiency and effectiveness of the supply chain. At the same time, manufacturers were forming strategic partnerships with distribution and IT companies to further improve supply chain efficiencies, particularly in relation to distribution.

The **New Zealand FMCG** (Fast Moving Consumer Goods) industry has a wholesale turnover of $9.8 billion, representing $15 billion in retail sales. It employs 35,600 people directly and 147,800 people indirectly (Coriolis Research, 2003). The food industry is a sub-set of the FMCG industry, comprising companies that process, produce, package, transport distribute and sell fresh, chilled, frozen, dried and canned food and beverages.

In New Zealand, the food industry is characterised by oligopolistic competition between key account retailers (supermarkets) and monopolistic competition between suppliers. The two main supermarkets in New Zealand have a combined market share of approximately 95% (Foodstuffs have approximately 55% share (www.foodstuffs.co.nz) and Progressive have approximately 40% share excluding Supervalue (www.progressive.co.nz). In contrast, the top 5 retail chains in Europe shared from 64% (UK) to 99% (Sweden) of national supermarket food sales in 2002, and the top 20 food retailers in the United States (US) accounted for 59% of total grocery sales in 2001 (New Zealand Trade and Enterprise, 2003). In Australian the top two retail supermarkets have a combined market share in 2002 of approximately 78% (Wright and Lund, 2003).

New Zealand food industry suppliers have traditionally supplied retailers via direct to store deliveries (DSD). More recently, as the supermarket retailers have become more concentrated, there has been a shift towards centralised distribution through retailer Distribution Centres (DCs). This shift follows international trends in countries such as the US and Canada where DSD categories account for 25% and 30% of supermarket sales respectively (Burn, 1999).

The need to develop theory to assist the New Zealand food industry to further improve its channel strategies and supply chain relationships was highlighted by Senior Management at a large food manufacturer (Goodman Fielder) in 2001 during the course of their work. At that time, various senior personnel at Goodman Fielder and a large retailer (Progressive) claimed that there were opportunities for the New Zealand food industry to improve the efficiency and effectiveness of its supply chain through adoption of global industry initiatives and development of long-term supply chain relationships. As a result, in

December 2001, Goodman Fielder commenced a VMI project with Progressive. At this time, the researcher, who was employed by Goodman Fielder, was appointed VMI Project Manager to lead the project with Progressive. Despite the significance of VMI, it was the first time, in the New Zealand food industry, that a manufacturer had worked with a retailer to drive supply chain benefits across both organisations. This situation presented an ideal opportunity for the researcher to study the unfolding situation and to have a direct hand in its development via action research.

This thesis develops theory on strategic supply chain relationships using VMI practices as the foundation. The theory is presented in the form of three integrated frameworks: Industry-level (generic where the unit of analysis is the food industry), Organisation-level (strategic where the unit of analysis is an individual organisation) and Management-level (operational where the unit of analysis is a product category). The frameworks identify the key determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry and the steps to be taken to implement these.

1.2   Primary research question

The primary research question addressed in this research is:

What are the key determinants of successful vendor managed inventory and strategic supply chain relationships in the New Zealand food industry?

The majority of documented VMI case studies are from North America and Europe. These case studies have shown that the benefits of VMI and supply chain relationships outweigh the costs (Cheung and Lee, 2002; Waller, Johnson and Davis, 1999; Kulp, 2000)); however this is yet to be proven in the New Zealand food industry and other similar environments. Prior to this research commencing, there appears to have been no literature written about why the New Zealand food industry has been slow to adopt VMI practices, or indeed whether VMI practices are actually needed. As a result there was a clear need to communicate the key

determinants of successful VMI and strategic supply chain relationships through academic research for the New Zealand food industry, as well as food industries in other countries with similar environments.

International strategic partnership and VMI literature and case studies, along with a New Zealand food industry case study, form the basis of this research.

1.3 Overview of methodology

This section briefly outlines and justifies action research as the main research methodology (refer to Chapter 4 for complete details). It then describes the three major thrusts of the research and how they are interrelated.

This research was conducted using a mixture of research media. The majority of the research was conducted using action research methods, supported by qualitative methods. Interviews, reviews of internal documentation, literature reviews and information on inventory levels and movements were the key sources of data used to understand and analyse the situation to identify critical success factors and theoretical insights. The key benefits and supply chain efficiencies are quantified where possible to add robustness to the results of the research.

Action research potentially has much to offer the researcher. According to Dick (1993, p.4) "Action research is a methodology which has the dual aims of action and research...

- Action to bring about change in some community or organisation or program
- Research to increase understanding on the part of the researcher or the client, or both (and often some wider community)."

The action research cycle shown in Figure 1 below consists of, at least, planning (or intention), action and review (or critique).
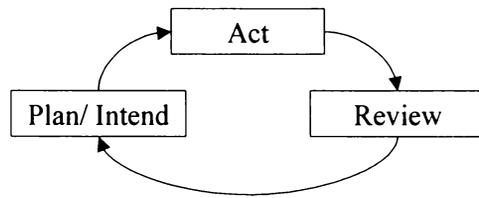
Figure 1: Action Research Model
(Source: Dick, 1993, p.5)

This model provides a mix of responsiveness and rigour, thus meeting both the action and research requirements. Repeated cycles allow the researcher to converge on an appropriate conclusion (Dick, 1993).

Action research methods were judged appropriate to maximise the flexibility and responsiveness of the research to the rapidly changing food industry and supply chain environment, while allowing the researcher to fully participate in the study. Critical reflection was a key component of the research cycle – plan, act and review, in order to justify the interpretations and assumptions made during the research.

There are a number of action research methodology variations: participatory, action science, systems methodology and evaluation. Systems methodology action research, in which the researcher develops an understanding of a richly interconnected and complex system, supplements the action research methods in this thesis. Specifically, Checkland's (1981) soft systems methodology (SSM) is applied.

Using Checkland's (1981) methodology as cited in Dick (1993), shown in Figure 2 below, the first stage is for the researcher to immerse themselves in the system to understand what the system is trying to achieve. They then plan an ideal system (or systems) to achieve the actual or intended achievements. The third step is to compare the ideal and actual systems. The fourth step is act upon the feasible and worthwhile improvements. It is typical for each cycle in SSM to take place several times. A better understanding develops through these iterations. Continuing uncertainty or ambiguity at any stage may trigger a return to an earlier stage.
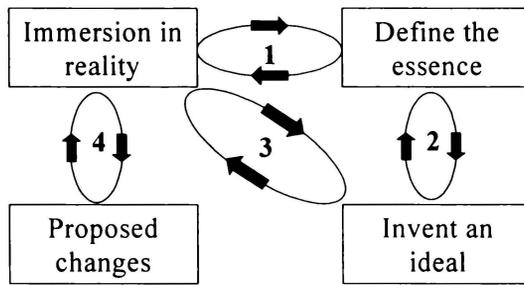
Figure 2: Checkland's Soft Systems Methodology

(Source: Dick, 1993, p.19)

There are three thrusts to this research covering the generic, strategic and operational aspects of supply chain relationships and VMI practices. These are shown in Figure 3 below along with the mode of study used:

- Industry-level, studied via an overview of historical literature, case studies and global best practices

- Organisation-level, studied via action research on a New Zealand food industry VMI case study

- Management-level, studied via action research on specific product categories
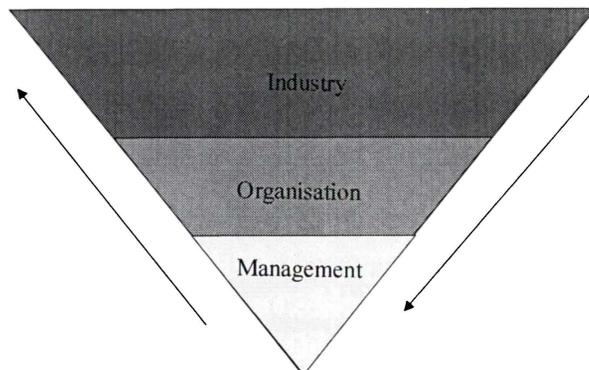
Figure 3: Thesis Research Model

The Industry-level addresses generic theoretical models and global supply chain best practice. It describes the environment surrounding/impacting the second level (Organisation-level). In turn, the second level describes the environment surrounding/impacting the third level (Management-level). The second level is

strategic in nature and considers the interrelationships between a major manufacturer and a major supermarket retailer. The third level is more operational and considers product categories within a major manufacturer and a major supermarket retailer's product portfolios.

Smaller case studies, within the main action research case study, are used to justify and validate the research findings. In principle, theory and findings from each level will flow up and down to the other levels to ensure a robust and consistent model is developed which addresses industry, organisation and management factors.

1.4   Limitations of scope

This research develops a generic model, tailored for specific conditions. The research and literature review focus on the New Zealand food industry with case studies from other industries and countries used where appropriate.

The main action research focuses on two organisations with operations in New Zealand – a large food manufacturer (Goodman Fielder) and a large supermarket retailer (Progressive). Goodman Fielder comprises approximately 8 - 9% of total supermarket sales in New Zealand (based on internal Goodman Fielder calculations), while Progressive has an estimated 40% share of supermarket sales excluding Supervalue (www.progressive.co.nz). These organisations are considered large enough to provide sufficient coverage of the New Zealand food industry to enable the findings to be generalised to other organisations and food industries in countries with similar characteristics. Refer to Figure 11 for comparative market shares in other countries.

1.5   Implications for practitioners

This thesis has implications for practitioners who wish to improve their supply chain activities through VMI and strategic supply chain relationships. Chapters 5 through 7 present the industry, organisation and management-level frameworks developed. The final chapter presents conclusions on this research from

practioner, academic, and action research perspectives. Practitioners should consider adopting these findings to improve their supply chain relationships and increase profitability and shareholder returns.

1.6 Outline of the thesis

This PhD thesis is documented in eight chapters:
- Chapter 1 Introduction
- Chapter 2 Literature Review
- Chapter 3 Research Questions
- Chapter 4 Research methodology
- Chapter 5 Developing an Industry-level framework
- Chapter 6 Developing an Organisation-level framework
- Chapter 7 Developing a Management-level framework
- Chapter 8 Discussion, conclusions, recommendations

This first chapter has introduced the topic and briefly described the current New Zealand food industry supply chain. Insights from prior literature and global trends were used to explain the need for the research and the primary research question was presented and briefly discussed. The research method was then described and the key limitations noted. Definitions and abbreviations used in this thesis are presented in the glossary section.

The second chapter aims to build a theoretical foundation upon which the research is based by reviewing relevant literature and case studies. It shows how the research topic fits into the overall body of management knowledge. Key findings and case studies to-date are discussed and potential research questions highlighted. Finally, further current industry, organisation and management-level research gaps are presented.

The third chapter summarises the primary research question and explains the need for this research. The potential research questions from the literature review are presented as secondary research questions and categorised into industry, organisation and management-levels.

The fourth chapter presents candidate research methods and explains why the methods chosen were selected. Key characteristics of action research and SSM are described. An overview of the process used to develop theory at each level through action research is then provided. Finally the ethical considerations arising from this research are discussed.

Chapters 5 through 7 analyse and apply the data and present the results of the research at three levels – industry, organisation and management. In each chapter the initial research results are presented and a first-cut framework developed. The organisation and management-level chapters, which are action research based, include a section on key findings from an action research perspective. Questions to justify the first-cut framework are described and answered through further research cycles and smaller case studies within the main action research case study. The results of the additional research cycles are used to refine the final framework and provide practical guidance on how to apply the framework. Finally, answers to the secondary research questions identified in the literature review, and summarised in Chapter 3, are presented.

The final chapter shows how this research has contributed to knowledge by summarising the answers to the research questions from Chapter 3 and explaining them within the context of this and the prior research examined in Chapter 2. Theory is presented to assist organisations in the New Zealand food industry utilise strategic relationships and VMI to develop successful supply chain relationships. The theory was developed from the findings in the previous sections through answers to the research questions asked. This chapter demonstrates how the industry, organisation and management-level frameworks are interrelated and emphasises the importance of developing successful supply chain relationships in order to improve profitability and returns to shareholders. Findings from an action research perspective are discussed along with personal insights and learnings from this research. Finally, limitations on the general applicability of this research are presented and opportunities for further research identified.

1.7   Chapter summary

This chapter has laid the foundations for this thesis. A brief background to supply chain management, VMI and the New Zealand food industry was presented. The research question was then introduced and the need for the research justified. Next, the research methodology was briefly described and justified. Finally, the thesis structure was outlined and the key limitations discussed.

The primary contribution to knowledge of this research is a working model which identifies the key determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry. The model comprises three interrelated frameworks covering industry, organisation and management-levels to assist organisations in the New Zealand food industry develop successful VMI and strategic supply chain relationships. In line with experiences overseas, adoption of such factors by practitioners has the potential to significantly reduce repetitive purchasing activities, lower costs of producing claims, reduce inventory, increase inventory turns and solidify customer-vendor relationships.

A secondary contribution to knowledge is in the area of application of action research methods in a supply chain environment.

This research was planned and coordinated to meet the needs of Goodman Fielder, Progressive and the University of Waikato PhD research requirements.

Chapter 2   Literature Review

2.1   Introduction

Supply chain management is a key focus in organisations today as they strive to reduce inventory levels, lower costs, increase profit and enhance competitive advantages. The purpose of this chapter is to provide an understanding of supply chains along with theoretical insights, research findings and potential research questions on the basis of literature currently available.

The focus of the literature review is a more detailed description of key supply chain research findings, contributions to knowledge, theories, case studies and unanswered questions. The detailed literature review commences with a description of historical trends and patterns in the food industry to provide the reader with an understanding of the case study industry, its characteristics and how it has developed over time. This is followed by a comprehensive review of literature covering strategic alliances and partnerships, supply chain management, VMI and the role of IT and EDI in supply chains. A number of case studies relevant to the research case are discussed in each section. Potential research questions are identified throughout the literature review.

2.2   Research area

In the broadest context, this thesis focuses on the research area of **management**, and more specifically the management of organisational strategy. For the purposes of this thesis **organisational strategy** is defined as the specific pattern of decisions and actions that managers take to achieve superior organisational performance (Hill and Jones, 1998).

Organisational strategy is a fundamental part of how an organisation performs relative to its competitors and can be established at a number of levels including global, corporate, business and functional levels. **Supply chain strategy** is a sub-set of organisational strategy and covers strategies related to an organisation's value chain (Porter, 1980). **Strategic alliances and VMI** are a sub-set of supply chain strategy and focus on supply chain relationships between organisations and

transferring responsibility for managing orders from the retailer to the manufacturer. Figure 4 below shows the scope of the research covered in this thesis.

Figure 4: Scope of research area

The objective of this research is to use a New Zealand food industry case study to develop theory to enable organisations to establish and maintain successful VMI and strategic supply chain relationships. The key focus of the research is on establishing a working model, for organisations describing the key steps and determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry.

Major beneficiaries of this research are likely to be organisations operating in the food industry in New Zealand and countries with similar attributes.

2.3   Key research findings to-date

This section describes key research findings reported in the literature and the limitations, if any, of the findings. It commences with a review of historical and current trends in the food industry globally. The concept of strategic alliances and partnerships is then discussed and the use of VMI in supply chains described. Expanding on this, the role of Information Technology (IT) and Electronic Data Interchange (EDI) in supply chain management is examined and case studies relevant to the New Zealand food industry are discussed.

2.3.1 Trends in the food industry

According to Bowersox and Cooper (1992, p.432) "… at least 4 major evolutions, or planned changes, can be identified in the food industry." These can be summarised as:

1. Supermarkets emerged as a replacement for small food retailers
2. Supermarket chains vertically integrated with wholesalers leading to the establishment of retail owned DCs supplied directly by manufacturers
3. Integrated chains pressured food manufacturers to provide mixed truckload shipments of products to their DCs
4. Integrated retailers trying to push inventory holding responsibility 'up the channel' towards manufacturers.

Social, technical, ethical, governmental, geographical and cultural environments have also influenced the channel structure (Jain, 1981). "For example, mass retailing of food has been feasible due to the development of automobiles, highways, refrigerated cars, cash registers, packaging improvements and mass communications" (Jain, 1981, p.338). Stern and El-Ansary (1977) noted that during all these significant changes in the logistics channel structure, the actual process of selling food has remained relatively unchanged, while the cost of food has reduced to reflect greater participation by consumers in selecting and purchasing items from supermarket shelves. Today, over 30 years on, this still holds true for the most part with customers still visiting local retailers to select and purchase their groceries. The cost of food has remained relatively unchanged with inflationary cost increases offset by manufacturing and supply chain efficiencies.

In the late 1990's as organisations sought to implement Enterprise Resource Planning (ERP) systems, in order to integrate and automate internal processes and reporting, they turned their focus inwards by changing internal processes and systems. Consequently, their focus on external customers decreased as resources were allocated internally. Today, organisations are realising that, in order to maximise the benefits of the ERP systems, they must collaborate with supply chain partners, both suppliers and customers.

This collaboration can be found in the form of VMI and collaborative planning, forecasting and replenishment (CPFR) initiatives that have arisen to address the growing concern about inventory problems and communication. Proponents of VMI argue that the initiative has helped reduce inventory at manufacturer and distributor locations, resulting in fewer customer-level back orders, while at the same time improving service levels (Carol, 1999). However, researchers have found that the key barriers to fully realising the benefits of VMI are a lack of top-level management support and technology difficulties (Handfield and Nichols, 2002; Mentzer, Min and Zacharia, 2001; Waller et. al., 1999).

Another recent trend has been a move towards DCs and away from DSD, even for short shelf life, perishable products. This is evident in Canada where there is a growing demand for DCs where manufacturers can ship products in bulk and have them picked and packed in retail-ready packaging for delivery to stores. Similarly, the UK is moving towards DCs. DCs are effective in Canada because, similar to New Zealand, a lack of critical population mass requires transport providers to travel longer distances to service the same number of stores (Burn, 1999).

In summary, this section has highlighted the key trends in the food industry from the initial introduction of supermarkets to today where DCs and supplier/retailer collaboration are becoming common. Supply chain relationships are becoming more important as suppliers and retailers respond to changing consumer demands for greater variety, fresher products and lower prices. The main thrust of research on the food industry to-date has been the use of case studies to evaluate the impact of recent changes to the industry and provide conclusions on the effectiveness of the changes and whether they should be adopted on a wider basis.

2.3.2 Strategic alliances and partnerships

This section introduces theory related to the nature and types of strategic alliances and partnerships. A number of supply chain strategic partnership case studies are presented along with implications for the present research case study.

A principle concern of business strategy is identifying the areas in which an organisation should participate in order to maximise its long run profitability. In choosing business areas to compete in, an organisation has several options. It can focus on just one business, it can diversify into a number of different business areas or it can integrate vertically. Strategic alliances and partnerships are an alternative to vertical integration and diversification.

Partnership is defined by Ellram (1991, p.14) as "an ongoing relationship between two organisations which involves a commitment over an extended time period, and a mutual sharing of the risks and rewards of the relationship."

Strategic alliances and partnerships come in many forms including short and long-term contracts and strategic outsourcing. Long-term contracts are long-term cooperative relationships between two organisations. These arrangements are usually referred to as strategic alliances (Hill and Jones, 1998). Typically in these arrangements, both organisations make a commitment to jointly seek ways of lowering the costs or raising the quality of inputs into the downstream organisation's value creation process. Strategic alliances seem a particularly viable option when an organisation wishes to create value from transferring competencies or sharing resources between diversified businesses in order to realise economies of scope (Hill and Jones, 1998). According to Brickley, Smith and Zimmerman (1997), there are at least four factors driving the increase in strategic alliances: global competition, increased technology, improvements in information and communication technology, and excess capacity.

Segil (1998) found that strategic alliances are used to:

- Enter new markets
- Enhance marketing and sales distribution
- Access new technology
- Improve research capabilities
- Improve product development
- Defend market share

- Decrease time to market
- Add financial leverage

Strategic alliances can be used to improve supply chain efficiencies and reduce time to market. Rather than relying on a third party supplier to deliver goods on time, a strategic alliance can use its size and experience to either produce the goods internally or negotiate with suppliers for reduced lead times. In addition, by working together, strategic alliance partners may eliminate several steps in the supply chain, thereby increasing efficiencies and reducing time to market.

Financial leverage can be improved through a well-structured strategic alliance. The open exchange of information and coordinated decision making typical of a long-term supply chain partnership can help reduce the inefficiencies inherent in less collaborative relationships, such as excess inventories and slow response (Corbett and Blackburn, 1999). For example, reduced supply chain inventory levels and sharing capital and fixed investment costs (and the associated risks) that arise from the development of new products and processes can be used to improve financial leverage by increasing working capital (Hill and Jones, 1998).

Mentzer et. al., (2000) researched the nature of **inter-firm partnering** in supply chain management. They suggested a continuum of strategic and operational partnering based upon (1) the orientation of the partners and (2) the degree of on-going, long-term inter-firm relationships for achieving strategic goals, which deliver value to customers and profitability to partners. Their research identified environmental and partnering pressures (environmental uncertainty, global competition and time and quality based competition), along with partnering antecedents (interdependence, conflict, trust, commitment, organisational compatibility and top management vision) as the key factors influencing the partnering orientation (operational versus strategic).

The extant literature does not appear to have identified the critical success factors required for a successful inter-firm supply chain partnership in a concentrated industry, such as New Zealand, hence the first potential research question for this research is:

Potential research question #1: What are the critical success factors for a successful inter-firm supply chain partnership in a concentrated food industry?

Mentzer et al. (2000) also argued that implementation of **strategic partnering** leads to sustainable competitive advantage, whereas operational partnering leads to competitive parity. However, they do not propose either operational or strategic partnering as the ideal inter-firm relationship. Strategic partnering requires much time and effort to maintain a higher level of cooperation, and the investment in non-tangible assets may be hard to recover. Operational partnering may be more appropriate and likely to succeed between firms that are pursuing the maintenance of competitive parity. Transactional retailer-vendor relationships will continue to be more common in number than partnerships because they represent product assortments for retailers, that incur little or no relationship implementation costs, and the retailer does not see the assortment as a potential threat or competitive disadvantage. Operational partnering will, in turn, remain a far more common type of partnership, again because it is easier to achieve. They conclude that further analysis of the types of market environments most appropriate for strategic versus operational partnering would be very useful.

The extant literature does not appear to have identified which types of relationships are most appropriate for the New Zealand food industry, hence the second potential research question for this research is:

Potential research question #2: What types of retailer-vendor relationships are most appropriate for the New Zealand food industry?

Other researchers on partnering support Mentzer et al.'s research. For example, Ellram and Cooper (1990) claim that while most partnerships share some common elements and characteristics, there is no 'ideal' relationship that is appropriate in all situations.

Clemons and Row (1992) researched the impact of transaction cost economics on cooperative relationships. They defined **cooperative relationships** as efforts to add value through closer explicit coordination of economic activities between independent organisations with coordination taking many forms, from formal joint ventures to long-term primary supplier relationships. With cooperative relationships, coordination on a transaction-by-transaction basis, mediated principally through market pricing, is replaced by tightly coupled operations and decision processes in context of a long-term relationship.

Information technology advancements have helped facilitate coordination. For example, in the consumer packaged goods industry, the spread of checkout scanners has created significant opportunities for higher integration and cooperation. Similarly space management systems have encouraged retailers to work with manufacturers to determine shelf layouts. In merchandising support, IT is creating the opportunity for cooperation and is providing the monitoring capability to reduce the transaction risk associated with cooperation. One of the most significant uses of IT to support coordination is the increasing level of explicit coordination between buyers and suppliers within the value chain of a single industry. For example, IT advancements now enable manufacturers to access retailer scan data down to the store level and deliver inventory to a central DC based on scan sales, eliminating the need for purchase orders and reducing inventory levels in the supply chain.

Shaw and Gibbs (1995) used two case studies to examine how changing market structures in the food supply chains has affected the nature of collaboration between retailer and supplier. They adopted a case study research approach to provide an opportunity to examine in detail, the nature of the relationship between the parties involved. Their research was conducted in conjunction with action research case studies from the Strathclyde University food project. The focus of their research was on product development and marketing. They concluded that for good economic reasons, relationships must be driven by the need for profitability for both partners and by strategies which are sensible for each partner separately, as well as together. Given this, however, better results require that businesses work closely together.

Shaw and Gibbs found that as long as organisations continue to operate in environments where there are alternative sources of supply or alternative customers, competitive pressures limit the extent of margin transfer between stages, as well as increments to price. Their research indicated that greater interdependence is a force for bringing increasing stability to markets in the short and medium-term, while protecting competition in the longer term. The high short-term cost of switching between partners helps lock organisations into long-term relationships. This in turn, leads to organisations placing a greater interest in maximising the benefits of the relationship for the longer term through preferred supplier and preferred buyer status. Their research also noted that the levels of trust, commitment and information sharing, which are required if productivity and other gains are to be maximised, cannot easily be reached in a relationship which is primarily adversarial.

Wilson and Sankaran (2001) researched a vendor-manufacturer partnership in the New Zealand forestry industry. Empirical evidence from their case study supports previous theory that high trust vendor-manufacturer relationships tend to be high performers and that mutual dependence is conducive to the formation of trust. Several of their findings were unique to the New Zealand environment. These were:

- Overcapacity in process industries provided stronger motivation for suppliers to establish long-term partnerships with customers.
- Customers accepted spill over of technology to the manufacturer's competitors because the New Zealand market was very small, the majority of competitors were outside New Zealand and the supplier relied on competitor volumes to provide low cost products to them.
- Industry concentration was driven by the relatively small size of the New Zealand domestic market and the need to realise economies of scale in capital-intensive industries to provide adequate returns to shareholders.
- Corporate citizenship was an important factor in selection of partners with local suppliers preferred over international suppliers.

The findings from this research lead to the third potential research question:

Potential research question #3: What learning from the New Zealand forestry industry can be applied to the New Zealand food industry?

Siemienuich, Waddell, Sinclair (1999) researched the role of 'partnership' in supply chain management for the UK FMCG (fast moving consumer goods) industry by using a case study based on a major UK supermarket and a branded manufacturer of foodstuffs. The aim of their research was to identify critical human and organisational issues that could enhance or constrain any move to closer supply chain relationships or 'partnership sourcing' and hence was concerned with investigating strategic, policy, cultural, process, structural and attitudinal issues. Their key research findings, relevant to this thesis, are described in further detail below.

Both companies (the supermarket and manufacturer) agreed that one of the major drivers for change in supply chain philosophy was the need to improve customer service levels and take costs out of the supply chain to gain competitive advantage, both mutually and individually. This viewpoint was common at all levels in each organisation.

Both companies also identified formal and recognisable changes to working practices because of the supply chain linked initiatives. These included improved supplier forecasting, efforts to centralise warehousing and increased flow of information. The improved forecasting arose from more interaction between customer and supplier personnel in both logistics and planning functions and more interaction between sales and planning functions. The improved forecasting provided the supplier with more visibility over stocks, plans, forecasts and production requirements. The efforts to centralise warehousing resulted in changes in the distribution system and led to a reduction in inventory levels and lead times. New IT systems and a greater flow of information within and between a wide-range of functions had positive effects for both companies.

The case study also identified evidence of a culture change in both companies. The retailer had become less aggressive, more aware of the need to be flexible, more ready to discuss the potential for change, rather than simply demanding it, and more willing to share any benefits. Employees of the supplier felt they were more customer, rather than functionally, focused. Both companies felt they were trying to foresee and avoid problems by prevention rather than continuously fire-fighting problems that could, and should, have been avoided. The retailer also identified a greater degree of trust; however the supplier did not echo this referring to issues such as greater sharing of information, increased collaboration and improved potential for discussion and negotiation.

Several barriers to change in supply chain policy were also identified in the case study. These included strategy, structure, policy, and working practices. There was no evidence of a coherent supply chain strategy having been defined, or operating simultaneously at various levels in either organisation. Both companies noted that their historical functional structures did not provide sufficient cross-functional teams with common objectives that everyone could work towards. They suggested that either a matrix organisational structure or a process-oriented structure would facilitate this better. Both companies identified lack of formally documented operational procedures and reliance on personal relationships as an issue, particularly when personnel changed.

The recommendations from this case study are particularly relevant to this research and include:

- Both client and supplier companies need to refine and disseminate a clear and coherent policy-based strategy for supplier partnerships for all categories of supplier in the supply chain. The policies should incorporate stock control, benchmarking, vendor accreditation, long-term agreements, harmonisation of quality assurance procedures, backhauling, product development, supplier development, open book accounting, cost transparency and distinctions between own label and branded goods.

- Once a corporate strategy model has been developed, it must be clearly communicated to the relevant individuals and guidance given on how it impacts them and any new procedures they should adopt in order to comply with the new policy to avoid any confusion due to overlap of responsibilities.

- Both companies should explore the potential for a 'strategic supply chain management group' working at an operational level involving cross-functional teams to further develop the policy and strategy.

- Attention should be paid to potential impacts on both formal and informal working practices and care should be taken that valuable competencies are not lost or compromised.

- Clear roles and responsibilities should be defined in relation to the corporate strategy model and in relation to the competencies required by staff to fulfil those roles.

- Companies should formally recognise the importance of personal relationships with 'opposite numbers' in other organisations.

- Both companies should develop an IT policy that is consistent with the overall strategy towards customer-supplier relationships.

The findings from this research lead to the fourth potential research question:

Potential research question #4: Are the research findings from a UK food industry strategic partnership applicable to the food industry in New Zealand?

From the literature above, it can be seen that, the thrust of strategic alliance and partnership research has changed. Early research resulted from the need for organisations to have sustainable competitive advantages and focused on developing theory on the nature and type of relationships suitable for different situations. Over time the research changed from heavy theoretical underpinnings to the use of practical case studies to evaluate various forms of strategic alliances and partnerships. The case study findings have been used to update theoretical models in light of practical findings. It is likely that strategic alliance theory will

continue to evolve as new forms partnership arrangements develop and communication between organisations becomes more open and transparent.

In summary, this section has described strategic alliances and partnerships and presented case studies of strategic partnerships in supply chains, the food industry and New Zealand. Supply chain relationships have developed between retailers and suppliers as they seek to reduce costs and increase efficiencies in response to factors such as global competition, increased technology, improvements in information and communication technology, and excess capacity. There does not appear to be a single supply chain relationship structure that meets the needs of all players. Common elements of successful supply chain relationships appearing in the literature include trust, collaboration and information sharing.

2.3.3 Supply chain management

Supply chain literature includes the theory of how supply chains operate, case studies of supply chain relationships and IT impacts on supply chains. It covers a number of industries particularly manufacturing, logistics and e-commerce. The majority of the literature is on general supply chain management. This section defines supply chains and supply chain management and presents findings from several case studies.

A supply chain consists of multiple partnerships. Chapman, Christopher, Juttner, Peck and Wilding (2002, p.60) define a **supply chain** as "a network of interrelated entities that combine to enable the satisfaction of customer demand." Kiefer and Novack (1999, p.19) claim that the optimised supply chain involves "… an integrated collection of organisations that manage information, product and cash flow, from a point of origin to a point of consumption, with the goals of maximising consumption satisfaction while minimising the total costs of the organisations involved."

Supply chain management addresses the fundamental business problem of supplying product to meet demand in a complex and uncertain world – from the point of view of the entire supply chain. Mentzer (1999, p.550) defines **supply chain management** as:

The systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and supply chain as a whole.

Similarly, Birchfield (2002, p.52) states "supply chain management directs and coordinates logistics activities across interdependent organisations that together make up a complete market channel for a range of products or services." That is, rather than focusing on internal organisation efficiency, supply chain management seeks to improve performance through the closer integration of external organisation relations. Stevens (1989) is more specific and describes supply chain management as the flow of both information and material, synchronised to the customer's requirements, from raw materials to the end customer.

These definitions of supply chain management have common elements of multiple organisations, coordination, customer satisfaction and improvement. The multiple organisations element implies that supply chain management operates across two or more organisations rather than within a single organisation. As a result the two or more organisations must coordinate their activities, from sourcing raw materials, through to producing the goods and delivering them to end customers. By coordinating activities customer satisfaction should improve, by having the right products available, at the right time, at the best value for money. Improvements include reduced costs through procurement, production and logistics efficiencies, reduced out of stocks and greater customer satisfaction.

According to Kopczak and Johnson (2003) supply chain management has resulted in six major shifts in business focus over recent years. The first shift was from cross-functional integration to cross-enterprise integration. The second shift was from physical efficiency to market mediation. The third shift was from supply focus to demand focus. The fourth shift was from single company product design to collaborative, concurrent product, process, and supply chain design. The fifth shift was from cost reduction to breakthrough business models. Finally, the sixth shift was from mass-market supply to tailored offerings.

Various researchers have shown, through application of supply chain management, how grocery retailers world-wide have sought to radically reduce costs and inventory and move towards a 'pull' rather than 'push' distribution system through closer supply relationships and real-time information transfers (Fernie, 1995, Kurt Salmon Associates, 1993). In conjunction with this, new information technologies have provided opportunities for organisational integration.

A major supply chain management initiative over recent years has been the shift towards **central warehouses/distribution centres** (DCs). DCs are centrally located warehouses operated by retailers for the purpose of receiving goods from suppliers and distributing products to individual stores.

Benefits of moving towards DCs from both a supplier and retailer's perspective include streamlining the supply chain, increasing customer service levels and reducing transport and transaction costs. The supplier benefits by having one large order delivered to one central customer, rather than to delivering many small orders to individual stores (this is a particular issue in countries with widely dispersed and small population centres). Retailers benefit by being able to control inventory holdings centrally and obtaining bulk purchase discounts. More recently, DCs have also been used for short-shelf life, perishable products.

There are also disadvantages of moving towards DCs. From a supplier's perspective there is a loss of visibility of inventory levels in the supply chain, risk of product rationalisation and reduced ability to ensure there is sufficient stock on the supermarket shelves. From a retailer's perspective there is increased exposure to product obsolescence, increased operating costs and potential deterioration in cash flow.

Lack of visibility of supply chain inventory levels can lead to suppliers experiencing the 'bullwhip' effect where consumer demand volatility is amplified up the supply chain (Lee, Padmanabhan and Whang, 1997). The bullwhip effect arises when DC purchase levels are not matched to consumer demand patterns

resulting in either out of stock or excess stock situations. Excess stock situations amplify up the supply chain due to manufacturers increasing future production volumes to meet historical DC purchase levels. As a result, where consumer demand is less than DC purchases, post-promotional DC inventory levels are greater than expected and manufacturer forecasts for future promotions are overstated resulting in excess inventory levels at both the retailer DC and the manufacturer. (Refer to section 7.3.2 for an example of this in action).

From a supplier's perspective, DCs increase the retailer's ability to influence product ranging. If a retailer chooses not to stock a product in their DC then none of their stores can sell the product. In contrast, where products are delivered direct to store, suppliers are able to negotiate product ranging on a store-by-store basis. Similarly, suppliers are less able to control stock levels in store. This is because store buyers are responsible for placing orders from DCs whereas suppliers are responsible for placing orders for direct to store deliveries.

From a retailer's perspective there are significant costs to maintaining and operating a DC. Hidden costs in terms of product damage, obsolescence and write offs can be significant if DC operations are not tightly managed. In addition, high DC inventory levels reduce cash flow because suppliers are paid before the product is dispatched to stores and sold to consumers.

The literature does not appear to have identified the impact of DCs in countries, such as New Zealand, hence the fifth potential research question for this research is:

Potential research question #5:	How do food industry trends toward DCs impact geographically diverse countries with small regional populations such as New Zealand?

One factor influencing the 'pull' versus 'push' distribution system is forward buying, which is common with DC distribution systems. **Forward buying** is a concept where retailers purchase large volumes of product during periods when

prices are heavily discounted to cover both the promotional volume plus normal volumes until the next promotional period. This enables retailers to minimise their purchase costs. Thomas, Staatz and Pierson (1995) found that although forward buying practices have created strategic firm-level advantages for manufacturers and distributors, they have generated external system-wide costs at the same time. In response to forward buying practices manufacturers have to maintain reserve stocks and increase production capacity. This then strains other operational activities such as input procurement, production schedules, and transportation of both inputs and outputs. The overall impact is uneven production processes, increased inventory levels, inefficient transport patterns and diminished product quality.

These findings are supported by figures from the study conducted by Buzzell, Dew, Flaherty, Jaikumar, Quelch and Salmon in 1987 which indicate that grocery manufacturers are engaging in behaviour that collectively makes them all worse off. Retailers such as Wal-Mart and Kmart in the US are creating pressures to change these forward buying practices because they have more efficient purchasing and distribution systems that are designed to drive excess costs from the distribution system. They have implemented **Everyday low pricing** (EDLP) strategies to provide consistent low pricing while simultaneously avoiding the purchasing peaks and troughs for manufacturers.

Thomas et al.'s (1995, p.549) research concludes by stating:

> Whether current initiatives to reduce the inefficiencies associated with forward buying succeed depends on whether a critical mass of firms adopt these programs... Increased concentration in the industry decreases the transaction costs involved in forming alliances and therefore may be important to the development of a critical mass of operators moving away from the current forward buying system. In turn, the success of current industry initiatives to eliminate forward buying could result in significant changes in the makeup of the industry.

The literature does not appear to have identified the implications of forward buying practices in concentrated industries, such as New Zealand, hence the sixth potential research question for this research is:

> Potential research question #6: What are the implications of forward buying practices for the New Zealand food industry?

According to Hill and Scudder (2002) information sharing between buyers and suppliers is considered a major indicator of the use of supply chain management. They found that **EDI** is important, since it facilitates frequent automatic transfers of information required for high degrees of integration and coordination within the supply chain. They noted, however, that the use of EDI, without integration of supply chain activities, simply speeds up an existing process. Integration requires the reorganisation and restructuring of relationships between firms to achieve the full benefit of use of both EDI and supply chain management.

Wright and Lund (2003) reviewed the implementation of supply chain management within the Australian food and grocery industry and examined the workplace implications of industry rationalisation within the manufacturing, distribution and retailing components of the grocery supply chain. Their research focused on the strategic and market power of large retailers in influencing workplace change across the Australian grocery supply chain. They contrasted the duopoly structure of the Australian supermarket industry against the UK and US grocery industries. The Australian grocery industry has two major supermarkets (Woolworths and Coles) comprising 78% of the total industry. (While this is concentrated relative to the UK and US it is not as concentrated as the New Zealand grocery industry which has two major supermarkets (Progressive and Foodstuffs) comprising approximately 95% of the total industry (Foodstuffs have approximately 55% share (www.foodstuffs.co.nz) and Progressive have approximately 40% share excluding Supervalue which has approximately 5% (www.progressive.co.nz)).

Wright and Lund's research found that strategic partnerships between manufacturers and the two major supermarkets have been limited to the largest multinational food companies with well-established brand names and significant market power. By contrast, small- and medium-sized manufacturers and suppliers

lacking such market power appear to have little choice but to fit in with the retailers' supply chain initiatives.

The key supply chain initiatives adopted in Australia were warehouse, labour and transportation management systems. They found that most major Australian food and grocery manufacturers have outsourced their warehousing and distribution functions whereas the two major supermarket retailers have chosen to directly manage these facilities.

Their research concludes that supply chain developments within the Australian grocery industry reveal that the trend towards 'externalisation' is at best partial. That is, manufacturers, distributors and retailers continue to employ significant internal workforces. In fact, there is a trend back to internalisation by the major supermarket chains, which have rejected third-party management of their DCs because of their crucial role in the supply of product to supermarket outlets.

In summary, the thrust of supply chain management theory has shifted from defining the what, why and who of supply chain management to case study reviews of specific supply chain initiatives such as DCs and EDI. The case study research has tended to have a narrow focus on either a single supply chain initiative, single country or single industry. There has been limited research pulling together case study findings across multiple industries, countries or supply chain initiatives.

This section has defined supply chain management and discussed recent international trends towards greater collaboration, use of DCs and information sharing through EDI. The next section considers VMI practices which are a sub-set of supply chain management.

2.3.4   Vendor managed inventory

This section defines Vendor Managed Inventory (VMI) and provides an overview of its development and benefits. Research findings from international case studies are then discussed to provide insights into the drivers of their success or otherwise.

Taras (n.d, p.1) defines **VMI** as "a means of optimising supply chain performance in which the manufacturer is responsible for maintaining the supplier's inventory levels. The manufacturer has access to the supplier's inventory data and is responsible for generating orders." Similarly, Hall (2002, p.1) defines VMI as "a process where the supplier generates orders for the customer based on demand information sent by the customers. During this process the supplier is guided by mutually agreed to objectives for inventory levels, fill rates and transaction costs." This is different from consignment stock where the supplier places inventory at a customer's location and retains ownership of the inventory with payment not made until the item is actually sold (Taras, n.d.).

In recent years, VMI has been one of the most widely discussed partnering initiatives for improving multi-firm supply chain efficiency. Also known as continuous replenishment or supplier managed inventory, it was popularised in the late 1980's by Wal-Mart and Procter & Gamble. VMI became one of the key programmes in the grocery industry's pursuit of 'efficient consumer response; and the garment industry's 'quick response'. Successful VMI initiatives have been trumpeted by companies in the United States, including Campbell Soup and Johnson & Johnson, and by European firms such as Barilla, the pasta manufacturer. VMI practices are relatively recent to the New Zealand food industry compared to the examples above and highlights a seventh potential research question:

Potential research question #7: Why has the New Zealand food industry been slow to adopt VMI practices?

In a **VMI partnership**, the supplier, usually the manufacturer but sometimes a reseller or distributor, makes the main inventory replenishment decisions for the consuming organisation. This means the vendor monitors the buyer's inventory levels and makes periodic re-supply decisions regarding order quantities, shipping and timing.

Significant research has been conducted on how a supplier can make use of customer demand information for better demand forecasts and inventory control. These works show that there are significant benefits to the supplier, while the retailers do not receive any direct benefits (Cheung and Lee 2002). In contrast, Waller et. al., (1999) show that retailers benefit from improved service levels. Similarly, Cheung and Lee (2002) show that retailers can directly benefit from suppliers using supply chain information and VMI to rebalance retailers' stocks through replenishment.

According to Waller et al. (1999), the key benefits of VMI are reduced costs and improved service. Many suppliers are attracted to VMI because it mitigates uncertainty of demand thereby dampening the peaks and valleys of production, allowing smaller buffers of capacity and inventory. This reduces costs by permitting better utilisation of production and reduces the need for large buffer stocks. Through VMI, suppliers are able to influence the volume of purchases to increase the number of full-load trucks, thereby decreasing the number of part-load trucks and reducing overall transportation costs. From the retailer's perspective, service levels improve and, in times of critical shortage, inventory rebalancing across customer DCs can be achieved through visibility of total supply chain inventory levels.

Supporting this, Kulp (2002) investigated the extent to which a retailer's willingness to share internal (sales and inventory) information with a manufacturer, and the reliability of the information transmission between the retailer and the manufacturer, affects total supply chain profits. Their study found that the information shared between supply chain partner's influences the type of relationship formed (VMI or traditional) and the success of that relationship. (Refer to Chapter 7 for further discussion on the information shared between Goodman Fielder and Progressive).

Kulp's research model suggests that the extent of VMI use increases with the amount of internal accounting information the retailer reveals to the manufacturer (i.e. precision) and the manufacturer's ability to capture this information (i.e. reliability). The model also suggests that use of VMI leads to lower wholesale

prices because the manufacturer must share some of the efficiency gains that result from VMI with the retailer. The research results also suggest that VMI is more likely to lead to higher supply chain profits if both companies commit to sharing precise internal accounting information and reliably transmitting, receiving and using this information for inventory decisions.

In 1998 Nabisco and Wegmans Food Markets performed a 13-week test of a collaborative planning, forecasting and replenishment program with retailers. The process involved retailers and manufacturers agreeing on sales forecasts for a given period, using sales history, promotional plans and other data, and then presetting order amounts when the forecast was completed. The plan was reviewed 5 weeks ahead and when the plan became a forecast the orders were frozen. Sales growth, case fill rates, days of supply and forecast accuracy were used to measure the performance of the concept. This programme was similar to a pilot conducted by Wal-Mart and Warner-Lambert's Listerine products in 1995 to 1996 and succeeded in increasing the product's in-stock position and sales. These examples show how increased communication between manufacturers and retailers increased customer service levels while reducing inventory-holding costs.

Although VMI partnerships have been shown to be successful, Vergin and Barr (1999) found that even though 80 percent of manufacturers polled increased sales due to VMI, only 20 percent improved the production process, and only 10 percent lowered inventory. They suggested that the reason for this is that the companies may not have adequately integrated the VMI process into their corporate cultures. Similarly, Waller et al. (1999, p.198) concluded their research by stating:

> We found that successful [VMI] implementation depends heavily on sound business processes and interpersonal relationships. A purely technical solution without regard for the people involved is unlikely to deliver the benefits we have described. Effective teamwork is required, with strong participation by both the manufacturer and retailer. Moreover, trust between supply chain partners is critical. Both must experience (and recognise) clear benefits, or the relationship is doomed. Finally, organisation incentives and metrics must be aligned with VMI goals... Clearly VMI relationships will fail without necessary relationships, metrics and organisational structure.

Lee and Billington (1992) identified 14 common pitfalls in managing supply chain inventory that limit the ability of organisations to manage inventory efficiently and effectively. The pitfalls cover information definition, operational problems and strategic/design related problems (refer to Appendix 1 for full list of the pitfalls and associated symptoms). In response to these pitfalls, a number of corresponding opportunities and strategies were presented to maximise the benefits of managing inventory throughout the supply chain. Without clear strategies to address these common pitfalls, supply chain management initiatives, such as VMI, are unlikely to achieve their objectives.

The majority of documented **VMI cases studies** are based in North America and Europe. Cachon and Fisher (as cited in Waller et al, 1999) examined forecasting and inventory management under VMI for Campbell's Soup Inc. Using simulations of their ordering rules they found both retailer and manufacturer's inventories could be reduced while improving customer service levels. They also considered cases with limited manufacturing capacity and issues related to allocating inventory across retailers. In another study, Narayanan and Raman (as cited in Waller et al, 1999) developed a simple analytic inventory model to examine the benefits of VMI when product demand is influenced by product availability. They found that transferring stocking decisions to the manufacturer could lead to increased channel profits. Finally, a number of studies have established and characterised the value of centralising inventory in a supply chain (Waller et al., 1999).

No articles have been found on the applicability of international VMI research findings to the New Zealand food industry. Similarly, there have been no studies detected on the food industry in New Zealand or in a country with similar size, geography and demographics. International literature on VMI is inconclusive on whether the benefits are sustainable and generic across all countries, industries and organisations. Some case studies portray highly successful VMI partnerships while others show unsuccessful VMI partnerships which have been discontinued for various reasons. Prior to this research, it was still to be determined whether the findings from global studies could be applied successfully in the New Zealand

food industry and, if so, what the resulting benefits were. This leads to the following potential research question:

> Potential research question #8: Can international VMI partnership research findings be applied to the New Zealand food industry and, if so, what are the results?

In summary, the main thrust of early VMI research was to define VMI and describe the perceived benefits and the reasons why organisations should adopt it. More recent VMI research has used case studies to evaluate the success, or otherwise, of VMI initiatives and provide key insights for organisations seeking to adopt VMI. The future focus of VMI research is likely to be in the form of case studies from countries and industries that have not adopted VMI practices widely.

This section has defined VMI and used case studies to demonstrate how it is being applied. The key benefits arising from VMI are reduced inventory, increased customer service levels and improved supplier-retailer relationships. The most successful VMI relationships are the result of both process and system changes, supported by effective relationships. VMI is likely to be unsuccessful if there is a lack of management support, incompatible organisational structures and poor measurement and reporting of key performance indicators.

2.3.5   Role of IT and EDI in supply chain management

This section describes the role of Information Technology (IT) and, in particular, Electronic Data Interchange (EDI) in supply chain management. It then explains how the benefits of EDI are maximised when EDI is combined with business process changes.

EDI has been defined in literature in numerous ways. Laughlin (1989, p.21) defines it as "a method of computer-to-computer data transmission intended to improve the speed and accuracy of transactions among trading partners." Williams (1994, p.173) defines it as "… the inter-organisational exchange of business documentation in a structured, machine processable form." This

definition emphasises the inter-organisational nature of EDI and the structured nature of the transmitted data, while limiting the type of data transmitted to business data. By enabling fast and effective communications, EDI provides the means for efficient channel coordination.

Williams' (1994) research found that suppliers adopting EDI in the marketing channel are characterised as having large organisational size and high levels of demand uncertainty. EDI enables both suppliers and customers to reduce demand uncertainty by providing visibility of production schedules, inventory levels and freight tracking systems. They found that the logistics channel is characterised by a different set of factors. Shippers appear to have unilateral power and exercise it by giving carriers mandates to adopt EDI. Those choosing not to adhere must either pay surcharges or risk losing their complete business. In response to this some carriers have proactively adopted EDI as a means of competing in a highly competitive environment, enabling them to differentiate their service offerings from competitors.

In 1997, Clark and Hammond discussed the relationship between **business process reengineering** and channel performance for firms implementing EDI linkages within the US grocery industry. They claimed "firms adopting EDI without using **continuous replenishment processes** (CRP) to reengineer the ordering processes have failed to realise any statistically significant improvements in either inventory levels or warehouse stockouts" (p.248).

According to Clark and Hammond (1997), under a CRP programme, integrated information sharing across the channel is combined with vendor-determined ordering to improve total channel performance. In contrast with CRP, EDI ordering does not require substantial changes in the way data is analysed or transmitted in the channel. Order quantities are still determined by the retailer buyers using the same systems that were in place before the use of EDI. CRP represents a radical redesign of the entire ordering process based on the use of EDI to send information on sales and inventory levels, instead of orders, to manufacturers. Using CRP (or VMI) in the grocery industry, orders for products are essentially eliminated, with manufacturers determining quantities to ship to

retailers based on daily sales or warehouse shipment data provided by the retailers.

Clark and Hammond's 1997 study indicated that the impact of CRP on retailer inventory turns is at least five times larger than the improvements realised by implementing EDI ordering without CRP. Their regression results indicated, "retailer inventory levels are reduced with increasing levels of CRP usage and are not significantly affected by increasing EDI usage" (p.258).

Hill and Scudder's (2002) findings are similar, suggesting that firms view EDI as a tool for improving efficiencies, rather than as a tool for facilitating supply chain integration. They claim that the food industry has focused on the development of supply chain management techniques, such as efficient consumer response (ECR), as well as the use of EDI. Their research found that transactions which were the most routine and frequent, with both customers and suppliers, were the ones most likely to be completed using EDI. They also found that the larger the company, in both sales volume and employees, the more likely it was to be an EDI user, while the nature of a company's product and market, did not impact the use of EDI. Finally they found that customers more commonly used EDI activity than suppliers. This suggests that companies use EDI to become more coordinated with suppliers, but not necessarily with customers.

Similarly, Waller et al. (1999), found that successful implementation of VMI often depends on computer platforms, communications technology and product identification and tracking systems. EDI is an enabler, but not a requirement for VMI (Carter, 1990). For example, Frito-Lay used VMI techniques long before establishing EDI. These research findings lead to the following question:

Potential research question #9: What supply chain efficiencies can be realised in the New Zealand food industry through VMI without EDI?

In summary, EDI research has evolved over time. The research initially focused on quantifying the benefits of EDI from a financial and supply chain management perspective. More recently the research has become case study based and compared the nature and extent of benefits realised through EDI with other supply chain initiatives. The recent research findings have helped explain why EDI has not been widely implemented across industries and countries and how organisations can realise similar benefits through VMI/CRP. The next focus area for EDI research will be extrapolating recent case study findings in order to provide a wider range of organisations and industries with the tools required to maximise the benefits from EDI in conjunction with other supply chain initiatives.

This section has described the use of EDI in supply chains and discussed research findings showing that EDI alone does not maximise supply chain efficiencies. Rather EDI, in conjunction with increased supply chain coordination, leads to greater supply chain efficiencies.

2.4 Current research gaps

This section views the literature from an industry, organisation and management-level rather than functional level and highlights further current research gaps in supply chain and VMI literature. Additional potential research questions are identified throughout this section.

2.4.1 Industry-level research gaps

The New Zealand food industry is unique in that, since June 2002, there are only two key retail players: Foodstuffs and Progressive, comprising approximately 95% of the total supermarket industry (Foodstuffs have approximately 55% share (www.foodstuffs.co.nz) and Progressive have approximately 40% share excluding Supervalue (www.progressive.co.nz). While Australia also has two dominant grocery retailers, these only comprise 78% of the supermarket industry. The US, UK and European countries, have a greater number of supermarket retailers with less market share.

> Potential research question #10:   What industry characteristics are unique to
>   the New Zealand food industry?

Foodstuffs and Progressive believe that because of the concentration of food retailers in New Zealand, information sharing with suppliers through VMI will reduce their competitiveness.   This attitude conflicts with international case studies which show that the benefits of information sharing through VMI and supply chain relationships outweigh the costs.   This is yet to be proven in the New Zealand environment.

> Potential research question #11:   Does information sharing through VMI
>   reduce competitiveness in the New Zealand
>   food industry?

Clark and Hammond's study of CRP in the US grocery industry identified several managerial implications and research opportunities.   They identified that "differences in environment were significant factors influencing retailer performance.   Companies outside the United States may have significant differences in these external factors that would limit the use of this [adoption of CRP] approach" (1997, p.263).   Based on this statement there is additional research required to determine whether their findings from the US grocery industry can be applied to the New Zealand and other similar food industries.

> Potential research question #12:   Can findings from the US grocery industry
>   be applied to the New Zealand food
>   industry?

2.4.2   Organisation-level research gaps

Corbett and Blackburn (1999) identified that the open-ended nature of supply chain partnerships makes them more challenging than strategic alliance and project based partnerships, in which two firms may work toward a common goal but later dissolve the association after achieving the goal.   They noted that supply chain literature focuses mainly on the characteristics of partnership and on new

supplier-management practices, saying relatively little about the actual process of developing partnerships.

The findings of Corbett and Blackburn (1999) provide a framework for supply chain projects based on the experiences of Pellton International, a large multinational chemical company; however the framework has not been tailored to specific countries or industries.

> Potential research question #13: What process is required to develop supply chain partnerships?

> Potential research question #14: What factors are unique to food industry supply chain partnerships?

2.4.3 Management-level research gaps

Clark and Hammond (1997, p.263) noted:

> One important issue that was not specifically addressed in this research was the potential for retailers and manufacturers to realise the benefits attributed to CRP by simply sharing information without also requiring the adoption of the VMI process. In theory, it would seem that most of the benefits of CRP could be realised by information sharing without actually requiring the implementation of the VMI replenishment process.

Further research is required to determine whether this theory holds true in the New Zealand food industry. This research gap is covered by potential research question #9 in section 2.3.5.

2.4.4 Summary

Overall, there are several key gaps in current literature and research in respect of supply chain initiatives in the New Zealand food industry at the industry, organisation and Management-levels. There is no research to determine whether findings from the US grocery industry can be applied to the New Zealand food industry. Similarly, there are no articles on VMI and supply chain relationships specific to the New Zealand food industry, which outline the costs and benefits. Finally, there is no research in New Zealand or overseas on whether the benefits

of CRP can be realised by information sharing without implementing VMI or EDI practices.

2.5 Chapter summary

This chapter has described relevant literature on the food industry, supply chain management and VMI. Key authors and research centres on the subject were presented. Several potential research questions and current research gaps were identified from the literature. These are incorporated into the research, where appropriate, to help answer the primary research question addressed by this thesis.

Chapter 3   Research Questions

3.1   Introduction

This chapter defines and justifies the primary research question and describes how the research is structured to answer the question. The potential research questions identified in Chapter 2 are summarised and categorised into industry, organisation and management-levels. These form the set of secondary questions for this thesis, the answers to which will provide depth and academic support for the action research results and will contribute to knowledge by closing some of the current research gaps, particularly as they relate to the New Zealand food industry.

3.2   Primary research question

A number of global industries, including the New Zealand food industry, have been slow to develop and implement strategic supply chain relationships and VMI practices. These practices are common overseas, particularly in the food industries of the US, UK and Europe. This thesis addresses the primary question:

> *What are the key determinants of successful vendor managed inventory*
> *and strategic supply chain relationships in the New Zealand food*
> *industry?*

This thesis develops a generic framework, developed under a specific set of circumstances, based on a New Zealand food industry case study. These circumstances and their potential limitations on the application of the generic framework to other industries and countries are discussed in Chapter 5. The research findings are presented as three integrated frameworks: Industry-level, Organisation-level and Management-level.

At the Industry-level a literature review, industry statistics, global best practice and international case studies will be used to identify factors impacting industry structures and highlight those factors potentially unique to the action research case study. The Industry-level framework will cover the structure, profitability and supply chain initiatives required by industries to develop successful supply chain

relationships. Conditions potentially unique to the New Zealand case study environment will be highlighted and discussed as possible limitations to the application of the framework.

At the Organisation-level strategic alliance and relationship theory, international case studies, global best practice and the action research case study will influence the framework developed. In response to the research gaps identified during the literature review, this research will focus on the key determinants of successful strategic VMI and supply chain relationships. The Organisation-level framework will be developed from strategic relationship theory and the Goodman Fielder and Progressive action research case study findings. The framework will cover organisation structure, objectives, culture and attitudes.

The Management-level framework focuses on specific product categories having different shelf life, temperature, promotional volatility and branding dynamics. The framework will cover management commitment, systems and processes, information needs and communication requirements. A New Zealand action research VMI case study will be used to support, or otherwise, international VMI research findings.

Where possible, the case study will also be used to answer the potential research questions identified during the literature review.

3.3   Need for this research

This thesis has stressed the limited adoption of global supply chain initiatives in the New Zealand food industry. In contrast, international literature (Clark and Hammond, 1997; Kulp, 2002) and case studies, such as Wal-Mart, Procter & Gamble, Campbell Soup, Johnson & Johnson and Barilla, have demonstrated the benefits of supply chain relationships and initiatives such as DCs, EDI, VMI and CRP.

The New Zealand food industry appears unusual in that, since 2002, the retail industry has been dominated by two organisations comprising 95% of

supermarkets (Foodstuffs have approximately 55% share (www.foodstuffs.co.nz) and Progressive have 40% share excluding Supervalue (www.progressive.co.nz). This dominance reflects the oligopolistic structure of the industry, where only a few firms account for most of the production in the market and products may or may not be differentiated (Brickley et al., 1997).

While this oligopoly retail industry structure is unusual, there is no evidence to suggest that supply chain practices adopted overseas and in other New Zealand industries cannot be adopted in the New Zealand food industry. On the contrary, supply chain relationships may enable suppliers and retailers to reduce costs and maintain profits in an increasingly competitive market. For example, Kurt Salmon Associates (1993) predicted that the benefits of CRP could be as great as 5% of sales. Clark and Hammond (1997) and Intentia (2003) identified benefits of reduced inventory levels, increased inventory turn and improved supplier-retailer relationships.

The purpose of this research is to identify the key determinants of successful supply chain and VMI relationships in the New Zealand food industry and, further, to derive a series of interrelated frameworks for the food industry to adopt. The frameworks will be generic in nature, but tailored to the unique characteristics of the New Zealand food industry.

3.4   Secondary research questions

The purpose of the secondary research questions is to contribute to knowledge and provide depth and academic support to the frameworks developed.

The potential research questions were identified during the literature review as current research gaps; addressing them will help close the research gaps, particularly in relation to the New Zealand food industry, and will contribute to knowledge on VMI and supply chain relationships in the New Zealand food industry.

The questions are categorised into Industry-, Organisation- and Management-levels as follows:

The questions categorised under the heading of 'Industry-level' consider factors impacting on the New Zealand food industry from an industry perspective. They identify trends and research findings from other industries and countries which impact on the industry structure required for successful supply chain relationships, and relate to:

- International trends in VMI and supply chain initiatives
- How learning from other countries can be applied to New Zealand
- How learning from other industries can be applied to the New Zealand food industry
- Factors distinguishing the New Zealand food industry from other countries and industries

The Organisation-level questions relate to the nature and type of supply chain relationships; they consider existing VMI and supply chain relationship structures and are used to identify the key success factors in these relationships. Factors potentially unique to the New Zealand food industry are also sought to identify possible limitations of the research findings. The Organisation-level questions relate to:

- The most appropriate type of relationship structure
- How supply chain and VMI relationship learning from other countries can be applied to New Zealand
- Factors distinguishing the New Zealand food industry supply chain from food industries in other countries

The Management-level questions focus on global supply chain practices and consider the key benefits of such practices. In particular, the need to implement all these practices, or a sub-set of these, is questioned. The nature of the benefits

realised by adopting these practices is also addressed. The Management-level questions relate to:

- How supply chain and VMI practices in other countries can be applied to New Zealand
- What combination of supply chain practices have the greatest cost/benefit
- Factors distinguishing the New Zealand food industry from food industries in other countries

Table 1 summarises the potential research questions identified during the literature review in Chapter 2 and categorises them under the headings of Industry-level, Organisation-level and Management-level using the classifications described above.

	Potential research questions	Industry-level	Organisation-level	Management-level
1	What are the critical success factors for a successful inter-firm supply chain partnership in a concentrated food industry?	√		
2	What types of retailer-vendor relationships are most appropriate for the New Zealand food industry?		√	
3	What learning from the New Zealand forestry industry can be applied to the New Zealand food industry?	√		
4	Are the research findings from a UK food industry strategic partnership applicable to the food industry in New Zealand?		√	
5	How do food industry trends toward DCs impact geographically diverse countries with small regional populations such as New Zealand?	√		
6	What are the implications of forward buying practices for the New Zealand food industry?			√
7	Why has the New Zealand food industry been slow to adopt VMI practices?	√		

	Potential research questions	Industry-level	Organisation-level	Management-level
8	Can international VMI partnership research findings be applied to the New Zealand food industry and, if so, what are the results?			√
9	What supply chain efficiencies can be realised in the New Zealand food industry through VMI without EDI?			√
10	What industry characteristics are unique to the New Zealand food industry?	√		
11	Does information sharing through VMI reduce competitiveness in a concentrated industry, such as New Zealand?			√
12	Can findings from the US grocery industry be applied to the New Zealand food industry?		√	
13	What process is required to develop supply chain partnerships?		√	
14	What factors are unique to food industry supply chain partnerships?		√	

Table 1: Summary of secondary research questions

3.5 Chapter summary

This chapter has defined the primary research question and classified the potential research questions, identified in the literature review, into industry, organisation and management-levels. These questions form the secondary research questions in this thesis and will provide depth to the three interrelated frameworks and the research results. Answers to these questions are presented in the applicable industry, organisation and management-level results chapters. The following chapter describes the research methodology used to answer these questions.

Chapter 4   Research methodology and design

4.1   Introduction

This chapter describes the candidate research methodologies and justifies the selection of action research, supported by soft system methodologies (SSM), as the most appropriate method. It then explains the research design and defines best practice.   Finally, the ethical considerations pertinent to this research are presented.

Dick's (1993) action research cycle, described earlier in section 1.3, consists of planning (or intention), action and review (or critique/reflection).   Dick claims that this cycle provides a mix of responsiveness and rigour, thus meeting both the action and research requirements.   Repeated cycles allow the researcher to converge on an appropriate conclusion.

Eden and Huxham (1996, p.526) claim "Action research has become increasingly prominent among researchers involved in the study of organisations as an espoused paradigm used to justify the validity of a range of research outputs." This is because action research involves the researcher working with members of an organisation over a matter which is of genuine concern to them and which there is intent by the organisation members to take action based on the intervention (Eden, Huxham, 1996).

4.2   Typical supply chain management research methods

The majority of supply chain management research to-date has been in the form of case studies and simulations. Very little research has been conducted using action research methods in the field of supply chain management.

The literature review provides many examples of case study research including Shaw and Gibbs (1995), Clark and Hammond (1997), Wilson and Sankaran (2001) and Wright and Lund (2003). No case studies have been detected on retailer-manufacturer supply chain practices in the New Zealand food industry.

Simulation has been used by a number of researchers including Clemons and Row (1992), Clark and Hammond (1997), Kulp (2002), Thomas et al. (1995) and Williams (1994). The main purpose of these simulations was to quantify potential benefits and costs of supply chain activities based on certain criteria.

The Strathclyde University food project used action research to increase industry competitiveness by finding ways of reducing the UK trading deficit in food (Shaw and Gibbs, 1995). This is a rare example of action research conducted in the field of supply chain management in the food industry.

4.3   Justification for the research methodology

This section describes candidate research methods and justifies the selection of action research methods for this thesis.

4.3.1   Candidate research methods

There are two broad streams of research methodologies – qualitative and quantitative. Table 2 below compares and contrasts the key characteristics these methodologies.

	Qualitative research	Quantitative research
Research problem	How? Why?	Who (how many)? What (how much)?
Literature review	Exploratory: - What are the variables involved? - Constructs are messy - Research questions are developed	Explanatory: - What are the relationships between the variables which have been previously identified and measured? - Hypotheses are developed
Paradigm	Critical realism/interpretive/ phenomenology	Positivist
Methodology	Examples include case studies and action research	Examples include experiments and surveys

Table 2: Characteristics of qualitative and quantitative research methods

(Source: Adapted from Perry, 1998, p.25)

Traditional quantitative research methods are based on the researcher making a guess or forming a hypothesis at the beginning of the research and then using this to test the data (Maykut and Morehouse, 1994). The focus of quantitative research is determine support/lack of support for a hypothesis and is therefore based on a positivist position. The positivist research orientation holds that science is, or should be, primarily concerned with the explanation and prediction of observable events (Kincheloe, 1991). "It is the insistence on explanation, prediction and proof that are the hallmarks of positivism" (Maykut and Morehouse, 1994, p.3).

Scientific research uses quantitative methods. Checkland and Holwell (1998) identified reductionism, repeatability and refutation as the three fundamental principles which characterise scientific research and give it power. In essence, scientists select a portion of the world to investigate and carry out disciplined observation in experiments. If the results of the experiment are repeatable, they count as part of the body of knowledge; and progress can be made in sequences of experiments through the testing to destruction of hypotheses. As a result, "scientific knowledge is the accumulation of hypotheses which have not (yet) been refuted" (Checkland and Holwell, 1998, p.11).

In broad terms, quantitative research is focused on numbers rather than words, objective rather than perspectival views and proof rather than discovery (Maykut and Morehouse, 1994). In quantitative research as many unique aspects of the environment are eliminated as possible in order to apply the results of quantitative research to the largest possible number of subjects and experiments.

The hallmarks of quantitative research have also become limitations from a social research perspective where contextual sensitivity and the need to understand complex social relationships are important. As Westbrook (1995, p.11) found "Scientific method did not permit them [the organisational behaviour research community] to capture or interpret the richness of human activity in organisations."

In contrast to quantitative research methods, qualitative research places emphasis on understanding, through looking closely at people's words, actions and records. The goal of qualitative research is to discover patterns that emerge after close observation, careful documentation and thoughtful analysis of the research topic. Qualitative research is based on the phenomenological position which focuses on understanding the meaning events have for persons being studied (Patton, 1991).

Qualitative research methods were historically perceived to lack robustness due to lack of repeatability and predictability. In 1985, Lincoln and Guba presented the philosophical basis for qualitative research, as well as a set of techniques and methods for conducting such research in a rigorous way. They argued that effectively "... qualitative research is based on a fundamentally different set of axioms or postulates than the dominant [positivist/quantitative] approach to research" (Maykut and Morehouse, 1994, p.10). Table 3 summarises these.

Questions	Postulates of the phenomenological approach	Postulates of the positivist approach
1. How does the world work?	There are multiple realities. These realities are socio-psychological constructions forming an interconnected whole. These realities can only be understood as such.	Reality is one. By carefully dividing and studying its parts, the whole can be understood.
2. What is the relationship between the knower and known?	The knower and then known are interdependent.	The knower can stand outside of what is to be known. True objectivity is possible.
3. What role do values play in understanding the world?	Values mediate and shape what is understood.	Values can be suspended in order to understand.
4. Are causal linkages possible?	Events shape each other. Multidirectional relationships can be discovered.	One event comes before another event and can be said to cause that event.
5. What is the possibility of generalisation?	Only tentative explanations for one time and place are possible.	Explanations from one time and place can be generalised to other times and places.

Questions	Postulates of the phenomenological approach	Postulates of the positivist approach
6. What does research contribute to knowledge?	Generally, the phenomenologist seeks to discover or uncover propositions.	Generally, the positivist seeks verification or proof of propositions.
	⇩ ⇩ These postulates undergrid different approaches to inquiry.	
	⇩ Qualitative research approach approach	⇩ Quantiative research approach
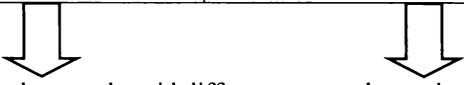
Table 3: Postulates of research paradigm

(Source: Maykut and Morehouse, 1994, p.12)

According to Maykut and Morehouse (1994, p.16) these postulates are "… based on two different and competing ways of understanding the world." These differences are reflected in the way research data is collected (words versus numbers), the perspective of the researcher (perspectival versus objective) and the way theory is developed (discovery versus proof).

Table 3 above suggests that positivist research methods, such as quantitative research, are best used in situations where the researcher wishes to prove the validity or otherwise of a hypothesis and explain the relationship between variables. Scientific experiments commonly use quantitative research methods. Phenomenological research methods, such as qualitative research, ethnomethodology, grounded theory, naturalist inquiry and enthongraphy (Patton, 1991) are best used in situations where there is a need to develop theory on why certain things occur in complex, interrelated, 'messy' environments. Case studies and action research are the main methods of qualitative research.

In summary, this research focuses on identifying the key determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry and has an interpretative/ phenomenological focus, rather than a positivist focus. The 'identify' factor is similar to the exploratory nature of qualitative research where research questions are developed, rather than the explanatory

nature of quantitative research methods where, previously identified, variables are tested and hypotheses developed. Therefore, in terms of Table 2 above, a qualitative research method is most appropriate to answer the primary research question. Similarly, in terms of Table 3 above, this research environment has multiple realities which form the whole (supermarket retailers and manufacturers working together to form the food industry), rather than unique parts (supermarket retailers and manufacturers) working in isolation to form the whole (food industry). The supermarket retailers and manufacturers are interdependent and, as such, have multidirectional relationships in line with the phenomenological postulate, rather than objective, cause and effect events described by the positivist.

Based on the characteristics and postulates described above, qualitative research methods were considered the most appropriate for this research topic, given their focus on multidimensional relationships, interconnected organisations and the need to evolve theory in response to the rapidly changing food industry.

The two main forms of qualitative research identified by Dick and Swepson (1997) in Table 2 above were case studies and action research. The next section describes action research and justifies its use.

4.3.2   Focus on action research methods

According to Dick and Swepson (1997, p.2):

> Action research is particularly useful if:
>
> - You must remain flexible
> - You wish to involve the people in the system being researched
> - You wish to bring about change at the same time, or
> - The situation is too ambiguous to frame a precise research question
>
> or any combination of the preceding conditions.

Action research differs from quantitative and scientific methods in the following ways (Dick and Swepson, 1997):

- It does not usually provide causal explanations of what is studied

- It does not usually attempt to answer questions as precise as those addressed by methods such as experimental research

- It mostly uses qualitative data

- It is done by researchers who do not make the same effort to distance themselves from what they are researching; in fact, they often set out to build close relationships with the people within the system studied

- It uses a research process which, rather than being standardised, is modified on the run in response to what happens

- It does not necessarily seek explanations at a more specific level than the phenomena it is dealing with – that is, it tends not to be 'reductionist'.

In addition, action research is often regarded as giving answers which are specific to the particular situation, and which cannot be generalised to other situations. These differences are also potential disadvantages and limitations of action research methods.

As Coughlan and Coghlan (2002, p.225) state "Action research does not preclude the use of data gathering methods from traditional research. Qualitative and quantitative tools, such as interviews and surveys, are commonly used."

Action research is best suited to situations where the researcher wishes to bring about action in the form of change, and at the same time, develop an understanding which informs the change and is in addition to what is known. In light of the conclusions stated in section 4.3.1 and the potential disadvantages and limitations above, action research methods were judged the most appropriate research methods to maximise the flexibility and responsiveness of the research to the rapidly changing food industry and supply chain environment.

Action research was selected to maximise the findings and theory development available by having the researcher integrally involved in the organisations being studied. Throughout this research, the researcher was employed by Goodman Fielder and worked in a VMI-type role with Progressive. VMI provided an opportunity for both organisations to fulfil their goals of increased customer service levels and reduced inventory holdings.

The ability of the researcher to bring about change during the research period was also considered critical. Action research methods enable the researcher to alternate between action and critical reflection. Eden and Huxham (1996, p.530) support this by stating:

> The ability of the researcher to characterise and conceptualise the particular experience in ways which make the research meaningful to others is critical. Action research is concerned with systematic relationships, rather than single theories: the aim is to understand conceptual and theoretical *frameworks* where each theory must be understood in the context of other related theories. Thus in action research, the reflection and data collection process – and hence the emergent theories – are most valuably focused on aspects that cannot be captured by other approaches.

Consulting differs from action research in that most forms of action research are more deliberate in their pursuit of understanding. More importantly, frequent critical reflection is a formal and central part of most action research. Critical reflection is characterised by a vigorous search for disconfirming evidence and involves at least two components: (1) reflecting after the event to draw lessons from the action by asking questions such as 'what worked?' and 'what didn't work?' and (2) identifying the consequences by asking questions such as 'what do we understand now?' and 'how will we act now?' (Dick, 1999, 2002). Most practice is much less reflective than action research; and if it does use reflection, is neither as deliberate nor as critical in its use (Dick and Swepson, 1997).

Action research enables the research questions to evolve and be refined throughout the research to better meet the needs of the organisations being studied and to adapt to the continuously changing and evolving New Zealand food industry. For example, within the first 3 months of this research commencing

Progressive acquired Woolworths. Six months later Burns Philp commenced their hostile takeover bid for Goodman Fielder and within another six months the Burns Philp acquisition was complete. Continuous cycles of 'plan, act and review' were considered key to developing a practical model, applied in practice which was responsive to the rapidly changing New Zealand food industry.

In this research, the need for responsiveness was considered more important than the need for replication; however at the same time, the requirement for rigour was considered fundamental to the success of the overall research. According to Dick (1993) in order to achieve rigour in action research, procedures should be adopted to include the following:

- Using brief cycles to provide adequate iteration
- Striving to access multiple data sources to provide a dialectic
- Developing interpretations as part of data collection
- Accessing the relevant literature as part of interpretation, to widen the dialectic; and
- Continuously testing assumptions sceptically and rigorously by actively seeking exceptions to apparent agreement and obtaining explanations for apparent disagreement.

There are a number of action research methodologies including the broad categories of participatory, action science, systems methodology and evaluation. In determining which action research methodology to select, Dick's (2000a) following guide to decisions on research methods was considered.

- If your chief motivation for using action research is a strong commitment to participation and equity, then the more deliberately participative approaches are more suitable
- If you work in an academic setting where action research is regarded as a fringe paradigm then using evaluation methodologies is more appropriate

- If you are drawn towards understanding how interpersonal relationships and system dynamics interact to undermine or produce effectiveness, action science methodologies should be selected

- If you want to develop an understanding of richly interconnected and complex systems, particularly if they can be treated as an information or decision-making system, then systems methodologies should be considered

This research topic does not have a strong commitment to equity between the parties. Although the researcher is a key participant in the research, there is not a strong requirement for participation in the research by Goodman Fielder and Progressive. As a result, the participative approach was not considered the most appropriate research method.

Because the researcher does not work in an academic setting where action research is considered a fringe paradigm, evaluation methodologies were not considered appropriate.

Action science methods focus on how interpersonal relationships and dynamics of the system interact. Although strategic partnerships and VMI require strong interpersonal relationships, supply chain activities focus on interactions between organisations rather than individuals. Systems dynamics is a simulation technique involving entities, or stocks, and quantifiable flows between them. Operations Researcher's would consider this technique for analysing particularly the Management-level framework. However, a systems dynamics simulation was not considered viable in this research because the main factors in the frameworks are qualitative. Further, even if this aspect could be overcome, say with surrogate variables, constant change is part of the New Zealand food industry environment. Simulation techniques would require constant refinement of the model before running it and analysing the output, unworkable when a quick response to the change is required. As a result, action science was not considered the most appropriate method for this research.

Systems methodologies focus on richly interconnected and complex systems. Strategic relationships, by their very nature, involve two or more parties participating in one or more activities. The complexity of the relationship depends on a range of factors including the number of parties involved and the nature of activities performed. Successful strategic relationships often have richly interconnected and complex systems in order to manage information and activity flows.

Based on these factors, system methods were considered the most appropriate category of action research to use. More specifically, aspects of Checkland's SSM were selected to complement the action research methods used. These are described in the following section.

4.3.3 Soft systems methodology

Checkland's SSM was developed over a number of years to help formulate and structure thinking about problems in complex and 'soft' (human) situations. Its core (epistemological premise) is the construction of conceptual models of purposeful human activity, structured by systems theory and the comparison of those models' unstructured perceptions of the real world (Rose, 1997). Systems theory attempts to take a holistic view of the interrelations of component parts – the wider picture (Rose and Haynes, 1999). SSM is not about analysing systems found in the world, but about applying systems principles to structure thinking about things that happen in the world.

SSM is potentially well suited to the evaluation of complex VMI and strategic supply chain relationships. Its philosophical underpinnings are interpretative, not objectivist. It is focused upon qualitative issues; it can also be participative in nature. Its systematic nature makes it suitable for dealing with complex human situations, and it can explicitly cope with differing stakeholder views via the concept of Weltanschauung (world views).

The original Checkland SSM developed in 1981 comprised four stages: immersion in reality, define the essence, invent an ideal and propose changes (refer to Figure 2). This model has been clarified and developed over time. The

SSM model used in this research was developed by Checkland and Scholes in 1990 and can be viewed as comprising seven stages, as shown in Figure 5 below.
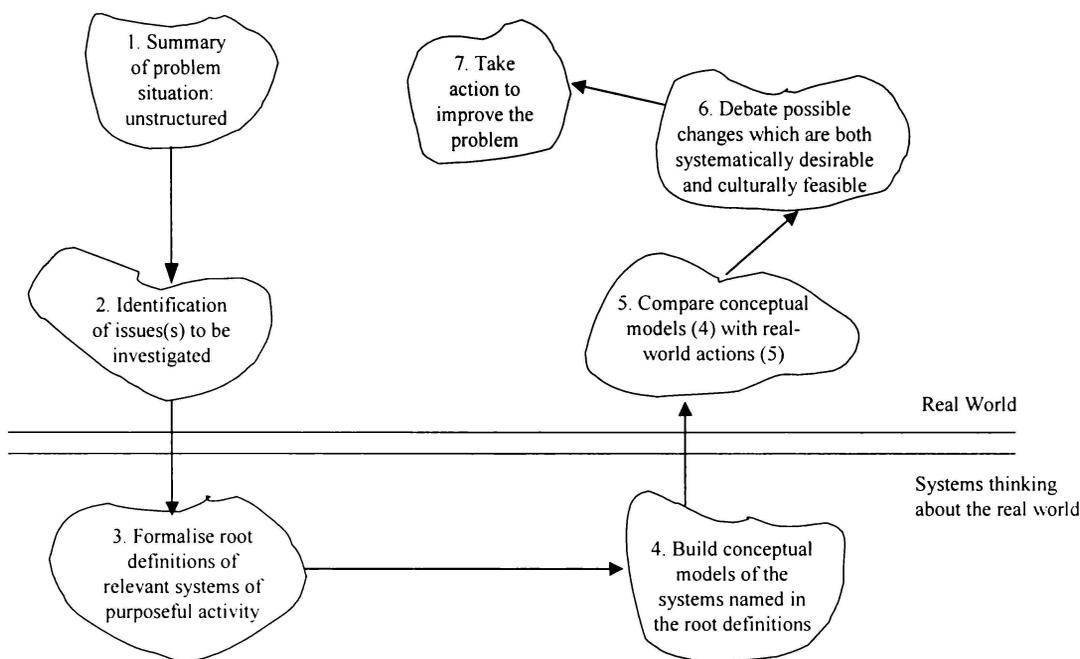
Figure 5: The seven steps of SSM

(Source: Checkland and Scholes, 1990)

These stages are described in detail below (Buchanan, 1997):

Stage 1 involves the researcher having their first encounter with the problem situation. During this stage the researcher must resist attempts to impose a particular structure on the situation and must recognise that if they decide to become involved, they become part of the situation. The researcher must clarify their own objectives and the reasons for wishing to become involved. This is consistent with action research where one of the researcher's objectives must be developing theory with "implications beyond those required for action or generation of knowledge in the domain of the project" (Eden and Huxham, 1996, p.539).

The second stage of SSM is concerned with identifying the issues to be investigated. It moves from *finding out* about a problem situation to *taking action* to improve it by using systems thinking about the situation. By the end of Stage 2

the research must fully understand the situation. This is consistent with Eden and Huxham's (1996) first action research characteristic of integral involvement by the researcher.

Stage 3 involves forming root definitions of the relevant systems. A CATWOE (Customer, Actors, Transformation process, Weltanschauung, Owner, Environmental constraints) is a useful tool for defining the root definition. This stage is not explicitly covered in the action research cycle of plan, act and review. The SSM approach of defining the root definition infers a one-time step of understanding and documenting the system. In contrast, action research adopts an emergent approach with incremental theories emerging through cycles of research.

Stage 4 leads out of Stage 3 by building conceptual models showing the dependencies within the relevant system as nodes and arrows. This is consistent with Eden and Huxham's (1996) fifth characteristic of action research which is concerned with a system of emergent theory. That is "... theory develops from a synthesis of that which emerges from data and that which emerges from the use in practice of the body of theory which informed the intervention and research intent" (p.539). Both action research and SSM can be shown to use a combination of data and theory to develop theory.

The fifth stage of SSM compares the conceptual models with reality. Differences between the models are explored and potential changes identified. This stage is closely associated with the action research critical reflection phase. In action research, the researcher plans, acts and then reviews the outcome of their actions before repeating the cycle.

Stage 6 of SSM debates possible changes to the model which are both systematically desirable and culturally feasible. In action research the 'debate' stage is conducted through continuous cycles of plan, act and review with changes and evolutions occurring throughout the process.

The final stage of SSM involves taking action to improve the problem. This is consistent with action research of step of 'act'; however in action research, taking action is not the final step, rather it is one step in a number of cycles which evolve over time.

Relevant aspects of these steps will be merged with the action research case study and are referred to throughout the results chapters.

4.3.4 Summary

This section has described candidate research methods and justified why action research methods, supported by systems methodologies were selected for this research. The key reasons were to maximise responsiveness and flexibility by enabling the researcher to be fully involved in the research and implement change throughout the research using critical reflection techniques. By applying aspects of SSM, in conjunction with action research, the researcher was able to address the richly connected and complex systems found in supply chain relationships. As Checkland (1991, p.6) states it is "… the explicit methodological framework, declared in advance by the action researcher, which enables the researcher to justify what he or she says, thus beginning the process of developing a legitimate rigorous alternative to positivistic research."

4.4   Research design

This section describes how the research was designed to answer the primary research question while, at the same time, meeting the requirements for action research. It presents the research methods used and describes in detail how the research was structured to develop the industry, organisation and management-level frameworks.

This research was conducted using a mixture of research media. The majority of the research was conducted using action research and SSM. Interviews, reviews of internal documentation and literature reviews were the key sources of data.

4.4.1   Overview of research design

The results of this research are presented in chapters 5 through 7 covering the industry, organisation and management-level frameworks respectively.   The output is a working model, appropriate for the New Zealand food industry, which is applicable to other food industries in countries with similar characteristics to New Zealand.

All three frameworks were developed and refined in conjunction with each other. Although each framework could have been developed in isolation, to maximise the benefits of this research, findings from each framework were used to further develop, justify and refine the other frameworks (levels of abstraction). Characteristics of good frameworks incorporated into this research are described in Appendix 2. Essentially, a good framework captures the key variables and their interrelationships and has a level of insight and depth in the naming that provides immediate use.   It also has the qualities of good information, such as completeness and consistency.

The frameworks are interrelated and overlapping as depicted in Figure 6 below.
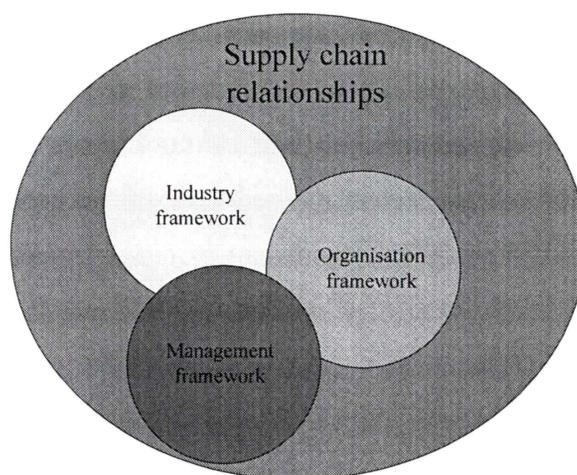
Figure 6: Supply Chain Relationship Framework

4.4.2   Industry-level

The focus of the Industry-level research was to develop a framework identifying the key determinants of successful VMI and strategic supply chain relationships at an Industry-level. These factors were identified using literature reviews and case

studies to develop an understanding of current international and best practices. Figure 7 below shows the process used to develop the framework.
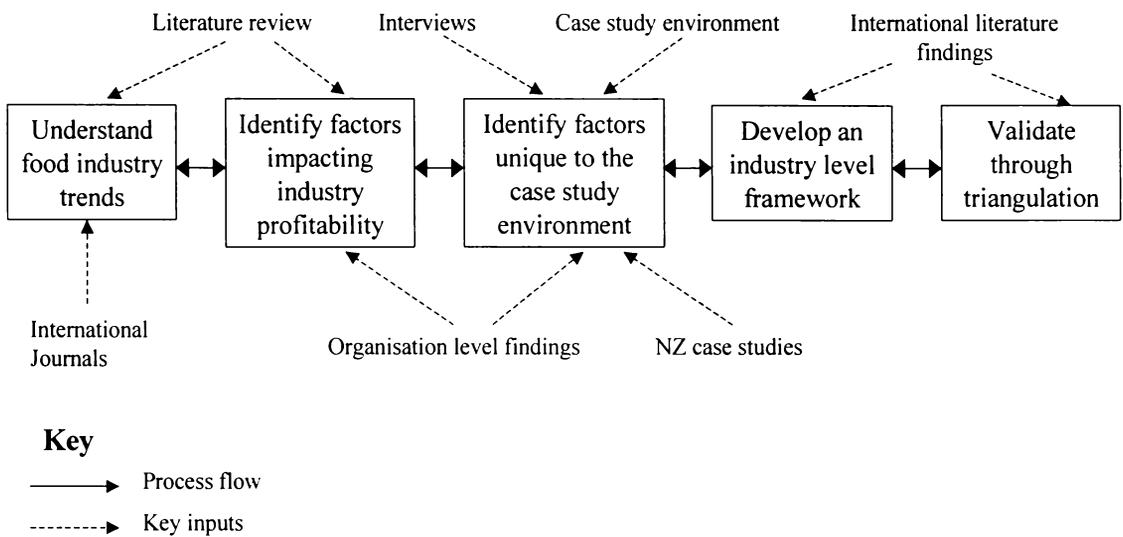
Figure 7: Industry-level Process Flow

An understanding of trends in the food industry was developed through a literature review. The researcher's experience and knowledge of the New Zealand food industry through her work at Goodman Fielder was also used.

Key influences on industry structures, profitability and supply chain initiatives were identified through a literature review. Textbooks, academic journals, international supply chain journals and case studies were the key source of information, supported by discussions with people involved in the New Zealand food industry. Potential research questions were identified during the literature review and answered as part of the research.

Trends in international industry structures and profitability were reviewed to develop an understanding of the key factors driving supply chain initiatives overseas. The structure and dynamics of the New Zealand food industry were then documented to gain an understanding of the factors potentially unique to the action research case study industry. Another New Zealand industry case study was reviewed to ensure that factors potentially unique to New Zealand were considered and incorporated into the limitations of the final framework.

Once an understanding of the food industry, factors impacting industry profitability and factors potentially unique to the action research case study were obtained, a first-cut Industry-level framework was developed. The framework was justified and validated by comparing and contrasting the first-cut framework with international literature and research findings. Factors identified in the international research and excluded in the framework were considered and either incorporated into the final framework or their exclusion explained. Similarly, factors included in the first-cut framework but not identified in the international research were either removed from the final framework or their inclusion explained. This process provided an objective benchmark, against which the research findings could be compared, to ensure that knowledge was being advanced appropriately.

Findings and outcomes from the Organisation and Management-levels were used to enhance the depth of the Industry-level findings, conclusions and recommendations. Continual refinements to the Industry-level framework were made as the researcher's knowledge of the research case study industry and global best practices developed.

The key output of the Industry-level research is a diagrammatic framework covering structure, profitability and supply chain initiatives, which has been applied and justified using a New Zealand food industry example. The framework is supported by descriptions of each factor identified with an explanation of how they should be used to improve Industry-level supply chain relationships. Limitations of the framework are discussed in light of factors identified as potentially unique to the research case study environment. Variances to international research findings are explained and justified.

4.4.3   Organisation-level

The focus of the Organisation-level research was to develop a framework identifying the key determinants of successful Organisation-level VMI and supply chain relationships in the New Zealand food industry. Aspects of Checkland and Scholes (1989) SSM, described in section 4.3.3, were incorporated into the

research as appropriate. Figure 8 below shows the process used to develop the framework.
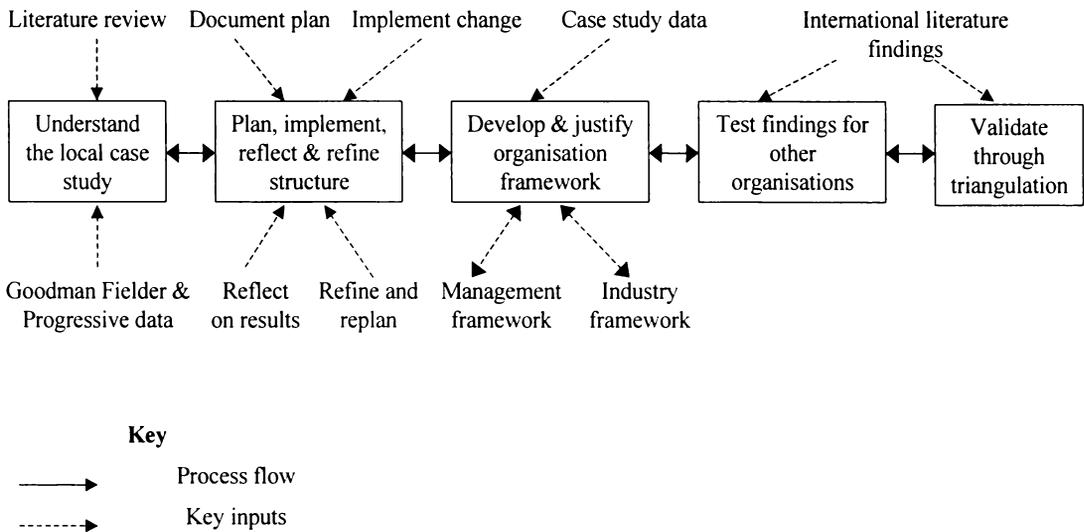
Figure 8: Organisation-level Process Flow

The Organisation-level framework was developed through an action research case study between Goodman Fielder and Progressive. The aim of the case study was to identify the critical success factors in their relationship by understanding how Goodman Fielder and Progressive worked together. The action research was supported by a literature review on strategic alliances and partnerships and supply chain initiatives. The action research and literature review findings, were then used to develop a first-cut Organisation-level framework. This framework was then applied and justified through further action research using smaller case studies within the main action research case study. Findings from the Industry and Management-level research were also used to refine the framework. Finally, international literature findings were used to triangulate the findings by comparing and contrasting the action research findings with international research to identify potential inconsistencies.

Aspects of Checkland and Scholes (1989) SSM supported the action research by having the researcher identify the issues to be investigated (Step 2) and formalise the root systems (Step 3). The justification plan provided the researcher with an opportunity to debate the framework (Step 6) and take action to improve the problem (Step 7) through further case studies within the main action research case

study. The two-way arrows in Figure 8 above reflect the cyclical nature of action research with ongoing cycles of research. This process enabled the researcher to propose, apply and justify the changes before finalising the framework.

The key output is an Organisation-level framework supported by descriptions of each factor identified with an explanation of how they should be used to structure VMI and strategic supply chain organisational relationships.

4.4.4 Management-level

The focus of the Management-level research was to develop a framework which identifies the key determinants of successful VMI and strategic supply chain relationships at a Management-level. Aspects of Checkland and Scholes (1989) SSM, described in section 4.3.3 were incorporated into the research as appropriate. Figure 9 below shows the process used to develop the framework.
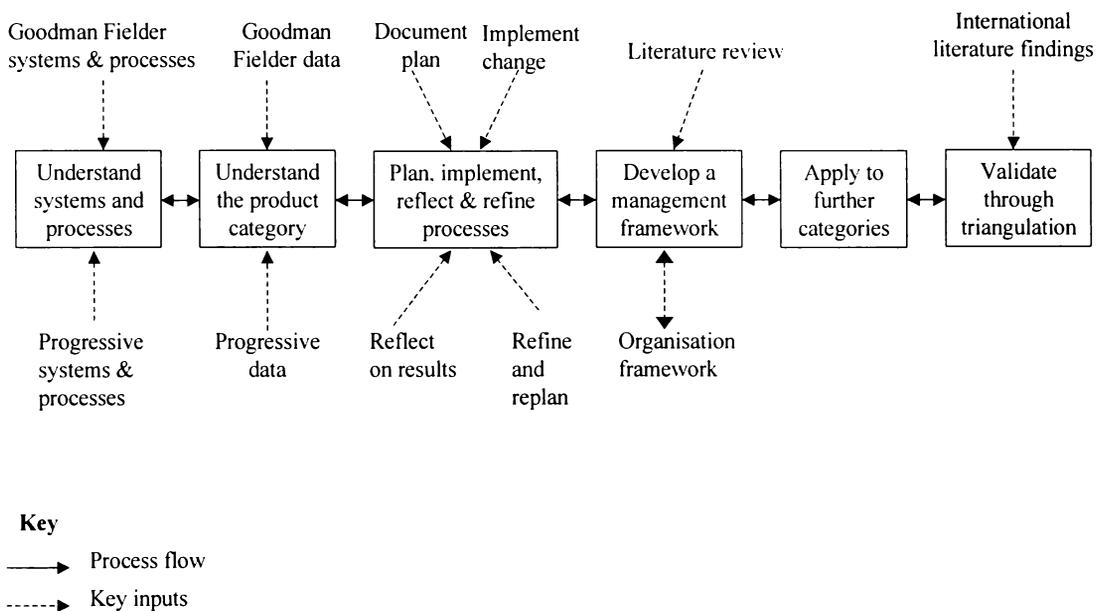
Figure 9: Management-level Process Flow

The Management-level framework was developed through an action research case study between Goodman Fielder and Progressive. The aim of the case study was to understand the critical success factors of Goodman Fielder and Progressive's supply chain initiatives for specific product categories. The action research was supported with a literature review and case studies on VMI, supply chain, IT and

EDI initiatives. The action research and literature review findings, were then used to develop a first-cut Management-level framework.

This framework was then applied and justified through further action research on other product categories to develop a final Management-level framework. The first-cut framework was validated using triangulation methods to ensure it was complete, robust and relevant. International literature findings were used to triangulate the findings by comparing and contrasting the action research findings with international research results. This process provided an objective benchmark against which the research findings could be compared to ensure that knowledge was being advanced appropriately. Findings from the Industry and Organisation-level research were also used to refine the Management-level framework. Changes and recommendations arising from the justification and validation stage were incorporated into the final framework as appropriate.

Components of Checkland and Scholes (1989) SSM were also used in the Management-level action research. This enabled the researcher to understand the product category and supply chain issues (Steps 1 and 2) and to invent an ideal first-cut framework based on the initial action research (Step 4). The first-cut framework was then applied, debated (Step 6) and justified through further action research cycles using other product categories. This process enabled the researcher to propose, apply and justify the changes before finalising the framework. In addition, triangulation enabled factors identified in international research, and excluded from the first-cut framework, to be considered and either incorporated into the final framework or their exclusion explained. Similarly, factors included in the first-cut framework but not identified in the international research were either removed from the final framework because they were not relevant or their inclusion explained.

The final Management-level framework is supported by descriptions of each factor identified with an explanation of how they should be used to develop successful Management-level VMI and strategic supply chain relationships.

4.4.5 Presenting action research findings

The latter stages of an action research project are outlined below in Figure 10 (Eden and Huxham, 1996). This shows the formal requirement to explicitly state pre-understandings when writing about research outcomes. It also shows the need to formally document the methodical reflection processes used.
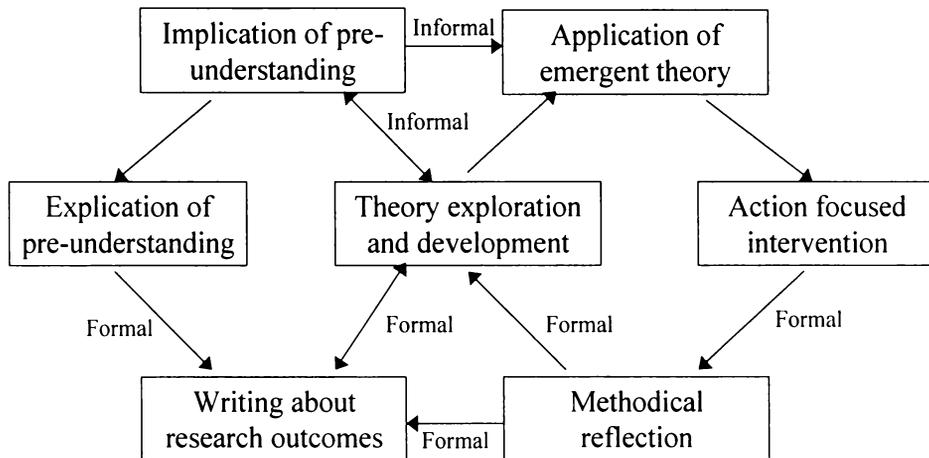
Figure 10: The latter stages of an action research project
(Source: Eden and Huxham, 1996, p.534)

These stages are incorporated throughout this research. For example, documenting the first-cut frameworks in the results chapters can be aligned with the 'theory exploration and development' stage above. The justification questions can be aligned with the 'application of emergent theory' stage. Answers to the questions can be aligned to 'writing about research outcomes' and 'action focused intervention' stages. Reflection on the first-cut frameworks, answers to the justification questions and triangulation were key components of the methodical reflection stage. Although this process is described sequentially above, it was performed in a cyclical nature throughout the research period.

4.4.6 Best practice defined

The frameworks developed in this research are based on best practice characteristics of successful VMI and supply chain relationships identified through literature reviews and an action research case study. This section defines such **best practice**.

The Chevron approach recognises four levels of best practice (O'Dell, Grayson, Essaides, 1998). These are:

1. A good idea not yet proven, but one that makes intuitive sense
2. A good practice, implemented technique, methodology, procedure or process that has improved business results
3. A local best practice, a best approach for all or a large part of the organisation based on analysing hard data
4. An industry best practice, similar to level 3, but using hard data from industry

This research aims to take a good practice already implemented in the action research case study (level 2), along with good ideas identified as part of the action research cycles of plan, act, reflect (level 1) to develop local best practice (level 3) and industry best practice (level 4).

4.4.7 Action research best practice

The research methodology for this thesis is action research supported by SSM. According to Eden and Huxham (1996), there are fifteen characteristics of action research. These characteristics are summarised in Table 4 below.

	Characteristic	Method of incorporation into the research
1	Integral involvement by the researcher with an intent to change the organisation	The researcher is co-ordinating the Goodman Fielder and Progressive VMI Project with direct responsibility for improving supply chain operations through reduced inventory and improved customer service.
2	Must have implications beyond those required for action or generation of knowledge in the domain of the project	Aim of the Organisation and Management-level research is to develop Organisation and Management-level frameworks relevant to the New Zealand food industry. The research will be described in general terms where possible rather than in situation-specific terms. The aim of the research is to generalise findings for the New Zealand food industry.

	Characteristic	Method of incorporation into the research
3	Explicit requirement to elaborate and develop theory	The researcher will continuously seek to raise broader questions that are of interest to a wider community who work in a wider variety of contexts. The ultimate aim is to develop a practical model for the New Zealand food industry.
4	Theories developed must be supported or developed through action research	There will be a clear focus on developing and elaborating theory from practice rather than visa versa. Literature reviews will be used to provide theoretical support and justification for the action research findings. The aim is to ensure that the research output explains the link between the specific experience of the intervention and the design of the tool or method.
5	System of emergent theory	The aim of this research is to develop theory out of the research rather than test pre-determined theories in research. The research is structured so the Industry-level framework, which provides background information, is developed in conjunction with the Organisation and Management-level frameworks. Each framework will be capable of being stand-alone or integrated. The first-cut frameworks will be developed, justified and refined prior to the final frameworks being presented.
6	Incremental theory building – cycle of developing theory to action to reflection to developing theory	The research will be cyclical in nature with clear planning, implementation, reflection and re-planning stages. Smaller case studies within the main action research case study will be used to justify and validate initial research findings.
7	Descriptive theory must recognise the practical implications in the final documentation	There will be a clear focus on developing and elaborating theory from practice rather than visa versa. The frameworks will have a practical focus rather than deep theoretical basis. The research will be documented in a descriptive manner which recognises the practical aspects of action research.
8	Systematic reflection	Reflections will be formally documented with clear links to the implementation and re-planning phases of action research. The researcher's journal will contain some or all of the following: observation notes, methodological notes, theoretical notes and personal notes.

	Characteristic	Method of incorporation into the research
9	Process of exploration of data must be either replicable or be capable of being explained to others	A method of data exploration will be developed to ensure that the outcomes of data exploration are not based on intuition alone, but are based on a formal process of integrating records of reflection, planning, implementation and re-planning.
10	Writing about research is an important aspect of theory exploration and development	The written research process will follow the latter stages of an action research project methodology (Figure 10).
11	Adherence to characteristics 1 – 10 is a necessary but not sufficient condition for action research	Noted that characteristics 1 – 10 are concerned with internal validity and require characteristics 12 – 15 for external validity.
12	Reflection and data collection processes can not be captured by other approaches	The Goodman Fielder and Progressive VMI Project is the first of its kind in New Zealand. The project scope, methods and outcomes are continuously evolving. Findings from one process are modified and applied to other areas for discussion and reflection.
13	Triangulation methods should be fully exploited and reported	Literature reviews and international case studies will be used to compare and contrast the action research findings with theory to ensure the final frameworks developed are complete and robust. Smaller case studies within the main action research case study will be used to justify and validate the initial research findings.
14	Validity and applicability of the results depends on the history and context of the research	The aim of this research was to develop a series of interrelated frameworks applicable to the New Zealand food industry. In order to develop a general framework the context of the case study and its applicability to the wider industry will be carefully considered
15	Theory must be disseminated in such a way to be of interest to a wider audience than those integrally involved with the action/research	The aim of the research is to develop a framework relevant to the New Zealand food industry. The final thesis will be presented with 3 stand-alone, yet integrated frameworks

Table 4: Characteristics of Action Research

These characteristics were considered in the Organisation-level, Management-level and overall research and a score given to each characteristic based on the following:

0   Characteristic not addressed and not incorporated into the research

1   Characteristic briefly addressed at a top-level with further opportunity for focus

2   Characteristic incorporated into the research at a medium-level with some further opportunity for focus

3   Characteristic incorporated into the research at a detailed-level with limited opportunity for additional focus

4   Characteristic fully incorporated into the research

4.5   About the Researcher

The Researcher is a qualified accountant in both New Zealand and the US with a background in audit. She has also completed an Executive Masters in Business Administration (MBA) to supplement and broaden her accounting and finance skills.

Throughout this research Goodman Fielder employed the Researcher in a Finance and Project capacity. A key reason why Goodman Fielder selected her as the VMI Project Manager was her auditing background and systems and processes knowledge. The VMI project has been running for over two and a half years, and is still ongoing, with the Researcher spending between 10 and 25 hours per week on the project. The Researcher is Auckland based and visits the Progressive Auckland head office on a daily basis. The Researcher visits the South Island Progressive site 2 to 3 times per year.

4.6   Ethical considerations

There are a number of ethical implications in research. This section describes the ethical dilemmas considered during this research and explains how they were addressed.

Hammersley and Atkinson (1994, p.248) define participant observation as "observation carried out when the researcher is playing an established participant role in the scene studied." In action research, where the researcher is working with members of an organisation with intent to take action, participant observation research methods are often adopted. The ethical dilemmas associated with participant observation include:

- To what extent should those being studied know the researcher as a researcher?
- To what extent should the nature and purpose of the research be communicated to those being studied?
- To what extent should the researcher become involved in the activities being studied?
- To what extent should the researcher adopt an insider orientation?

Fontana and Frey (1994) identified ethical concerns associated with interviewing including informed consent, right to privacy, protection from harm, degree of involvement by the researcher and manipulation of subject and findings. These raise the following ethical dilemmas:

- To what extent should the participant be informed about the research?
- How and to what extent should privacy and confidentiality be maintained?
- How will the researcher and participant be protected from harm?
- To what extent should the researcher become involved in the activity?
- What processes are in place to minimise manipulation of the participant during the interview and to ensure that the findings are appropriately interpreted and presented?

These ethical dilemmas were addressed in this research by having the researcher clearly communicate her research to both organisations involved in the case study prior to commencement of the research and continuously throughout the research period. Both organisations were fully aware of the research being conducted and

provided their permission to be involved. The risk of injury to individuals was minimised by researching the organisations, rather than the people within the organisations.

Ethics committee approval was received from the University of Waikato on 1 October 2002 subject to both case study organisations being fully aware of the research being conducted.

Both organisations provided their permission for the final thesis to be published and become a public document (refer to Appendix 3). Commercially sensitive information was removed prior to final publication.

4.7   Chapter summary

This chapter has described action research and SSM and justified their use in this research. The research process for each framework was described along with the research methods used. The 15 key characteristics of action research described by Eden and Huxham (1996) were then defined and the approach used to address each characteristic described. The key ethical considerations arising from the research and how they were addressed were then discussed.

The following chapters present the results of the research. The Industry-level framework is presented, followed by the Organisation-level framework and finally the Management-level framework. These frameworks were developed in conjunction with each other throughout the research period; however for presentation purposes they are presented in a top-down format in line with the overall thesis research model.

Chapter 5   Developing an Industry-level framework

5.1   Introduction

This chapter seeks to build a foundation for the Organisation- and Management-level frameworks by highlighting industry factors which impact on the structure and profitability of food industries across the developed world. The output from this chapter is a statement of the determinants of a successful Industry-level supply chain relationship, expressed via the Industry-level framework developed.

The purpose of this chapter is scene setting and background building rather than developing contributions to knowledge, through action research methods, which begin in Chapter 6. This chapter provides the reader with a holistic Industry-level framework, tailored to food industries in countries demonstrating the unique characteristics described in this chapter.

The chapter begins with an overview of the food industry and considers factors impacting the profitability of the industry and global supply chain initiatives. The New Zealand food industry, which forms the basis of the action research case study, is then described and the unique features of the industry, having the potential to impact the general application of the Industry-level framework, are highlighted. Following this a first-cut Industry-level framework is developed, which is then justified by applying the New Zealand food industry case study, as an example, and using triangulation to confirm the findings. A final Industry-level framework is then presented along with answers to the secondary Industry-level research questions asked in section 3.4.

5.2   Background to the food industry

There is no such thing as a typical food company. The food industry itself encompasses companies that process, produce, package, transport and distribute products. The products can include fresh, chilled, frozen, dried and canned food. Out of necessity, food enterprises are forecast-driven, and the forecasts are often created in isolation from other members of the supply chain. Typically, production is made to stock before customer orders arrive; companies receive an

order one day for delivery the next. Short product shelf lives and sell-by dates add to the complexity. As emphasis on customer service levels and product availability in the industry continues to grow, small manufacturing companies are being forced to close or merge, and the big food companies are reacting defensively by focusing on reorganisation and rationalisation of their product assortment (Intentia, 2003).

Food retailers vary in size and complexity from large foreign-owned global supermarket chains to small independently owned and operated stores. Similarly, suppliers to the industry range in size from small owner operated manufacturing businesses, to large multi-national manufacturing organisations, such as Coca Cola. The size and diversity of both retailers and suppliers in the food industry adds complexity to supply chain initiatives throughout the industry.

5.3   Competing in the food industry

Porter (1980) identified five forces impacting on industry profitability. He argued that the stronger each of the forces is the more limited ability established companies have to raise prices and increase profitability.

The strength of each of Porter's five forces is summarised, in Table 5 below, in relation to the food industry. The full analysis is presented in Appendix 4.

Risk of entry by potential competitors in the food industry is high due to low barriers to entry for both retailers and manufacturers. The degree of rivalry among established organisations is variable across different segments within the food industry, dependent on the size of the organisation and the segment in which they operate. The bargaining strength of buyers is also variable across the food industry, depending on the size and dominance of the buyer. Large supermarket retailers have a high degree of bargaining power whereas small, owner-operated stores have a low degree of bargaining power. The bargaining power of food industry suppliers is low to medium because of the large number of suppliers relative to buyers and the low cost of switching between suppliers. The threat of

substitutes is high due to the similarity of many products, particularly in appearance and taste, with the key-differentiating factor often being branding.

	Low	Medium	High	Variable
Risk of entry by potential competitors			√	
Degree of rivalry among established organisations				√
Bargaining power of buyers				√
Bargaining power of suppliers	√	√		
Threat of substitutes			√	

Table 5: Assessment of Porter's five forces in the food industry

Hence, overall the food industry tends to have medium to high strength factors, depending on the final assessment of bargaining power of buyers and rivalry among established firms. As a result, organisations within the industry have a low to medium ability to raise prices and earn greater profits.

In order to earn greater profits organisations in the food industry will need to compete on non-price factors such as advertising and promotions, brand positioning and product quality, functionality and design. At the same time, they should review their cost structure to identify opportunities to reduce costs and increase profitability. Alternatively, they could change the strength of one or more of the factors above by adopting a strategy to differentiate their product offering to reduce the threat of substitutes, or to invest in technology, systems and processes to reduce the impact of potential new entrants. Similarly, organisations with a medium ability to raise prices and earn greater profits should also assess opportunities to reduce costs and change the strength of one or more of Porter's forces.

5.4 Competitive response - supply chain initiatives to reduce costs

Given their reduced ability to raise prices for greater profits, food industry organisations must attempt to reduce costs in order to remain competitive while providing adequate returns to shareholders. This section considers supply chain initiatives in the food industry as a means to reduce costs.

5.4.1 Vendor-manufacturer relationships

The partner model developed by Dyer, Cho and Chu (1998) shows how vendor-manufacturer relationships can be used to increase profitability. The partner model began with the success of Japanese automobile firms, such as Toyota. Over the years, vendor-manufacturing partnering has emerged in the automotive industries of the US, UK, continental Europe and Australia (Wilson and Sankaran, 2001).

In this approach suppliers are given implicit (and sometimes explicit) guarantees on future business and, in return, make relation-specific site, physical and human asset investments to enhance the buyer's productivity by facilitating inventory reduction, quality improvement and rapid product development (Dyer, 1996, Wilson and Sankaran, 2001). These partnership arrangements have been defined as "tailored business relationship[s] based on mutual trust, openness, shared risk and shared rewards that yield a competitive advantage, resulting in business performance greater than would be achieved by the firms individually" (Lambert, Emmelhainz and Gardner, 1996, p.2).

This relationship approach is consistent with the Japanese culture of valuing long-term personal relationships and trust. Developing close supplier/distributor/manufacturer relationships is a tactic that supports Japanese companies' generic strategies. The results of these close relationships are lower costs and the ability to respond to unexpected changes in customer's demand. In contrast, in the US it is still common for a company and its suppliers and distributors to have an anonymous relationship in which each party tries to strike the best bargain to make the most profit. This historical US approach is changing as more and more US companies, such as Xerox, Motorola, Kodak, McDonalds

and Wal-Mart, are developing long-term relationships with suppliers (Hill and Jones, 1998).

In Australia, Wright and Lund (2003) found that strategic partnerships between food manufacturers and the two major Australian supermarkets have been limited to the largest multinational food companies with well-established brand names and significant market power. By contrast, small- and medium-sized manufacturers and suppliers lacking such market power appeared to have little choice but to fit in with the retailer's supply chain initiatives.

5.4.2 *Adoption of EDI and VMI practices in the food industry*

The literature review identified several key trends in the food industry globally. In particular, greater collaboration between suppliers and retailers was highlighted as companies begin to compete on a supply chain versus supply chain basis rather than a firm versus firm basis. These trends are being driven by increased competition and consumer requirements for fresher products, greater choice, lower prices and more convenience. The food industry has begun to respond to these trends by developing supply chain relationships through initiatives such as strategic partnerships, VMI, EDI and centralisation of distribution through DCs.

In the US, supply chain relationships and practices such as DCs, EDI and VMI have been operating in some organisations for many years. For example, Wal-Mart and Procter & Gamble popularised VMI in the late 1980's. Similarly, the UK and Europe have been practising EDI and VMI for many years, as evidenced by organisations such as Barilla, a European pasta manufacturer. These trends are consistent with Bowersox and Cooper's (1992) findings which identified the fourth stage of the food industry evolution as integrated retailers trying to push inventory holding responsibility 'up the channel' towards manufacturers. Other countries, such as New Zealand, have been slow to develop supply chain relationships and practices. Hence, there does not appear to be a consistent pattern of supply chain initiatives across the food industry globally.

5.5 Industry-level characteristics potentially unique to the New Zealand food industry

This section identifies characteristics potentially unique to the action research case study which could limit the general applicability of the Industry-level framework developed. First background to the New Zealand industry and the action research case study organisations is provided. Characteristics potentially unique to the New Zealand food industry are then categorised as factors potentially unique to the industry and factors potentially unique to the country.

5.5.1 Background to the New Zealand food industry

The New Zealand FMCG industry has a wholesale turnover of $9.8 billion, representing $15 billion in retail sales. It employs 35,600 people directly and 147,800 people indirectly (Coriolis Research, 2003). The industry is characterised by oligopolistic competition between supermarket retailers and monopolistic competition between suppliers. Foodstuffs and Progressive share approximately 55% and 40% of the supermarket retail market respectively (www.foodstuffs.co.nz, www.progressive.co.nz). In addition, there are many small convenience channel retailers, such as petrol stations, dairies, distributors and wholesalers.

In contrast to the two supermarket retailers, there are many suppliers to the industry, ranging in size and complexity. Household names include local companies such as Hubbards, Goodman Fielder and Mainland, as well as global companies such as Coca Cola, Colgate-Palmolive and Heinz-Wattie. Agricultural suppliers such as Fonterra, Richmond and Zespri are also key suppliers to the industry.

Goodman Fielder is one of the largest suppliers to the New Zealand FMCG industry comprising an estimated 8 - 9% of wholesale turnover (based on internal Goodman Fielder calculations). It is the largest food manufacturing company in Australasia. The New Zealand organisation produces a large range of products under the following brands: Quality Bakers, Bluebird, Uncle Toby's, Meadow Lea, Irvines, Ernest Adams, Diamond, Edmonds and Champion. Two of

Goodman Fielder's core operating principles are reducing complexity and driving value for customers and consumers via quality and service.

Historically, Progressive has operated supermarkets in New Zealand under the Countdown and Foodtown brands. During this research, in June 2002, Progressive acquired Woolworths New Zealand which operated supermarkets under the Big Fresh, Price Chopper and Woolworths brands. The combined organisation now accounts for approximately 40% of the New Zealand grocery market, excluding Supervalue (www.progressive.co.nz). One of Progressive's medium-term goals is to have all products distributed through its DCs except for bread and milk. In order to realise this goal, Progressive must work with its suppliers to increase customer service levels while at the same time reducing inventory levels.

Goodman Fielder is one of Progressive's largest suppliers, accounting for approximately 8 - 9% of Progressive's sales (based on internal Goodman Fielder calculations). Goodman Fielder supplies Progressive through a combination of direct-to-store and DC deliveries. According to research conducted by New Zealand Trade and Enterprise (2003, p.73) "Goodman Fielder and Heinz-Wattie have dominated the processed food sector. It is estimated that these two groups combined fill about 60% of the typical shopping basket."

5.5.2   *Factors potentially unique to the New Zealand food industry*
This section describes factors which are potentially unique to the New Zealand food industry.

The New Zealand retail food industry has an oligopoly structure with two dominant players, Progressive and Foodstuffs, comprising approximately 95% of the market (Foodstuffs have approximately 55% share (www.foodstuffs.co.nz) and Progressive have approximately 40% share excluding Supervalue (www.progressive.co.nz). This high level dominance is unique. Australia has two dominant grocery retailers comprising approximately 78% of the retail grocery market. In contrast, the US, UK and Europe countries have several large grocery retailers with the top 5 retail chains in the UK having 64% share and the

top 20 food retailers in the US accounting for 59% of total grocery sales (New Zealand Trade and Enterprise, 2003). As Figure 11 shows below only Switzerland has such a high concentration of grocery retailers.

TOP TWO SUPERMARKETS SHARE OF SUPERMARKET SALES[1]
(% of supermarket sales; select countries; 2000)

| New Zealand (Post Merger) | Switzerland | Australia | Netherlands |

Population = 3.7 million | Population = 7.3 million | Population = 19.2 million | Population = 15.9 million

| Finland | Norway | Denmark | Hong Kong |

Population = 5.2 million | Population = 4.5 million | Population = 5.3 million | Population = 7.1 million
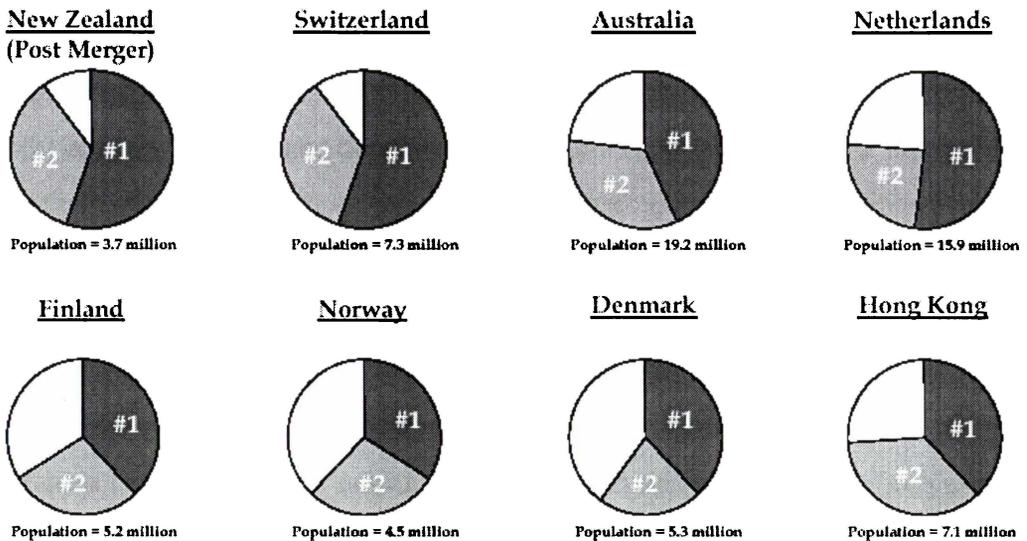
Figure 11: Comparative supermarket shares

(Source: Coriolis Research, 2001, p.48)

Porter's (1980) research found that in a consolidated industry, such as the New Zealand retail food industry, the competitive action of one company directly affects the market share of its rivals, forcing a response from them. The consequence can result in rival companies trying to undercut each other's prices, pushing industry profits down. In order to offset the impact of lower pricing, the New Zealand food industry has sought to reduce supply chain costs through various supply chain initiatives, such as greater use of DCs, adoption of EDI and establishment of VMI practices.

In support of this, New Zealand Trade and Enterprise (2003, p.76) found

> The food processing industry in New Zealand is characterised by a small number of large companies that tend to dominate the domestic market, but remain small or insignificant players in their respective world markets. The high degree of concentration could be seen, as undermining industry competitiveness, but is consistent with two important facts: the need to have scale to compete internationally and the relatively small size of the New Zealand economy (it is easy to be a dominant player).

The oligopolistic structure of the food industry retailers in New Zealand allows the buyers to dominate supply companies. This is similar to the auto component industry whose buyers, such as General Motors, Ford and Chrysler, are large in size, few in number and powerful. The suppliers of auto components are numerous and typically small in scale. The auto majors have used their powerful position to play off suppliers against each other, forcing down the price they have to pay for component parts and demanding better quality. If a component supplier objects, then the auto major uses the threat of switching to another supplier as a bargaining tool (Hill and Jones, 1998).

In summary, the New Zealand food industry is unusual among other food industries in that it has an oligopoly of supermarket retailers with over 95% market share (Foodstuffs have approximately 55% share (www.foodstuffs.co.nz) and Progressive have approximately 40% share excluding Supervalue which has approximately 5% share (www.progressive.co.nz). As a result, there is a high degree of competitiveness between the supermarket retailers driven by branding and price. The dominance of the two supermarket retailers gives them a high degree of power over suppliers.

5.5.3 *Factors potentially unique to New Zealand*

This research is based in New Zealand, a country with a population of just over 4 million people. The country is reliant on the dairy, agriculture and forestry industries for the majority of its foreign earnings. IT, film and service industries are growing as local organisations and skills are being recognised internationally. This section discusses research findings from another New Zealand industry to identify factors potentially unique to New Zealand which may limit the applicability of the Industry-level framework developed.

The forestry industry was selected as a comparative industry due to its similarity to the food industry in terms of:

- High risk of entry by potential competitors - particularly from a global perspective

- High degree of rivalry - particularly in international markets
- High threat of substitutes – wood is a commodity-type product
- Strong bargaining power of buyers – buyers of forestry products tend to be large global organisations
- Low bargaining power of suppliers – New Zealand suppliers are small in comparison to the large global buyers

Wilson and Sankaran (2001) researched a vendor-manufacturer partnership in the New Zealand forestry industry. Their findings highlighted four factors which were potentially unique to the New Zealand environment: (1) over-capacity in process industries, (2) acceptability of technology spill over to competitors, (3) industry concentration and (4) corporate citizenship in partner selection. This section explores the implications of these findings on the New Zealand food industry.

Wilson and Sankaran found that over-capacity in process industries reduces the ability of organisations to achieve an acceptable level of return on investment for shareholders. This provides strong motivation for industry consolidation and formation of long-term partnerships. This trend is also evident in the New Zealand food industry which has experienced consolidation over recent years, particularly from a manufacturing perspective, through acquisitions and plant closures. The meat and dairy sectors are good examples of industry consolidation driven by historical over-capacity and inadequate shareholder returns.

Similar to the New Zealand forestry industry, technology spill over, where the benefits of joint vendor-manufacturer technology developments are shared across competitors to reduce development costs per unit, has been accepted in the New Zealand food industry in order to drive down manufacturing costs. For example, 'housebrand' products developed between retailers and manufacturers increase manufacturing throughput and therefore drive down the cost of all products, not just the housebrand product. Overall, every party benefits because without the additional volume the cost of the housebrand product would not be competitive.

Wilson and Sankaran found that a key reason for concentration of the forestry chemical industry was the relatively small size of the New Zealand domestic market and the need to realise economies of scale in capital-intensive industries to provide adequate returns to shareholders. This is also true of the New Zealand food industry; many suppliers have capital-intensive manufacturing operations, while retailers have capital-intensive DCs and IT systems. The meat and dairy sectors are examples of capital-intensive food industry suppliers in New Zealand. In order to minimise the cost of meat and dairy products to New Zealand consumers, these industries have undergone significant consolidation over the past 10 – 15 years. Industry shakeouts, including acquisitions and plant closures, have helped increase the profitability of these organisations.

Exceptions to these large-scale organisations are small niche food manufacturers that are continuing to be established on a regular basis. These organisations are typically vertically integrated with manufacturing and retailing combined into a single organisation. Examples of these are local bakeries and pie manufacturers. The majority of these remain as small, local organisations, while a small proportion of them grow into medium-sized organisations and gain critical mass by distributing their products through the two main supermarket retailers. Ponsonby Pies and Rivermill Bread are examples of organisations which have achieved significant growth over recent years.

The large New Zealand supermarket retailers have significant capital invested in buildings and IT systems. Consolidation of the industry into two main players has enabled Foodstuffs and Progressive to increase volumes through their DCs and stores, thereby reducing fixed and capital costs per unit and providing greater return to shareholders.

Wilson and Sankaran also identified that, by realising economies of scale through concentration of the New Zealand industry, organisations were better able to compete on an international basis. In return, the volumes sold to international customers helped lower the fixed manufacturing costs per unit, thereby reducing the cost to New Zealand customers. This same principle holds true in the New Zealand food industry where some manufacturers are able to gain critical mass to

fund further capital investment and reduce fixed costs per unit by exporting products overseas. This is supported by findings from a New Zealand Trade and Enterprise Review (2003, p.5) stating "Rivalry in the domestic market (seen as important to innovation and competitiveness) is compromised by the need for F&B [food and beverage] businesses to be large scale to effectively compete internationally." The dairy, meat and wine sectors are examples of large-scale, consolidated businesses.

Corporate citizenship in partner selection was a key consideration in determining the final choice of partner in the research conducted by Wilson and Sankaran. The buyer's final partner choice considered the impact their decision may have on the on-going viability of the supplier and its ability to continue to employ New Zealanders. This factor is not prevalent across the New Zealand food industry. While Foodstuffs market themselves as 'proudly New Zealand owned and operated', Progressive are price driven and will select a supplier based on purely price with little regard for where they are located. This is evidenced by Progressive's selection of housebrand manufacturers with a trend towards international suppliers away from local suppliers.

Further research by Sankaran, Samson and Wilson (2004, p.2) found that "When industry sales are confined to an economic region (e.g. Australasia), the oligopolistic nature of the supplier industry can restrict the extent of partnering..." They also found that "owing to the comparatively tiny executive base in oligopolistic industries in small markets, personal preferences and relationships between key executives in both organisations can exert a sizable influence on partnership formation" (p.2).

In summary Table 6 below compares the forestry and food industries in relation to the factors identified above as potentially unique to New Zealand.

	Food industry	Forestry industry
Over-capacity in process industries	√	√
Acceptability of technology spill over to competitors	√	√
High capital investment	√	√
Corporate citizenship in partner selection		√

Table 6: Industry factors potentially unique to New Zealand

5.5.4   Summary

This section has outlined the action research case study industry and identified factors potentially unique to the industry and country which may limit the general applicability of the Industry-level framework developed. These are:

Industry:
- Oligopoly structure of the industry retailers

Country:
- Over-capacity in process industries
- Acceptability of technology spill over to competitors
- High capital investment
- Concentration of industries

5.6   Key drivers of food industry supply chain relationships

This section reviews the findings from the previous sections and the literature review, and identifies the key factors influencing the structure and nature of supply chain relationships in the New Zealand food industry at an Industry-level.

A number of factors influencing the nature and form of food industry relationships were identified. These included:

- Continuing consolidation of industry players
- Growing rivalry between organisations
- Increasing bargaining power of buyers
- Declining profitability
- Increasing need for capital investment
- Continuing advances in technology

The food industry is becoming more and more consolidated as both retailers and manufacturers seek to improve profitability and reduce costs through acquisitions and mergers. Retailers are merging as evidenced in New Zealand by Progressive's acquisition of Woolworths in 2002. Similarly, manufacturers are currently merging and consolidating in response to reduced industry profitability and the need to provide adequate returns to shareholders. Small manufacturers are being acquired by larger organisations in order to drive growth, leverage existing assets and gain critical mass to improve profitability.

This action research case study industry shows clear evidence of high rivalry between supermarket retailers and strong bargaining power of these retailers. As a result profitability of the food industry is declining. The many small, niche food retailers operating in the convenience channel are an exception to this, and generally have a lower degree of rivalry and low levels of bargaining power with suppliers.

In conjunction with industry consolidation, a number of players have invested in capital to reduce costs by improving manufacturing, distribution and supply chain operations. Other smaller organisations are seeking additional capital to fund growth and enhance their competitiveness. In order to provide a return on the capital invested, organisations are looking at opportunities to grow volumes, both locally and internationally, and to increase profitability.

In order to offset the impact of lower pricing, organisations have recently begun to take advantage of technological advancements to improve their supply chain. EDI

is gaining popularity, particularly by larger organisations that can afford to invest in such technology to reduce transaction-processing costs.

These factors all influence the nature and type of relationships within the food industry. Long-term relationships and partnership arrangements are critical to enable industry players to maintain and grow their profitability over time.

5.7 First cut of the Industry-level framework

This section focuses on developing a first-cut Industry-level framework, based on the literature review, factors impacting industry profitability and supply chain initiatives to reduce costs.

The process used to develop the Industry-level framework was presented in section 4.4.2. The key steps were (1) understand the food industry, (2) identify factors impacting industry profitability, (3) identify factors specific to the action research case study, (4) develop an Industry-level framework and (5) validate through triangulation.

The purpose of the Industry-level framework was to identify potential inputs and factors impacting on the structure and type of relationships needed in the New Zealand food industry, in order to develop successful supply chain relationships, as shown in Figure 12 below.
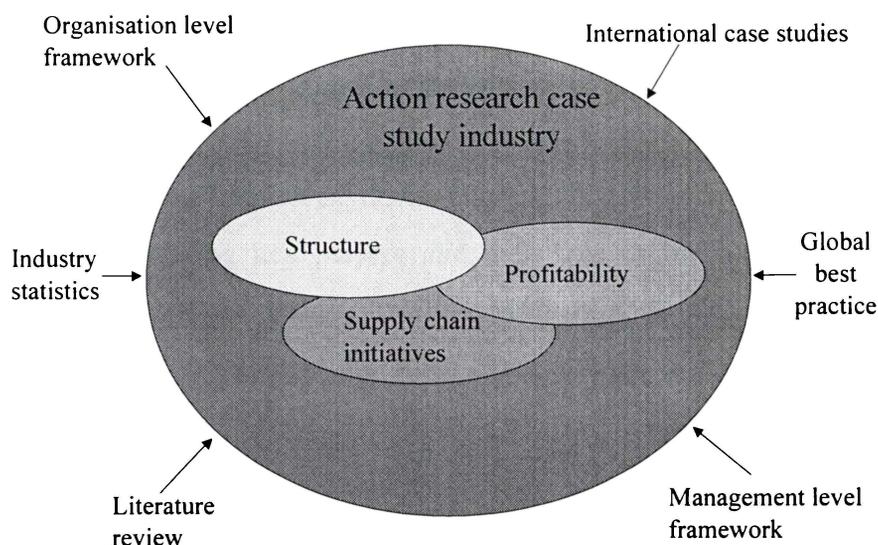
Figure 12: Factors to be considered in the Industry-level Framework

The six key drivers of relationships in the New Zealand food industry, discussed in section 5.6, form the basis of the first-cut Industry-level framework. Based on the literature review and discussions with people involved in the action research case study, there appear to be 3 stages in developing successful supply chain relationships at the Industry-level. The first stage is to understand the industry structure and identify key players. The second stage is to analyse the degree of rivalry between organisations, determine the bargaining power of buyers and evaluate industry profitability. The third stage involves developing long-term relationships, investing in technology and adopting supply chain best practices. These factors in each of the 'Understand', 'Analyse' and 'Develop' stages are shown in Figure 13 below.
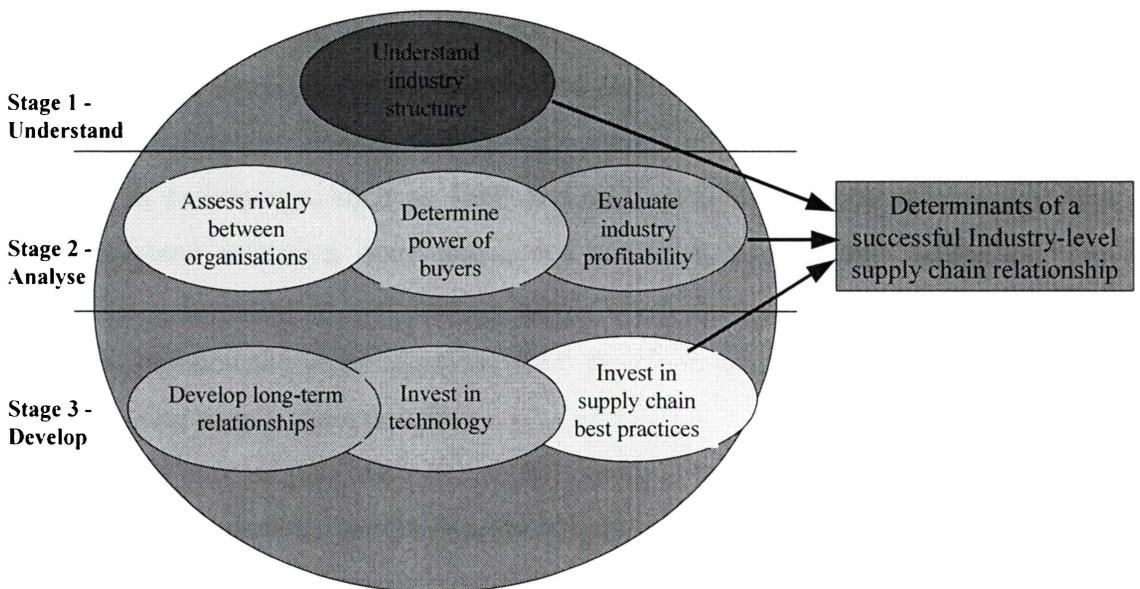
Figure 13: First Cut Industry-level Framework

Stage 1 (Understand) involves developing an understanding of the industry structure by identifying key players and their role in the industry. Different organisations within the industry will identify slightly different key players depending on their position in the value chain and the segments in which they compete.

Stage 2 (Analyse) builds on the understanding developed in Stage 1. The industry's competitive structure, demand conditions and the height of exit barriers

in the industry should be used to assess the degree of rivalry between organisations (Porter, 1980). The bargaining power of buyers should be determined by considering the size of the buyers relative to suppliers, the quantities purchased, the reliance of suppliers on the buyers for income and the ability of buyers to switch between suppliers and/or vertically integrate. Industry profitability can then be evaluated. The more intense the rivalry between organisations and the greater the bargaining power of the buyers, the less opportunity there is for organisations in the industry to raise prices and earn greater profits. As a result, organisations with a low ability to raise prices need to identify ways to further reduce costs and increase returns to shareholders.

Stage 3 (Develop) considers the strategies that should be adopted by industry players, based on the findings from the Understand and Analyse stages. Long-term relationships should be formed throughout the supply chain with the key industry players identified in the Understand and Analyse stages. Establishing long-term relationships will take time and should be nurtured on an ongoing basis. Investing in technology, such as ERP and EDI, will enable organisations to automate labour intensive, non-value added activities, while stream lining the supply chain. Investing in best practice supply chain initiatives, such as DCs and VMI, will broaden the benefits gained from developing long-term relationships and automating supply chain practices.

In order to determine whether the first-cut framework above is complete, practical and robust, the framework will be justified and applied using the case study, and then validated using triangulation with literature before being finalised for application to the general food industry. Possible limitations of the framework will be discussed in relation to factors potentially unique to the case study industry and country.

5.8   Justification of the first-cut Industry-level framework

The justification plan comprises a number of critical questions to which answers are sought. This section lists the critical questions, explains the rationale for them and then answers them using the case study supplier, Goodman Fielder, as an example of a major player in the New Zealand food industry.

The following critical questions were identified through discussions with employees from Goodman Fielder and Progressive Middle Management, and represent a summary of the key points raised.

1. Is an understanding of the industry structure required in order to complete the Analyse and Develop stages?

2. Should more of Porter's five forces be included in the Industry-level framework?

3. Why does industry profitability need to be evaluated before progressing to the Develop stage?

4. Is investment in technology necessary in the Develop stage of the framework?

5. Does this framework provide sufficient guidance to industry players to enable them to determine an appropriate supply chain strategy?

5.8.1   Understanding the industry

The first critical question seeks to determine whether an understanding the industry structure is required prior to completing the Analyse and Develop stages and whether this step can be incorporated into the Analyse stage.   If an understanding is only required in order to answer the questions in the Analyse stage, this step could potentially be incorporated into the second stage. If a more detailed understanding is required, the scope of the understanding must be clarified.

Developing an understanding of the industry structure is important in order to identify the nature of the industry, the key players and their roles.   The understanding should start with a broad overview of the macro environment in

which the industry operates and then become more specific to the industry and the segments in which the organisation participates.

From a Goodman Fielder perspective, the organisation operates mainly in New Zealand and Australia. These countries have moderate levels of economic growth, interest rates, exchange rates and inflation rates which are in line with other developed countries. None of these factors are excessive, negative or highly volatile.

While technology plays an important role in the food industry it does not make food industry products obsolete overnight; however it does present opportunities for new products, production processes and supply chain initiatives.

The social environment impacts the food industry through consumer trends for greater convenience and healthy eating. The changing demographics of the New Zealand and Australian populations are providing opportunities for new product development focused at specific age groups and regions.

The political and legal environment continues to impact on the competitiveness of the industry. Increasing food and health requirements are adding costs to the industry which cannot always be passed on to consumers, such as the new food labelling requirements introduced in December 2002. New Zealand and Australian legislation has the potential to restrict competition in certain segments of the industry through import/export restrictions and food safety standards.

Goodman Fielder operates in a number of product categories within the food industry which are at different life-cycle stages. Some categories, such as wrapped snacks are in the growth stage, while others such as pies are in decline. Overall the Goodman Fielder basket of products is in a growing. Developing supply chain relationships can be beneficial at all levels of the product life-cycle to improve speed to market for new products, minimise excess inventory for products in decline, and reduce supply chain costs for products in the shakeout, mature and declining stages.

Once an understanding of the general industry and product life cycles is established, an understanding of the players in the industry is required. For Goodman Fielder, which is a retail branded food manufacturer supported by a strong presence in the food service and commercial channels, the key players are the main retailers, Foodstuffs and Progressive, and competitors, such as Allied, Griffins, Unilever, McCains and Heinz-Wattie.

Because Goodman Fielder operates in both the retail and commercial segments of the food industry some competitors are also customers. For example, Goodman Fielder sells commercial products, such as flour and oil, as ingredients to retail competitors, such as Heinz-Wattie and Griffins. Similarly, a number of commercial and food service customers use Goodman Fielder products such as flour, oil and pastry, to make products which compete directly with Goodman Fielder retail products such as bread and pies. These factors add complexity to the industry view from a Goodman Fielder perspective with the role of customers and competitors overlapping. By starting the Industry-level analysis with developing a broad overview of the industry structure, complexities such as co-opetition are more likely to be identified at an early stage.

Beyond the pragmatics of the food industry, there is the argument that change is more likely to succeed if based on a sound understanding of the environment. For this reason, system methodologies, such as SSM, are founded on this premise. Indeed, the first stage of SSM is to understand the unstructured situation, and it is not until the fourth stage that tactics for change are formed.

In summary, based on the Goodman Fielder example above, developing an understanding of the industry structure is an important and distinct step from the Analyse stage of the framework.

5.8.2   Porter's five forces

The second critical question considers the completeness of Stage 2 (Analyse), and seeks to determine whether all of Porter's five forces should be included in the framework or whether a subset of these is sufficient.

The first-cut Industry-level framework included the two of Porter's (1980) five forces: bargaining power of buyers and rivalry among established firms.

The bargaining power of buyers varies across the industry depending on the size of the retailer and segment they compete in. The large supermarket retailers, such as Foodstuffs and Progressive, have a high degree of bargaining power over, both large and small, suppliers because of their large size and ability to influence product ranging and pricing. In contrast, smaller, regional retailers, such as petrol stations, lunch bars, dairies and cafes, have a low degree of bargaining power over suppliers, particularly large suppliers of well-known products. Because of the range of bargaining power of buyers across the industry, this factor has been included in the Industry-level framework.

Rivalry among established firms is dependent on the industry's competitive structure, demand conditions and the height of exit barriers in the industry. These factors vary across the industry depending on the segment organisations operate in and the level of capital invested. Small niche players compete on a regional basis and may produce a range of products with varying degrees of market growth/decline. The level of capital investment varies within the industry from large, capital intensive, national suppliers to low capital, regional niche players. For example, Goodman Fielder has capital-intensive bread production facilities but competes against local Bakeries with very little capital investment. The height of exit barriers also varies across the industry depending on the level of capital investment made. As these examples show, the rivalry among established firms varies by product and industry segment and therefore must be specifically addressed in developing an Industry-level supply chain strategy.

From a Goodman Fielder perspective, because the majority of suppliers to the New Zealand food industry are small and fragmented, the risk of entry by potential competitors is real and occurs regularly. Small niche players can develop over time and gain market share. An example of this is local pie manufacturers who start up frequently and compete against Goodman Fielder's pies. Some of these pie manufacturers, such as Ponsonby Pies, have developed into medium sized organisations which compete in the retail accounts at a regional

level. New entrants to the food industry are a common occurrence and part of the industry dynamics because of low barriers to entry. As a result the first-cut Industry-level framework does not specifically focus on this factor. An assumption is made, that given the nature of the food industry and regular entry of new suppliers, all supply chain strategies should incorporate the ongoing threat of entry of potential competitors.

Similarly, the threat of substitute products is real and occurs frequently. Most food products are close substitutes and are often very similar in appearance and taste with branding being the main differentiating factor. As a result, supply chain strategies adopted by food industry players should always reflect the substitutability of food products; therefore this factor has not been included as a separate factor in the Industry-level framework.

The bargaining power of Goodman Fielder is relatively low because of the dominance of the two main retailers. Even though Goodman Fielder is one of the largest suppliers to the food industry in New Zealand they are still dominated by Progressive and Foodstuffs. One of the reasons for this is that, although Goodman Fielder is a large organisation, it competes in multiple product categories, with different competitors of varying strength. As a result, their overall bargaining power is reduced. Because the bargaining power of suppliers is relatively low for the food industry as a whole this factor has not been included as a separate component of the Industry-level framework.

In summary, the first-cut Industry-level framework only includes two of Porters five forces in the Analyse stage, because the strength of the other three forces tends to be consistent across the industry. In contrast, bargaining power of buyers varies across the industry depending on the segment they operate in. Similarly, rivalry among established firms varies depending on the size of the organisation, the type of products sold and the industry segment in which they operate.

5.8.3 Understanding industry profitability

The second (Analyse) stage of the first-cut Industry-level framework includes evaluating industry profitability. The third critical question of the justification plan asks why this step is important and why profitability has to be evaluated prior to progressing to the Develop stage of the framework.

From Goodman Fielder's perspective their key customers in the retail sector have high bargaining power and there is a high degree of rivalry amongst suppliers. This is demonstrated by the high level of non-price activity in the form of advertising, promotions, brand positioning and continuous product innovation and development to improve product quality, functionality and design. Goodman Fielder actively advertises its key brands such as Quality Bakers, Meadow Lea and Bluebird on TV and regularly launches new products. In conjunction with this non-price activity, Goodman Fielder is continuously seeking ways to reduce costs and improve the efficiency and effectiveness of its supply chain activities. The supply chain initiatives and opportunities are covered in the third stage of the Industry-level framework.

In summary, the food industry has a low to medium ability to raise prices and earn greater profits. Organisations in the food industry should understand their ability to earn profits to assist them with adopting the most appropriate strategies going forward. Organisations which need to adopt a cost reduction strategy to increase profits, should progress to the Develop stage of the Industry-level framework. Organisations which do not need to adopt a cost cutting strategy may not need to progress to the Develop stage of the framework in the short-term to achieve their goals and objectives. Therefore understanding profitability and the associated strategies required to increase profitability are important before proceeding to the Develop stage of the framework.

5.8.4   Investment in technology

The fourth critical question of the justification plan considers whether investment in technology should be included in the framework, and if so, why and to what extent.

The Develop stage of the framework starts with developing long-term supply chain relationships. Once relationships have been established, in order to more efficiently and effectively manage the supply chain, some form of investment in technology is required. The food industry by nature is a high volume, low margin industry. The volume of transactions processed on a daily basis is high and automation of key processes will enable organisations to become more efficient, while minimising errors and freeing up resources to perform more value added activities.

From Goodman Fielder's perspective a number of supply chain processes have been computerised over recent years. These include forecasting, production planning, purchasing, inventory management and processing of customer orders. By integrating forecasting, production planning, purchasing and inventory management, Goodman Fielder has been better able to align production with forecasted sales volumes while reducing inventory levels and increasing customer service levels. The most significant investment has been in training and upskilling resources and improving systems and processes to better utilise existing technology. More recently Goodman Fielder has implemented EDI with some customers to eliminate the need for manual keying of customer purchase orders. Goodman Fielder's investment in technology has been supported by business process re-engineering to maximise the benefits from the technology.

The level of investment in technology required will vary depending on the size and sophistication of the organisation making the investment. However, in order to grow and remain competitive, all organisations will need to invest in some form of technology to manage their supply chain. Investment in technology will assist organisations move onto the final step of the Develop stage of the Industry-level framework which involves adopting in supply chain best practices such as DCs, EDI and VMI.

In spite of this, research findings, such as Clark and Hammond (1997), provide evidence that investment in technology alone does not provide substantial supply chain benefits unless it is supported by business process re-engineering and supply chain relationships. Therefore any investment in technology should be supported by long-term relationships and business process re-engineering to increase the benefits obtained.

In summary, it appears that all organisations in the food industry need to invest in some form of technology to improve their supply chain relationships. A key driver of the need for technology is the high volume, repetitive nature of transactions.

5.8.5 Completeness of the framework

The final critical question of the justification plan considers the framework as a whole to ensure that it provides sufficient depth and guidance to provide industry players with the appropriate tools to develop successful supply chain relationships at an Industry-level. In order to answer this question, the factors identified in the first-cut framework are compared with other research findings to add robustness to the research process through triangulation.

According to Hill and Jones (1998, p.72), "an organisation must either fit its strategy to the industry environment in which it operates or it must be able to reshape the industry's environment to its advantage through its chosen strategy." In order to achieve this, organisations must clearly understand the industry and the external environment in which they operate.

Thompson and Strickland (1997, p.68) support this by stating, "Judgments about what strategy to pursue need to flow directly from solid analysis of a company's external environment and internal situation." The first-cut Industry-level framework focuses on understanding the external environment in order to implement strategies to improve a company's profitability. A number of well known strategic analysis tools can be used to develop this understanding including:

- S.T.E.P. (Social, Technical, Economic and Politico-legal) analysis
- Industry profile
- Porter's five forces (Porter, 1980)
- Competitive position of major companies
- Competitor profiles
- Industry foresight (Prahalad and Hamel, 1994)

Thompson and Strickland (1997, p.70) found "Industry and competitive analysis aims at developing probing, insightful answers to seven questions.... The answers to these questions build understanding of a firm's surrounding environment and collectively, form the basis for matching its strategy to changing industry conditions and competitive realities." This reinforces the purpose of stages one and two of the Industry-level framework which aim to develop an understanding of the industry. The first stage of the framework is focused on gaining a high-level understanding of the industry, while the second stage considers specific aspects of the industry structure and their influence on industry profitability. By understanding the nature of the industry, organisations can then adopt appropriate strategies to meet the needs of the industry, thereby completing the Understand, Analyse, and Develop stage trilogy.

The Industry-level framework does not include every component of the strategic analysis tools identified above because organisations adopting the framework should use their judgement as to the appropriate tool(s) needed to develop an understanding of the industry. The tools used will vary depending on the organisation's existing knowledge of the industry and the additional understanding they require.

The Industry-level framework seeks to provide a structure to enable industry players to develop an understanding of the industry in general, determine the strength of two of Porter's five forces and then assess their ability to increase prices and earn greater profits. Section 5.8.2 above explained why only two of Porter's five forces were specifically included in the framework.

Stage 3 of the Industry-level framework is focused on developing an internal supply chain strategy and describes the steps involved in establishing an efficient and effective supply chain strategy encompassing relationships, technology and best practice. As Intentia (2003, p.1) state "Collaboration is the cornerstone of a future oriented food and beverage company." Hill and Jones (1998) identify a cost-leadership strategy appropriate for companies with low product differentiation, mass markets and competencies in manufacturing and materials management. They claim, "the overriding goal of the cost leader must be to increase its efficiency and lower its costs compared with its rivals" (p.189). The Industry-level framework supports this strategy through developing long-term relationships, investing in supply chain technology and adopting supply chain best practices.

The Industry-level framework does not define what 'invest in supply chain best practice' is. The reason for this is to provide the framework with flexibility and general applicability. Because of the diverse nature of the food industry best practice supply chain initiatives will vary across participants and countries. Large retailers may identify moves towards DCs as a best practice; however for smaller convenience retailers this strategy is not feasible or relevant. Similarly, for some suppliers EDI and VMI initiatives reflect global best practice; however these initiatives are only relevant for large customers. Best practice supply chain initiatives, such as outsourcing dispatch and distribution activities may be more appropriate for small convenience customers. Based on this the framework is general rather than prescriptive.

The first-cut framework has a logical flow which organisations can follow over a period as they develop their supply chain strategy. Strategy setting should not be a one off exercise; rather strategies should be reviewed and updated on a regular basis in response to external and internal changes. This framework provides the flexibility for organisations to reassess their supply chain strategy and modify it as necessary.

Simplicity was a key consideration in developing the Industry-level framework to maximise its practicality and workability for food industries in other countries. The Industry-level framework has been kept simple with 7 key factors identified. No changes to the factors identified in the first-cut framework were highlighted as a result of answering the justification questions. Rather this justification section has provided clarity and depth to the factors identified in the first-cut framework. The following section presents the final Industry-level framework.

5.9   Final Industry-level framework

This section formally presents the final Industry-level framework based on the first-cut Industry-level framework, modified by the findings from the justification questions and results from the action research case study example. The framework is presented pictorially in Figure 14 below with each factor then briefly defined.
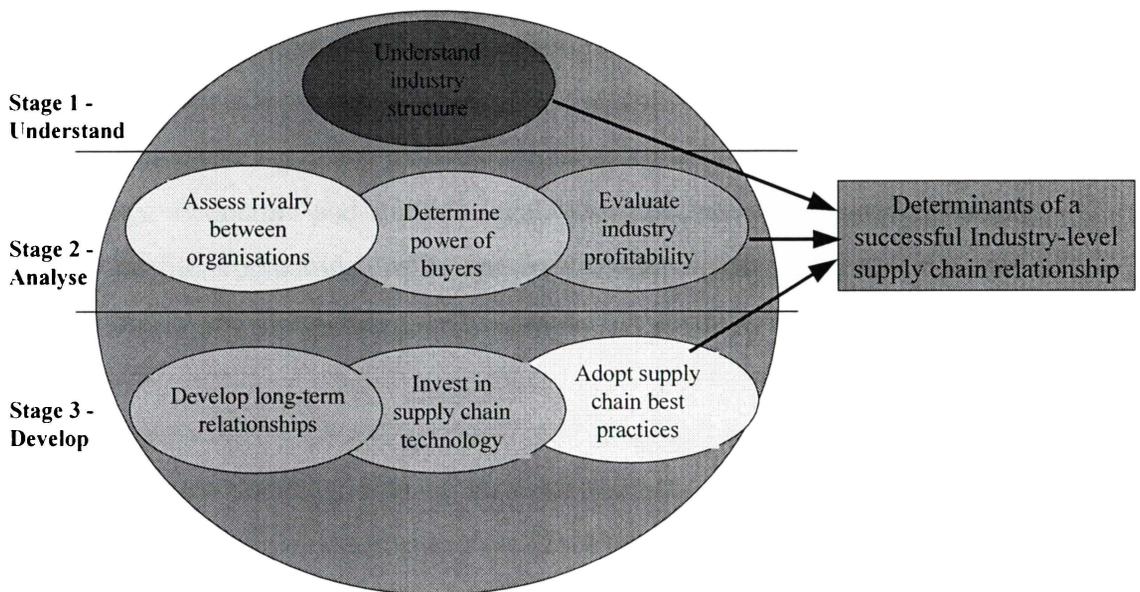
Figure 14: Final Industry-level Framework

The framework above shows the key success factors required at an Industry-level to develop an efficient and effective supply chain relationship. Without all of these factors, the New Zealand food industry will not be able to develop successful supply chain relationships. Each of the key factors is defined below.

Stage 1 (Understand) requires organisations in the industry to develop an understanding of the industry structure. This involves understanding the macro economic environment, the industry life-cycle stage and the key players and their roles in the industry. Answering the following 7 questions will assist organisations build an understanding of the industry (Thompson and Strickland, 1997, p.70):

1. What are the industry's dominant economic features?
2. What competitive forces are at work in the industry and how strong are they?
3. What are the drivers of change in the industry and what impact will they have?
4. Which companies are in the strongest/weakest competitive positions?
5. Who is likely to make what competitive moves next?
6. What key factors will determine competitive success or failure?
7. How attractive is the industry in terms of its prospects for above-average profitability?

A broad understanding of the industry can be using tools such as a STEP (Social, Technology, Economic and Politico-legal) analysis, industry life-cycle analysis, industry profile, competitor profile and industry foresight. Refer to Appendix 5 for an industry and competitive analysis summary form which incorporates these tools.

A more detailed understanding of the total industry should then be developed which is more specific and focused on the segments in which the organisation participates. A 'SWOT' (Strength, Weaknesses, Opportunities and Threats) analysis is a useful tool to assist organisations understand their internal strengths and weaknesses and identify external opportunities and threats. Understanding the industry should not be a one off exercise, rather it should be a continuous process with regular updates to reflect changes in the industry such as mergers, acquisitions and new entrants. For some organisations competitors could also be suppliers or customers.

Stage 2 (Analyse) starts with assessing the level of rivalry between organisations. In order to do this, the industry's competitive structure, demand conditions and the height of exit barriers in the industry should be considered (Porter, 1980).

The competitive structure refers to the number and size of companies in the industry. A fragmented industry with many small to medium sized companies, none of which are in a position to dominate the industry, tends to have low barriers to entry and commodity type products that are hard to differentiate. At the other extreme a highly consolidated industry has a small number of large companies, which are interdependent resulting in price wars and companies attempting to differentiate their products through non-price factors such as advertising and promotions, brand positioning and product quality, functionality and design (Hill and Jones, 1998).

Strong demand conditions moderate the competition among established companies and create opportunities for expansion. When demand is weak, intensive competition can develop, particularly in consolidated industries with high exit barriers.

Exit barriers are economic, strategic and emotional factors that keep companies in an industry even when returns are low. If exit barriers are high and the industry is in decline, then excess capacity may result.

The next step in the Analyse stage of the framework requires organisations to determine the bargaining power of the buyers they are selling to. The bargaining power of buyers is strongest when the following six factors are true:

- There are many small suppliers and a few large buyers
- The buyers purchase in large quantities
- The supply industry depends on the buyers for a large percentage of its total orders
- Buyers can switch between supply companies at a low cost

- Buyers can purchase inputs from several companies at once
- Buyers can use the threat to supply their own needs through vertical integration.

The overall strength of buyers bargaining power should be determined based on an assessment of the factors above.

Finally, the Analyse stage requires organisations to evaluate the industry profitability based on the assessment of rivalry between organisations and the bargaining power of the buyers. The more intense the rivalry between organisations and the greater the bargaining power of the buyers, the less opportunity there is for organisations in the industry to raise prices and earn greater profits. If there is little opportunity to raise prices and earn greater profits, organisations should adopt a strategy of competing on non-price factors, such as advertising, promotions, brand positioning and product quality, functionality and design, in conjunction with a strategy to reduce costs. If cost reduction is a key strategy then organisations should proceed with the third stage of the Industry-level framework.

Stage 3 (Develop) considers the strategies that should be adopted by industry players based on the findings from the Understand and Analyse stages. These strategies include forming long-term relationships; investing in supply chain technology and adopting best practice supply chain initiatives.

Long-term relationships should be formed throughout the supply chain with the key industry players identified in the Understand and Analyse stages. Establishing long-term relationships will take time and should be nurtured on an ongoing basis. The Organisation-level framework presented in section 6.10 provides a more detailed framework to enable organisations to develop supply chain relationships.

Investing in supply chain technology, such as ERP systems and EDI, will enable organisations to automate high volume, repetitive, non-value added activities, while stream lining the supply chain. The level of investment in technology will

vary between organisations depending on the industry segments in which they operate. Small, niche suppliers and retailers will require different systems and processes from large, high volume suppliers and retailers. To maximise the benefits of investing in technology organisations should also invest in training and upskilling employees and changes to underlying business systems and processes.

Finally, adopting best practice supply chain initiatives, such as EDI, VMI and use of DCs, will broaden the benefits gained from developing long-term relationships and automating supply chain processes. Initiatives such as VMI, when coupled with EDI, have been shown to be more effective than just EDI or VMI alone. Best practice supply chain initiatives should be identified by examining trends in other countries and industries and then tailored to the specific industry environment. Adopting best practice supply chain initiatives is essential to the long-term profitability of the industries, particularly for those industries where buyers have strong bargaining power and there is a high degree of rivalry between firms.

5.9.1 Potential limitations on the application of the framework
This section describes the factors that may limit the general application of this framework to other industries and countries.

Firstly, this framework has been developed for the New Zealand food industry. Although the framework may be applicable to other industries, no allowance has been made for this in the research.

Secondly, as explained in section 5.5.4, the action research case study environment has several potentially unique factors which may impact the general applicability of this framework. The case study was used to justify the first-cut framework and therefore the framework has only been justified and applied in the New Zealand food industry. Factors potentially unique to the New Zealand food industry are:

- Oligopoly structure of the industry retailers
- Over-capacity in the process segment of the industry
- Acceptability of technology spill over to competitors
- High capital investment
- Concentration of suppliers within industry segments

The oligopoly structure of retailers in the industry increases their bargaining power, thereby reducing the ability of industry players to raise prices to increase profitability. As a result, the New Zealand food industry is more likely to try and reduce costs than other countries and industries with less dominant buyers.

Over-capacity in the process segment of the industry is driving consolidation and rationalisation of the industry in order to maintain and/or increase profitability. As a result, some segments of the New Zealand food industry are seeking to reduce costs through mergers and acquisitions rather than supply chain initiatives. This factor may explain why some segments have been slow to adopt supply chain initiatives compared to other countries and industries. Similarly, other countries and industries with over-capacity may seek to reduce costs by consolidation before implementing supply chain initiatives.

Technology spill over has been accepted in the New Zealand food industry in order to drive down manufacturing costs by increasing volumes. New Zealand food industry manufacturers have adopted this strategy, particularly in relation to housebrand products, to reduce costs and therefore increase profitability. This is another factor which assists to explain why the New Zealand food industry has been slow to adopt global supply chain initiatives. While this strategy is possible in the New Zealand food industry, it may not be capable of replication in other countries or industries. As a result, other countries and industries may need to accelerate adoption of other cost reduction strategies to decrease costs.

Organisations in the New Zealand food industry may have above average levels of capital investment and fixed costs compared to players in other countries because of the small size of the New Zealand food industry relative to larger countries. In

order to increase profitability and shareholder returns, organisations in the New Zealand food industry must grow their volumes through local pricing strategies and/or new business. If the capital-intensive segment is in decline and there are high barriers to exit there is likely to be increased competition and reduced pricing. Cost reduction and pricing strategies will become important in determining the overall profitability of the industry segment.

The final factor identified as being potentially unique to the action research case study is concentration of suppliers. Given the relatively small population of New Zealand there is limited opportunity for a large number of suppliers, particularly in capital-intensive segments of the industry. As a result, there are often only 2 – 3 key players in each industry segment. Increased rivalry between established players and the need to maintain profitability may increase the likelihood of organisations in the New Zealand food industry adopting supply chain strategies to reduce costs.

5.10 Answers to Industry-level secondary research questions

This section answers the Industry-level secondary research questions identified in the literature review and summarised in section 3.4. Each question is restated and then answered.

5.10.1 Secondary research question #1

What are the critical success factors for a successful inter-firm supply chain partnership in a concentrated food industry?

The Industry-level framework described in section 5.9 above, identified 7 critical success factors at an Industry-level for successful VMI and strategic supply chain relationships in the New Zealand food industry. These factors were identified through a literature review and case studies and applied in a New Zealand food industry context, using Goodman Fielder as an example, to justify the factors.

The Industry-level framework is generic in nature and can be applied by all food industries throughout the developed world; however a number of potential

limitations to the application of the framework were discussed. These potential limitations arose because the framework was developed and justified in a New Zealand context. As a result, while the Industry-level framework presented is applicable in concentrated food industries with similar characteristics to New Zealand, it may also be applicable to other industries and non-concentrated food industries, subject to the potential limitations.

5.10.2 Secondary research question #3

What learning from the New Zealand forestry industry can be applied to the New Zealand food industry?

Section 5.5.3 compared the findings from a New Zealand forestry case study to the New Zealand food industry. Table 6 summarised the findings and found that 3 out of the 4 factors identified in the New Zealand forestry case study also applied to the New Zealand food industry. Over-capacity in process industries, acceptability of technology spill over to competitors and high capital investment were found to be common to both industries. These factors have been incorporated into the Industry-level research findings as potential limitations on the application of the framework to all food industries in the developed world. The fourth factor of corporate citizenship noted in the forestry case study was not supported by the food industry research findings.

5.10.3 Secondary research question #5

How do food industry trends toward DCs impact geographically diverse countries with small regional populations such as New Zealand?

Global FMCG moves towards DCs have impacted the New Zealand food industry by the continued consolidation of industry players and stronger bargaining power of buyers. This is evidenced by Progressive's acquisition of Woolworths. A key driver for Progressive of this acquisition was to improve supply chain efficiencies through greater utilisation of their DC and supply chain infrastructure (refer to Figure 17 for the location of Progressive's DCs). By purchasing large volumes for distribution via DCs, Progressive has strengthened their bargaining power as a

buyer and forced many suppliers to accept the changes imposed on them in terms of increased trading terms, DC deliveries and lower pricing.

This example shows how the food industry in New Zealand, a geographically diverse country with small regional populations, has reacted to global moves towards DCs. In order to make DCs efficient in New Zealand the food industry has undergone consolidation.

Therefore, in answer to the research question above, in order to establish and operate efficient and effective DCs, countries, such as New Zealand, with small regional populations may experience industry consolidation.

5.10.4 Secondary research question #7

Why has the New Zealand food industry been slow to adopt VMI practices?

The New Zealand food industry appears to have been slow to adopt VMI practices for a number of reasons. The majority of these reasons are due to the uniqueness of the New Zealand food industry and the oligopoly structure of supermarket retailers.

VMI practices require retailers and suppliers to work together. The New Zealand food industry has many suppliers and two major supermarket retailers. As a result the retailers have significant dominance over the industry and its supply chain initiatives. Until the retailers were willing to adopt VMI practices, suppliers had limited opportunity to initiate VMI practices because of their lack of bargaining power.

The slowness of the major retailers to adopt VMI practices can be attributed to a number of factors including:

- Internal focus during the Woolworths acquisition period
- Focus on establishment of DC operations which are a pre-requisite for VMI
- Mixed results of overseas VMI experiences

During the Woolworths acquisition both Foodstuffs and Progressive Senior Management were internally focused. Progressive was focused on successfully acquiring Woolworths, while Foodstuffs were focused on preventing the acquisition. Due to law changes during the takeover bid, the acquisition took over 12 months to finalise. During this time, both Foodstuffs and Progressive were internally focused and sought to aggressively defend their market share. This diverted Senior Management focus from initiatives such as VMI.

While the debate over ownership of Woolworths was continuing, Progressive was actively expanding their DC operations and forcing suppliers to shift from DSD to DC deliveries. VMI practices usually involve suppliers managing retailer DC inventory. Without DCs the need for, and benefit of, VMI is significantly reduced.

The mixed VMI results from overseas, as discussed in the literature review, section 2.3.4, have also impacted on the willingness of the New Zealand food industry to adopt VMI practices. While some international VMI practices, such as Wal-Mart, have been successful and well documented, other VMI practices have not produced the expected benefits and have been discontinued. As a result, until the benefits of VMI could be clearly documented, both retailers and suppliers in the New Zealand food industry placed lower priority on VMI than other supply chain initiatives.

5.10.5 Secondary research question #10
What industry characteristics are unique to the New Zealand food industry?

Section 5.5.2 described factors potentially unique to the New Zealand food industry. The main finding was that the New Zealand food industry is unusual among other food industries in that it has an oligopoly of retailers. As a result, there is a high degree of competitiveness between the retailers driven by branding and price. The dominance of the two retailers gives them a high degree of power over suppliers.

5.11 Chapter summary

In summary, this phase of the research has resulted in the development of an Industry-level framework which identifies 7 key elements for successful VMI and supply chain relationships at an Industry-level. The research was conducted in a food industry with an oligopolistic structure of supermarket retailers and has developed a practical model tailored for the New Zealand food industry and countries with similar industry characteristics. To-date, there does not appear to have been any other research conducted on supply chain relationships in oligopolistic food industries. Further research is required to determine whether this framework is applicable to other food industries which do not have oligopolistic structures. The next chapter builds on the Industry-level framework by identifying key factors for successful Organisation-level VMI and strategic supply chain relationships.

Chapter 6 Developing an Organisation-level framework

6.1 Introduction

In June 2002 when Progressive acquired Woolworths, one of their key short-term objectives was to consolidate their DC's to gain supply chain efficiencies. This chapter uses action research to understand how Goodman Fielder and Progressive worked together, during the Progressive DC consolidations, to develop an Organisation-level framework, which identifies the key determinants of successful VMI and supply chain relationships in the New Zealand food industry.

In this chapter, as in Chapter 7, initial scene setting is followed by presentation of action research findings from which a first-cut framework is developed. A justification plan is then outlined and the findings from the justification plan described. From this, a final, revised framework is presented and the key factors explained. Finally the relevant secondary research questions are addressed.

6.2 The Progressive distribution centre vision

This section describes Progressive's DC vision and outlines the benefits of consolidating the Progressive and Woolworths DCs.

In the New Zealand supermarket industry there have traditionally been three key players – Progressive, Foodstuffs and Woolworths. Progressive has always been an advocate for centralised distribution and has actively worked with suppliers to reduce direct to store deliveries and increase DC deliveries. In contrast, Foodstuffs has placed less focus on developing a centralised distribution system mainly because a large proportion of their stores are independently owned and operated. As a result, Foodstuffs have retained a strong direct to store distribution channel, supported by small DC operations. Prior to acquisition, Woolworths were still developing their DC infrastructure and had reduced the level of direct to store deliveries; however they were not as efficient in their DC supply chain as Progressive.

Progressive have used their large DC volumes to obtain lower purchase prices from suppliers. Progressive believes that the additional discount they receive from suppliers, more than offsets the cost of establishing and running centralised DCs.

There are significant costs involved in maintaining and running a DC. These include owning/leasing premises, establishing and maintaining IT systems, direct and indirect labour, energy and site administration. In addition, organisations with DCs are responsible for the cost of transporting products from their DCs to stores along with any product damage, shrinkage and write offs.

Progressive's acquisition business case for Woolworths claimed a number of benefits to be gained by closing surplus DCs and consolidating volumes through a single DC per region. These included:

- Increased supply chain efficiencies by increasing stock turn per square metre of warehouse space
- Increased customer service levels
- Reduced overheads per unit
- Reduced complexity
- Increased freight efficiencies

In June 2002, when Progressive acquired Woolworths the merged entity had the following four Progressive DCs: Auckland ambient, Christchurch ambient, Auckland chilled and frozen, and Christchurch chilled and frozen. Woolworths had six DCs comprising Auckland ambient, Palmerston North ambient, Christchurch ambient, Auckland chilled and frozen, Palmerston North chilled and frozen and Christchurch chilled and frozen.

Progressive's strategy was to reduce the number of DCs from 10 to 6, within 12 months of acquisition, with ambient and chilled/frozen DCs in Auckland, Palmerston North and Christchurch. The Progressive DC vision is shown in Figure 15 below.
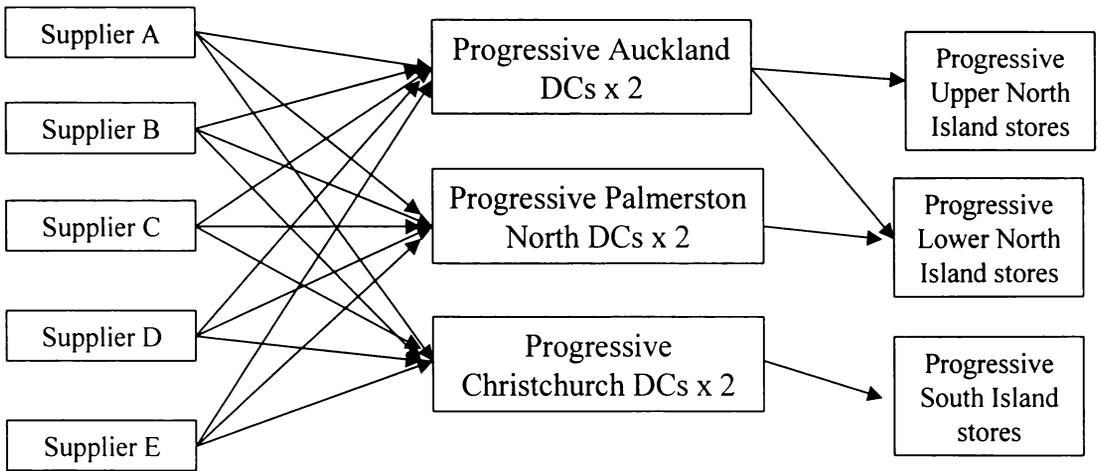
Figure 15: The Progressive DC vision

The Progressive DC model above contrasts against a direct to store delivery (DSD) model where suppliers deliver directly to multiple stores as shown below in Figure 16. Progressive's vision is to retain the DSD model for bread and milk products only.
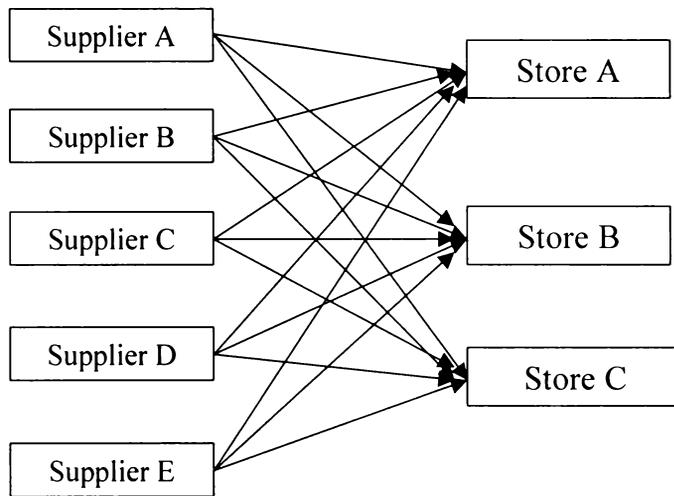
Figure 16: Direct to store delivery model

6.3 The Progressive distribution centre consolidation plan

This section describes Progressive's plan to consolidate the Progressive and Woolworths DCs and their intended timeframe.

In January 2002, Progressive was experiencing significant growth in volumes and DC supply. As a result they started developing expansion plans for their Auckland ambient DC. In April, when the likelihood of the Woolworths

acquisition increased, Progressive increased the size of their DC expansion to enable them to handle the Woolworths volumes through their DC if required. Site development started in April, and by June 2002, when Woolworths was finally acquired, Progressive had already started pouring foundations for the expanded DC.

By September 2002 plans were well underway to expand the Woolworths Palmerston North ambient and chilled/frozen DC operations to service all Progressive lower North Island volumes. IT changes were made to both the Progressive and Woolworths systems in September and in October high volume, high turnover products were switched from being serviced by Progressive Auckland DCs to the Woolworths Palmerston North ambient and chilled/frozen DCs.

At the same time, a DC consolidation plan was put in place for Auckland and Christchurch with key assumptions made on target dates and the intended IT platform. Progressive Senior Management approved this plan and smaller teams were established to implement it. The original timeframes were changed as implementation issues and resource constraints were identified.

Two sites were selected for the Christchurch DC to maximise the use of existing group assets and minimise the DC consolidation lead-time. By using spare storage facilities in the group, Progressive was able to avoid expanding the existing Christchurch DC facilities and implement the DC consolidation plan in a shorter time frame.

The key constraint to merging the chilled and frozen DCs was storage space. Both Progressive and Woolworths used P&O, a third party storage company. P&O did not have sufficient storage space available to enable the Progressive and Woolworth's volumes to be consolidated into a single site in the short-term. A medium-term plan was required to allow P&O to work with their other customers to relocate their storage, freeing up space for the Progressive and Woolworths volumes to be handled in a single location.

In Auckland, the Progressive ambient DC was selected as the combined DC location going forward because of its expansion and greater storage capacity.

The map in Figure 17 below identifies the geographical location of the 6 Progressive DC sites (ambient and chilled/frozen) along with the 9 Goodman Fielder manufacturing sites and the 2 distribution sites which supply the Progressive DCs. For simplicity purposes, the 10 Goodman Fielder bread plants (7 North Island and 3 South Island) which supply fresh bread and chilled pies and pizzas direct to Progressive stores are not shown below.

South Island
- 2 Progressive DCs
- 3 Goodman Fielder manufacturing sites supplying DCs
- 2 Goodman Fielder distribution sites supply DCs

North Island
- 4 Progressive DCs
- 6 Goodman Fielder manufacturing sites supplying DCs

Key
● Progressive ambient DCs (3 sites)
▲ Progressive chilled/frozen DCs (3 sites)
■ Goodman Fielder manufacturing sites supplying DCs (9 sites)
◆ Goodman Fielder distribution site supplying DCs (2 sites)

Figure 17: Location of Progressive and Goodman Fielder sites

6.4 How Goodman Fielder and Progressive worked together

This section describes how Goodman Fielder and Progressive worked together on the South Island DC consolidation to minimise the negative impacts of, and maximise the benefits of, the DC consolidations. Based on these, the critical success factors of the relationship are identified and presented in section 6.6.

6.4.1 Background

Prior to the acquisition of Woolworths, Goodman Fielder had established a VMI relationship with Progressive. The acquisition of Woolworths and consolidation

of DCs gave Goodman Fielder and Progressive an opportunity to strengthen their relationship and gain further benefits from sharing best practice with Woolworths by working together during the DC consolidations.

The researcher, as part of her VMI work, played two key roles in the DC consolidation process – strategic insight and day-to-day management. The strategic insight component of the role was to be Goodman Fielder's 'ears and eyes on the ground'. This role involved communicating Progressive's intentions on a timely basis to key stakeholders in the Goodman Fielder supply chain to enable them to plan changes in response to Progressive's proposed changes. The day-to-day management role involved overseeing the Progressive DC consolidation process from a Goodman Fielder perspective, managing inventory levels, reviewing product ranging and regular communication to key stakeholders.

By being on-site each day, the researcher was able to gain timely insights into the DC consolidation process. In October 2002, when the researcher first found out about the initial DC consolidation plan, she sent an e-mail to key people at Goodman Fielder outlining the potential benefits and implications. The e-mail described the impacts on Goodman Fielder of reducing stock levels in the overall supply chain, the proposed timing and implications of each DC consolidation for Goodman Fielder. The purpose of the e-mail was to help Goodman Fielder understand the potential implications on its sales volumes and budgets.

Without having a close relationship with Progressive, Goodman Fielder would not have known when the planned DC closures were and the potential implications. Following the e-mail, the researcher worked with Goodman Fielder internally to decide on a tactic to minimise the negative impact on sales as duplicate supply chain stock was eliminated from the Woolworths DC during the consolidation period. By having the researcher on site at Progressive, Goodman Fielder was able to plan for the expected drop in sales, rather than having to react after the event by stopping production and/or discounting heavily. This process represented the planning stage of the action research cycle of 'plan, act and review'. This planning stage and the resulting actions taken are described below.

As part of the DC consolidation management process, the researcher provided regular updates on current product ranging, proposed ranging, excessive stock holdings, temporary product sourcing changes and final product ranging in order for key stakeholders at Goodman Fielder to make more informed decisions relating to supply chain activities. This was achieved by analysing data extracts from the Progressive and Woolworths systems.

The process described above incorporates stages 1 and 2 of SSM described in section 4.3.3. By immersing herself in the situation, the researcher was able to fully understand the situation and identify the issues to be investigated.

6.4.2 Identifying potential issues

In November 2002, the researcher obtained data extracts from the Progressive and Woolworths systems showing stock on hand details in the Christchurch ambient DCs and the proposed product ranging in the consolidated DC. This information was matched by the researcher and provided useful information for both Goodman Fielder and Progressive. Key things identified were:

- 17 product lines had more than 6 weeks stock on hand in the Progressive DC
- 17 product lines had more than 6 weeks stock on hand in the Woolworths DC
- 11 products had no stock on hand in either the Progressive or Woolworths DCs
- 5 products were bulk, in-store bakery products only ranged in Woolworths
- 6 products were deleted lines with small amounts of stock remaining in the Progressive and Woolworths DCs
- 31 products were identified as lines which should be deleted from the South Island DC
- 7 products were identified as products distributed through the Woolworths DCs but distributed direct to store for Progressive
- 16 products had been approved for ranging in Woolworths but did not have stock on hand at the time of the data extract

- 6 products were Woolworths housebrand products pending deletion
- 144 products were identified as ranging opportunities in the Woolworths Christchurch DC

This information was circulated within Goodman Fielder and Progressive to enable the product ranging decisions to be reviewed and to allow actions to be taken on products with excess stock on hand. The key actions taken as part of the 'plan, act and review' action research cycle are described in the following sections.

6.4.3 Managing the product range

This section explains how Goodman Fielder used the Progressive and Woolworths South Island DC information to maximise ranging opportunities and manage product deletions.

Of the 31 products proposed for deletion in the South Island, Goodman Fielder had already highlighted several products for deletion internally. Where Goodman Fielder agreed with the proposed deletion decision, the sales forecast was zeroed out to reflect the deletion.

Goodman Fielder disagreed with the proposed deletion of 25 products with total South Island sales of approximately 134 cases per week. As a result, the Progressive Category Managers were contacted and the proposed deletions discussed. This process worked well by enabling Goodman Fielder to proactively approach Progressive Category Managers to explain why the products should not be deleted. A key reason for this was that it is much easier to retain a product than it is to delete a product and then re-range it; otherwise all parties in the supply chain from manufacturer to retailer ultimately ending up loosing sales and consumers also miss out. Because of the above process, Goodman Fielder was able to retain 20 of the 25 products in the South Island which had initially been identified for deletion by the Progressive Category Managers. Not only were the products retained in the South Island but the ranging was increased from the Progressive stores to Woolworths stores nationally benefiting both organisations.

These actions described how Goodman Fielder used the Progressive and Woolworths South Island DC information, which was not provided to any other suppliers, to increase product ranging and manage product deletions. In the researcher's judgment, a shared vision of increasing sales and reducing inventory helped both organisations work together and manage the product range.

6.4.4   Managing excess stock

This section outlines how Goodman Fielder and Progressive worked together to reduce high South Island stock on hand levels and avoid excess stock at the time of the DC consolidation.

The Progressive and Woolworths data extract identified a number of products with excessive stock on hand levels including cake mix, cookies, housebrand chips and Champion flour.

In order to move the excess stock of cake mix, several additional Woolworths South Island promotions were arranged. Woolworths agreed to reduce their margin on the product and Goodman Fielder agreed to provide Woolworths with a small scan discount to help sell the excess stock at a cheaper price. The Woolworths Buyer sent out 1 – 2 cases of each variant to all Woolworths South Island stores in order to keep the product moving.

The cookies and housebrand chips were identified as having high stock levels in not only the South Island but throughout New Zealand. As a result, the researcher set up weekly cookie and housebrand chip tracking spreadsheets to monitor sales volumes, order levels and stock on hand. Refer to Chapter 7 for further details.

The Champion flour stock was high due to a promotion coming up the following week. No further action was required to move this stock because the stock had already been sold by the time the data extract had been analysed.

As a result of the excess stock review process Progressive and Woolworths were able to reduce total inventory levels. At the same time, Goodman Fielder was able to avoid a drop in sales when the DCs merged by clearing the stock prior to

the DC consolidation and all parties were able to avoid the need to discount stock as it reached expiry date.

Critical reflection of the process highlighted lost sales due to out of stocks as downside of managing the excess stock process too closely. This happened for 2 days with the cookies during an advertised promotion. Because safety stock levels had been reduced so much, when promotional volumes were above forecasted levels, Woolworths did not have sufficient safety stock on hand to cover the additional sales. The key learning from this is that there is a very fine line between having too much and not enough stock. The researcher judged that a key success factor in this process was open communication between all parties and a willingness by both parties to work together to move the stock by sharing discounting costs.

6.4.5   Key advantages of working together at an Organisation-level
There were a number of key advantages to both Goodman Fielder and Progressive of working together at an Organisation-level on the South Island DC consolidation project. The advantages from managing the product ranging and excess stock were discussed in the previous sections. Appendix 6 describes the process of temporarily transferring supply of slow moving product lines to the North Island during the consolidation period. Appendix 7 describes how Goodman Fielder and Progressive worked together during the week following the DC consolidation to re-establish supply to the South Island. This section summarises the key advantages from Goodman Fielder and Progressive's perspective. Refer to Appendix 8 and Appendix 9 respectively for further details.

From a Goodman Fielder perspective the key advantages of working closely with Progressive at an Organisation-level included:

- Timely communication of the DC closure dates and the expected impact on Goodman Fielder (*)
- Review and input on product ranging and deletion decisions (*)

- Ability to identify and move excess stock through the Woolworths South Island stores prior to the DC closure thereby avoiding a sudden drop in sales once the DCs were consolidated (*)

- More accurate demand forecast splits between North Island and South Island volumes using historical data extracts from the Woolworths system (*)

- Reduced freight costs for products manufactured in the North Island during the temporary switch of products to the Woolworths Palmerston North DC

- Improved customer service levels to Woolworths South Island post DC consolidation because of daily deliveries from the consolidated DC with 24 hour lead times compared to 2 – 5 day lead times from the North Island Woolworths DCs (*)

- Negligible distortion to Goodman Fielder sales demand history at the North Island/South Island level due to products being supplied from the consolidated DC within a week after Woolworths South Island DC closed (*)

- Enhanced working relationship with Progressive (*)

From a Progressive perspective the key advantages of working closely with Goodman Fielder at an Organisation-level included:

- Informed product ranging and deletion decisions (*)

- Ability to identify and move excess stock through the Woolworths South Island stores prior to the DC closure thereby avoiding the need to heavily discount stock after the DC consolidation (*)

- High levels of customer service to Woolworths South Island stores throughout the transition period (*)

- Less stock on hand at the time the Woolworths South Island DC was closed which had to be physically relocated to the Progressive South Island DC (*)

- Improved customer service levels to Woolworths South Island post DC consolidation because of daily deliveries from the consolidated DC with

24 hour lead times compared to 2 – 5 day lead times from the North Island Woolworths DCs (*)

- Enhanced working relationship with Goodman Fielder (*)

(*) Advantages unique to Goodman Fielder and Progressive due to the VMI relationship.

In summary, by working closely together in the 3 months leading up to the South Island DC consolidation Goodman Fielder and Progressive were able to better plan for the Woolworths South Island DC closure. The benefits included: maximising customer service levels to the Woolworths South Island stores throughout the DC transition, minimising excess stocks, minimising freight costs particularly immediately following the DC consolidation and strengthening their working relationship. This process was an integral part of stages 2 and 3 of SSM in identifying the issue(s) to be investigated and formulating definitions of the relevant systems (refer to Appendix 10). The following section identifies the key findings from the South Island DC consolidation project.

6.5   Key findings and insights

The South Island DC consolidation project shows how two organisations working together in a VMI relationship can achieve advantages over and above normal day-to-day transactional relationships. This section analyses the key advantages for Goodman Fielder and Progressive of working together on the South Island DC consolidation project in order to identify key findings and insights which could be applied to other organisations in the New Zealand food industry.

A number of advantages of working together unique to Goodman Fielder and Progressive were identified in the previous section. If the VMI relationship did not exist Goodman Fielder would have been treated like all other Progressive suppliers and would not have been as informed about the DC consolidation plans and range rationalisation initiatives. Similarly, Progressive would not have realised the advantages for Goodman Fielder products of continuous customer service, minimal excess stock and reduced freight costs post-DC consolidation.

Having a VMI person on-site at Progressive on a daily basis, responsible for managing inventory and customer service levels; however, is only the foundation to enabling both organisations to realise these benefits. Without a shared vision, openness in communication, trust over access to information, respect for each other and confidentiality these advantages would not be realised to the same extent. These attributes are discussed in further detail below and generalised where possible for use in other organisations in the New Zealand food industry.

Both Goodman Fielder and Progressive shared a common vision and win-win attitude in relation to the VMI project. Both organisations were focused on increasing customer service levels, reducing inventory levels and reducing total supply chain costs. Many of the advantages to-date speak for themselves. For example Goodman Fielder is no longer on the list of 20 worst suppliers to Progressive, Progressive's DC customer service levels to stores have increased and total supply chain inventory levels have reduced (refer to Chapter 7 section for further detail). The common vision was established and agreed by Goodman Fielder and Progressive Senior Management when the VMI project commenced in December 2001. This was documented in a position scope for the VMI role with agreed goals and measures. The vision has remained unchanged, while the win-win attitude has strengthened because of the benefits realised across all aspects of the business relationship.

This indicates that, where organisations share a common vision and a win-win attitude in relation to a specific project and/or venture, there are benefits to be gained by both organisations. In the researcher's judgment, other organisations in the New Zealand food industry could benefit by working together towards a common goal and adopting a win-win attitude.

Goodman Fielder and Progressive have an open relationship where ideas and suggestions are discussed at an early stage before they are developed and implemented. This enables input and feedback from the other party to be incorporated into the project plan to maximise the benefits. For example, Goodman Fielder had input into the South Island DC product ranging decisions in order to maximise sales for both Goodman Fielder and Progressive. Goodman

Fielder and Progressive's relationship has become more open over time, as the VMI role has evolved and both organisations realise that in order to benefit from joint initiatives, information must be shared openly. The information shared during the DC consolidation included volumes, inventory levels, forecasts, out of stocks, average weekly demand and promotional activity.

Other organisations in the food industry could benefit from this insight, by becoming more open with suppliers and customers in their supply chain activities. By sharing information openly, organisations throughout the supply chain can work towards a common vision and share the benefits amongst all parties.

There is trust and respect between Goodman Fielder and Progressive. A lot of the information provided to Goodman Fielder is confidential. Without a high level of trust between the organisations the confidential information would not be shared to the same extent, thereby reducing the potential gains to both organisations. For example, if Progressive had not provided Goodman Fielder with the list of products to be deleted from the South Island DC a number of key product lines may have been inadvertently deleted resulting in reduced sales and market share for both Goodman Fielder and Progressive. From the start of the VMI relationship there has been a high level of trust between both organisations. Both Goodman Fielder and Progressive realise, that in order to gain the most from the VMI relationship, a high level of trust and openness is required. The level of trust has grown deeper as benefits, at both the Management and Organisation-levels, have been realised, and no breaches of trust have occurred in the relationship to-date. As Handfield and Nicols (2002, p.163) state "Trust is not something that simply happens. Trust is developed when a company's performance history and the reliability of its supply chain linkages can be demonstrated."

The trust factor in the Goodman Fielder and Progressive relationship is another trait organisations in the food industry should focus on developing early in their relationships with other organisations in the supply chain.

This section has summarised the key findings and insights from the South Island DC consolidation project and attempted to generalise them to the New Zealand

food industry. The following section discusses the critical success factors required at an Organisation-level to achieve these benefits.

6.6 Critical success factors

This section reflects on the key benefits, findings and insights in the previous sections and develops a set of critical success factors required at the Organisation-level in order to establish a successful VMI and strategic supply chain relationship.

A number of advantages were realised by both Goodman Fielder and Progressive which were unique to their VMI relationship. This relationship commenced in December 2001 and has evolved since then. Both organisations are committed to the VMI relationship, as demonstrated by their investment in resources. Goodman Fielder has provided the researcher as an ongoing resource to work with Progressive on a daily basis. In turn, Progressive has provided ongoing daily access to their IT systems, Inventory Manager, Buyers and Category Managers.

The following factors were judged by the researcher to be critical to the success of the VMI relationship and the resulting benefits:

- Relative importance of both organisations to each other
- Shared vision
- Win-win attitude
- Openness
- Trust and integrity
- Respect
- Confidentiality

Firstly, for a VMI relationship to succeed the organisations must be relatively important to each other. If this factor is missing, at least one of the organisations may not be willing to invest the necessary time and resources in the relationship to ensure the remaining critical success factors are incorporated into the relationship.

Organisations wishing to enter into a VMI strategic relationship must develop a shared vision of what they would like to get out of the relationship. The vision may incorporate factors such as capital investment, customer service levels, inventory holdings and outsourcing arrangements.

Both organisations must then agree to share the benefits of the relationship and adopt a win-win attitude. The VMI relationship benefits may be shared equally or at an agreed rate.

Once the VMI relationship has been established, a shared vision developed, and benefit sharing agreed both parties must then focus on developing and deepening the relationship. This will require openness in communication, trust and integrity, respect for each other and confidentiality of information.

These critical success factors in a VMI relationship are similar to those required in strategic partnerships in other industries and countries. The Goodman Fielder and Progressive South Island DC consolidation project has reinforced the appropriateness of these factors for the New Zealand food industry.

The critical success factors listed above are mutually dependent. Without all of these factors the advantages of the VMI relationship would not be maximised. For example, if Progressive did not consider Goodman Fielder a key supplier, or Goodman Fielder did not consider Progressive a key customer, neither organisation would have invested in the VMI relationship. Similarly, if either organisation significantly breached the unwritten confidentiality rules it is likely that the trust, integrity and respect between the organisations would disappear. There would no longer be an open relationship, the win-win attitude would dissolve and each organisation would focus on benefiting themselves, potentially at the expense of the other organisation.

As Brandenburger (1996, p.4) states business isn't war and it isn't peace. Business is co-opetition. "Business is cooperation when it comes to creating a pie and competition when it comes to dividing it up." This is the view adopted by Goodman Fielder and Progressive in their VMI relationship. Their objective is to

increase sales and share the incremental profits resulting from the increased revenue and reduced supply chain costs.

Other organisations in the food industry could improve their supply chain relationships by adopting these critical success factors with key suppliers and customers. The first step is to identify those suppliers and customers who are considered key to the ongoing success and development of the organisation. These organisations may be key suppliers of materials and/or services, or key customers of finished products. Once these key organisations have been identified, the other organisation should be approached and asked if they are willing to develop a strategic supply chain relationship. A shared vision must then be developed so both organisations are striving towards the same goals. A win-win attitude is needed along with openness in communication, trust, integrity, respect for each other and confidentiality in respect of information.

These factors need to be regularly monitored by both organisations. Any, perceived or real, significant change or deterioration in these factors should be discussed by both organisations and a decision made as to whether the factors can be restored or whether the relationship should be disestablished. This decision will depend on the extent of the change/deterioration and the surrounding circumstances. If both organisations agree that change/deterioration is temporarily and can be fixed, then it is likely that the relationship will continue. For example, if openness in communication has deteriorated, then both organisations may agree to meet weekly to improve communications. In this situation, it is likely that the relationship will continue. In contrast, if the change or deterioration, in one or more of the critical success factors, is considered fundamental and difficult to resolve, then the relationship should be disestablished. For example, if one of the organisations is acquired by another organisation, then the relative importance factor may significantly change the dynamics of the relationship. In this situation, it is likely that the relationship will be disestablished.

This section has identified 7 factors, judged by the researcher, to be critical to the success of the Goodman Fielder and Progressive VMI relationship. By adopting these key insights and critical success factors, successful VMI and supply chain relationships could be developed by organisations in the food industry. Any change or deterioration in these factors should be discussed by both organisations and a decision made on whether to continue the relationship. The following section discusses the key findings from an action research perspective.

6.7 Key findings from an action research perspective

This section evaluates the South Island DC consolidation research in terms of meeting the fifteen key characteristics of action research described by Eden and Huxham (1996) and discusses how the critical reflection component of action research has impacted the work of the researcher.

6.7.1 Organisation-level assessment of action research characteristics

The validity and robustness of the South Island DC consolidation action research is assessed in Table 7 below. The estimated achievement score is based on the researchers judgement of how well the characteristic was addressed during the research as defined in section 4.4.7. The scores range from 0 to 4, with 4 being the highest level of achievement.

	Characteristic	Method of incorporation into research	Estimated achievement
1	Integral involvement by the researcher with an intent to change the organisation	The researcher was fully involved in the South Island DC consolidation project. She initiated ideas and implemented recommendations from both a Goodman Fielder and Progressive perspective to maximise the benefits of the DC consolidation for both organisations.	4
2	Must have implications beyond those required for action or generation of knowledge in the domain of the project	The key findings and critical success factors have implications for VMI and supply chain relationships beyond the domain of the Progressive South Island DC consolidation project. The findings specific to the South Island DC consolidation will be implemented in	3

	Characteristic	Method of incorporation into research	Estimated achievement
		the remaining DC consolidations. The critical success factors are more generic and once justified, through further cycles of action research and triangulation, will be applicable to other VMI and supply chain relationships in the New Zealand food industry.	
3	Explicit requirement to elaborate and develop theory	The key purpose of researching the implications of the South Island DC consolidation was to develop theory on supply chain relationships specific to the New Zealand food industry. The action research findings are supplemented by a literature review to add depth and completeness to the theory developed.	3
4	Theories developed must be supported or developed through action research	There was a clear focus on deriving theory from practice. The critical success factors from the South Island DC consolidation were developed from the key findings identified during the action research. The robustness and validity of the critical success factors will be justified through further cycles of action research and continued review of existing theory and literature.	2
5	System of emergent theory	This research seeks to develop theory out of the research rather than test pre-determined theories in research. The South Island DC consolidation project was the foundation for developing the Organisation-level framework. The justification plan and further action research cycles will be used to help ensure the initial research findings are complete and robust.	4
6	Incremental theory building – cycle of developing theory to action to reflection to developing theory	The South Island DC consolidation was the first major cycle in the Organisation-level research. The consolidation was planned, implemented and reflected upon with key findings and critical success factors identified for further application and justification in the subsequent	3

	Characteristic	Method of incorporation into research	Estimated achievement
		DC consolidation case study. The subsequent DC consolidation case study represents a further major action research cycle. These cycles are used to develop, apply and justify the emerging theory.	
7	Descriptive theory must recognise the practical implications in the final documentation	The framework developed has a practical focus rather than deep theoretical basis. The South Island DC consolidation research is documented in a manner which recognises the practical aspects of supply chain relationships.	3
8	Systematic reflection	The South Island DC consolidation project was continuously reflected upon to identify next steps, key findings and critical success factors. The process was then documented for application, justification and further reflection in the remaining DC consolidation case study.	3
9	Process of exploration of data must be either replicable or be capable of being explained to others	The process adopted during the South Island DC consolidation is documented to enable others to understand and replicate the plan-act-reflect process followed, as necessary. The data extracts and analysis have been described to enable readers to replicate the process.	2
10	Writing about research is an important aspect of theory exploration and development	The South Island DC consolidation research findings were documented throughout the research period in order to capture key findings and theory to be applied and justified in subsequent research cycles.	3
11	Adherence to characteristics 1 – 10 is a necessary but not sufficient condition for action research	Noted that characteristics 1 – 10 are concerned with internal validity and also require characteristics 12 – 15 for external validity	3
12	Reflection and data collection processes can not be captured by other approaches	The work Goodman Fielder and Progressive VMI relationship was the first of kind in New Zealand. The project scope, methods and outcomes were continuously evolving. Findings from one process were modified and applied to other areas for discussion and	3

	Characteristic	Method of incorporation into research	Estimated achievement
		reflection. Action research methods provided flexibility to change direction throughout the research period. This was particularly relevant in the Organisation-level research because at the commencement of this research, Progressive had not acquired Woolworths and the need for DC consolidations had not arisen.	
13	Triangulation methods should be fully exploited and reported	Obtaining feedback from key stakeholders at both Goodman Fielder and Progressive was used as a form of triangulation. In addition, existing literature and case studies from other countries and industries were used to justify the completeness and robustness of the first-cut framework developed.	3
14	Validity and applicability of the results depends on the history and context of the research	The purpose of Organisation-level research was to develop a framework applicable to the general New Zealand food industry. In order to develop a general framework the context of the South Island DC consolidation and its applicability to the wider industry has been carefully considered.	3
15	Theory must be disseminated in such a way to be of interest to a wider audience than those integrally involved with the action/research	The aim of the research was to develop a theory relevant to the general New Zealand food industry. The final theory is presented with 3 stand-alone, yet integrated, frameworks – Industry-level, Organisation-level and Management-level.	3

Table 7: Review of Characteristics of Action Research - Organisation-level

Based on the above, the South Island DC consolidation research appears to have met, in the range of 2 – 4, the fifteen key characteristics of action research identified by Eden and Huxham (1996). The researcher judged that the characteristics of integral involvement and systems of emergent theory were met in full. The two lowest scoring characteristics (4 and 9) are discussed in further detail below, along with how they will be strengthened in further research cycles.

In relation to Characteristic 4, development of theories through action research, Eden and Huxham (1996, p.531) state that "the basis for design must be explicit and shown to be related to the theories which inform the design and which, in turn, are supported or developed through action research." To improve the estimated achievement of this characteristic the justification plan will be designed to strengthen the linkage between the theory and action research.

In relation to Characteristic 9, Eden and Huxham (1999) noted that the process of *exploring* the data, rather than *collecting* the data must be replicable or, at least, capable of being explained to others. To improve the estimated achievement of this characteristic, documentation of the processes followed will be expanded to ensure that the process is capable of being explained to others.

6.7.2   Use of critical reflection

A key component of action research is critical reflection. By treating the South Island DC consolidation project as action research, the researcher was encouraged to critically reflect on the process and methods used by both Goodman Fielder and Progressive throughout the project. If this project had been treated as consulting work, rather than research, there would not have been the same depth of critical reflection. Reflection occurred throughout the whole project, resulting in instant 'ah-ha's', short and medium-term ideas for next steps, and longer-term suggestions and recommendations for future DC consolidations. The researcher's critical reflection was both formal and informal.

Informal critical reflection was incorporated into the researcher's daily activities by stepping back and considering the outcomes and impacts of decisions and changes in processes. An example of this informal reflection, resulting in an instant ah-ha, was at the beginning of the project when products with excess stock levels in the Woolworths South Island DC were identified and put on 'stop order'. Immediately after doing this, the researcher stepped back from the situation and reflected on the intended outcome of putting products on 'stop order'. As a result, rather than just identifying the excess stock products and putting them on 'stop order', other slow moving products were also identified and put on 'stop order',

thereby preventing Progressive from potentially ending up with excess stock on hand when the Woolworths DC closed.

This instant ah-ha evolved into a weekly review of stock on hand levels in the Woolworths South Island DC and a temporary transfer of some products from South Island supply to North Island supply. Without critical reflection on the process and project as a whole the instant ah-ha may have been a one off activity. Instead, by reflecting on the impact of the 'stop order' flag, proactive reviews were implemented to prevent further cases of excess stock. This highlights the impact of reinforcing feedback loops and the need for systems thinking in highly complex situations, supporting the use of SSM in this research.

The researcher used a monthly 'Action Research Cycle log' for formal reflection. This log was used to document actions taken during the month in key focus areas, review the key outcomes and findings and plan the next months key focus areas. Notes and e-mails from meetings, discussions and communications were also retained to provide support for the key actions taken, the resulting impacts, and feedback from people involved in the process. In addition, the formal reflection process was supported by theoretical underpinnings arising from the literature reviews which were incorporated into the reflection and planning stages of the action research cycles.

An example of an insightful outcome from the formal monthly reflection process was the identification the critical success factors of trust, openness and respect for each other. Before reflecting on the whole process, trust, openness and respect for each other tended to be taken for granted in the relationship rather than considered fundamental factors in the success of the whole relationship. Based on this insight, additional time was invested in nurturing the current relationship between Goodman Fielder and Progressive, particularly between the researcher and the Progressive Inventory Manager.

6.7.3 Summary

In summary, the South Island DC consolidation project has met, to some extent, the Eden and Huxham's fifteen key characteristics of action research. The process of critically reflecting on the research resulted in the researcher gaining several key insights which were used to develop the Organisation-level framework and associated theory. The following section uses the critical success factors, identified through action research, to develop a first-cut Organisation-level framework.

6.8   First cut of the Organisation-level framework

This section draws the findings from the previous sections together to develop a first-cut Organisation-level framework, based on the Goodman Fielder and Progressive South Island DC consolidation case study, which can ultimately be generalised for the New Zealand food industry.

In section 4.4.3 the process used to develop the Organisation-level framework was presented. The key steps were: (1) understand the local case study, (2) plan, implement, reflect and refine structure, (3) develop and justify the Organisation-level framework (4) test findings for other organisations and (5) validate through triangulation.

The purpose of the Organisation-level framework research was to identify potential inputs and factors impacting on how organisations work together in the food industry, in order to develop successful supply chain relationships, as shown in Figure 18 below.
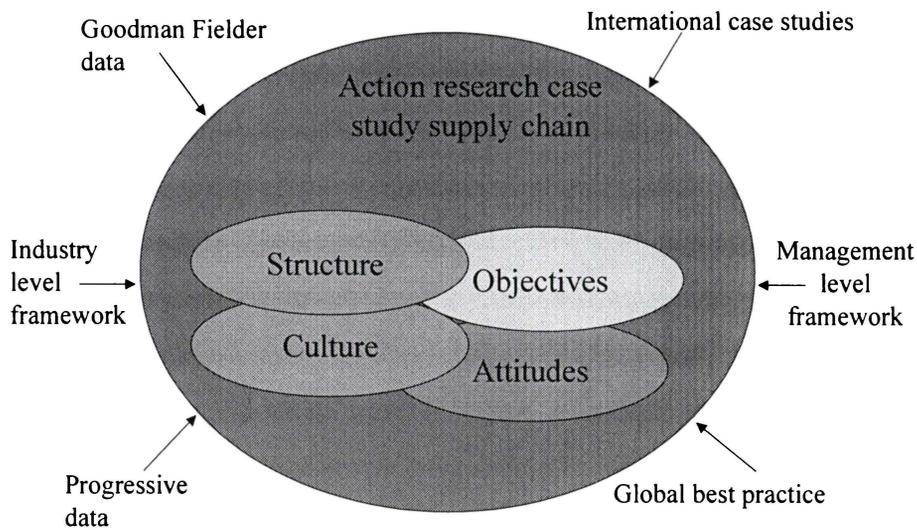
Figure 18: Factors to be considered in the Organisation-level framework

The South Island DC consolidation project was selected as the Goodman Fielder/Progressive Organisation-level case study to develop the first-cut framework. The DC closure was planned, implemented, documented and reflected on by both Goodman Fielder and Progressive. Action research was used to capture the key advantages, findings, insights, critical success factors and contributions to knowledge.

The 7 critical success factors identified in the South Island DC consolidation project form the basis of the first-cut Organisation-level framework. Based on the action research conducted to-date, there appear to be three stages in developing successful VMI and strategic supply chain relationships at the Organisation-level. The first stage is to determine whether the organisations are relatively important to each other. The second stage is to develop a win-win attitude and shared vision. The final stage involves developing confidentiality, respect, openness and trust and integrity aspects to strengthen the relationship. The factors in each of the 'Assess', 'Develop' and 'Nurture' stages are shown in Figure 19 below.
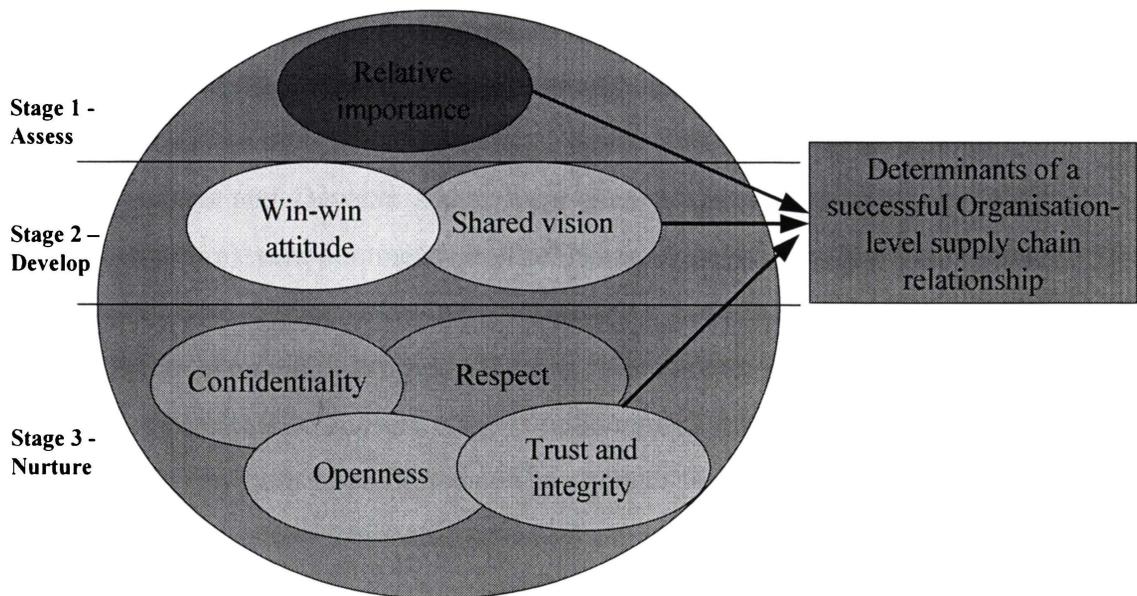
Figure 19: First Cut of Organisation-level Framework

Stage 1 (Assess) is required if the relationship between the organisations is to be successful. If either organisation does not consider the other organisation relatively important, they may not be willing to invest time and resources in developing a successful supply chain relationship. Most organisations prefer to develop relationships with key suppliers and customers first in order to gain the greatest benefits from the least number of relationships. Organisations who are relatively important to each other and wish to develop a supply chain relationship should proceed to the next stage

Stage 2 (Develop) involves developing a shared vision and adopting a win-win attitude where benefits are shared between the organisations. Without a common vision the supply chain relationship between the organisations is unlikely to succeed. Both organisations should be aiming to improve supply chain activities by working together to reduce inventory levels, increase customer service levels and eliminate duplication of data entry and processing. Although a shared vision is critical to the success of the supply chain relationship this, in itself, is not sufficient to successfully proceed to the Nurture stage. Both organisations must adopt a win-win attitude where they are willing to share benefits. Sharing benefits does not mean that additional profits/cost savings must be split equally rather it means that both organisations must be willing to invest time and resources to

benefit not only themselves but potentially the other organisation as well. By adopting a win-win attitude the organisations can strengthen their relationship.

Once the Assess and Develop stages have been documented and agreed, then Stage 3 (Nurture) can commence. The Nurture stage involves establishing confidentiality boundaries, developing respect for each other, establishing and maintaining an open relationship and ensuring there is ongoing trust and integrity in the relationship. The Nurture stage is ongoing and requires continuous focus and investment by both organisations. The stronger these factors, the greater the potential to advance the relationship.

The process of designing the first-cut Organisation-level framework described above represents stage 4 of SSM. Stage 4 involves building conceptual models of the systems named in the root definitions. The following section describes the justification plan adopted for the remaining DC consolidations in line with stage 5 of SSM, which requires the researcher to compare the conceptual models with real world actions.

6.9   Justification of the first-cut Organisation-level framework

The justification plan comprises a number of critical questions to which answers are sought. This section lists the critical questions, explains the rationale for them and then answers them using a further DC consolidation case study. The key success factors identified are compared and contrasted against relevant literature to ensure they are complete and robust.

The following critical questions were identified through discussions with employees from Goodman Fielder and Progressive Middle Management, and represent a summary of the key points raised.

1. How important does the other organisation need to be in order for the relationship to work? Can 'relative' be defined?

2. Is a win-win attitude critical to the success of the Organisation-level relationship or can the same relationship be achieved by only having a common vision?

3. Does the win-win attitude have to be adopted in the Develop stage prior to the commencement of the Nurture stage or should this factor be part of the Nurture stage?

4. Are all the confidentiality, respect, openness and trust and integrity factors critical success factors in order for the supply chain relationship to work? Are any of these factors subsets of other factors?

5. Are there any other factors considered critical to the success of the Goodman Fielder and Progressive supply chain relationship at the Organisation-level?

6.9.1 Relative importance

The first critical question relates to the term 'relative', what it means and whether it can be defined. This question is important when the application of framework to the food industry as a whole is considered. If the key customers in the food industry, such as large supermarket retailers, are only interested in developing relationships with 'important' suppliers the definition of 'important' is critical to the applicability and scope of the framework. Importance could potentially be defined by size, impact, complexity, product range, product life cycle or other factors. If, for example, importance is defined by size then the framework may only be applicable to large organisations.

The concept of 'relative' was considered during the Auckland ambient DC consolidation case study. The researcher used action research to attempt to identify those factors distinguishing Goodman Fielder from other Progressive suppliers who had not developed a VMI relationship with Progressive.

Goodman Fielder is one of New Zealand's largest retail food industry suppliers, accounting for approximately 8 - 9% of all retail grocery dollar sales in New Zealand (based on internal Goodman Fielder calculations). Progressive has a market share of approximately 40% of the New Zealand retail grocery industry, excluding Supervalue (www.progressive.co.nz). These statistics alone show the

relative size of Goodman Fielder and Progressive compared to other players in the industry.

During the Auckland ambient DC consolidation, Progressive focused on moving the largest suppliers first using the 80:20 rule in terms of volume. The Auckland ambient DC consolidation process took 10 weeks. In the first week the 8 highest volume suppliers were relocated from the Woolworths DC to the Progressive DC. These suppliers included Bluebird (a Goodman Fielder company), Carter Holt Harvey, Griffins, Arnotts, Vertex, Sanitarium, ABC Tissue and Kimberly Clark. Even though these suppliers were the top suppliers to Progressive in terms of volume they are not necessary the 'key' VMI suppliers to Progressive. This indicates that volume alone is not the only determinant of 'relative'.

A feature of Goodman Fielder which distinguishes it from the other high volume suppliers is it complexity. Goodman Fielder supplies over 375 products to the Progressive Auckland ambient DC. These products include both Goodman Fielder branded and housebrand products. The products are supplied from 5 business units within Goodman Fielder (Bluebird, Meadow Lea, Champion, Sweet & Savoury and Quality Bakers). Each Goodman Fielder business unit supplies Progressive under a different supplier number, requiring separate purchase orders with different contact details, delivery lead times, order frequencies and minimum order levels. This complexity requires greater management than a single company supplying high volumes of a few products (e.g. Carter Holt Harvey tissues and toilet paper).

Another distinguishing feature of Goodman Fielder, compared to some of the other high volume suppliers, is its wide range of products and product categories. Goodman Fielder products fall into a number of product categories with over 12 Progressive Category Managers having Goodman Fielder products in their portfolios. Prior to DC consolidation, 9 Auckland buyers purchased Goodman Fielder products into the Auckland ambient DCs (4 Woolworths buyers and 5 Progressive buyers). This is unlike other high volume suppliers which have products in a few categories and only have a few number buyers dealing with the complete product range.

Product shelf life is another factor to consider when determining the relative importance of a supplier. The Goodman Fielder products supplied to the Progressive Auckland ambient DC range in shelf life from 90 days to over a year with the majority of products having a shelf life between 3 and 9 months. Shorter shelf life products require greater warehouse and inventory management than products with no shelf life (e.g. tissues and toilet paper). In particular, short shelf life products with high promotional volumes and low base line sales must be carefully managed to ensure purchasing patterns match sales demand to avoid excess inventories and short dated stock problems.

Based on the findings above, the term 'relative' includes size, complexity of the business, product range and product shelf life. Size can be defined in terms of volume, complexity in terms of business units and IT platforms, product range in terms of number of product categories and number of products within each category, and product shelf life in terms of the risk of product expiring prior to sale and promotional versus base line sales.

These criteria are currently met to some extent by the three VMI relationships at Progressive. At the time of the Auckland ambient DC consolidation, Goodman Fielder, Heinz-Wattie and New Zealand Dairy Foods had formed VMI relationships with Progressive.

Heinz-Wattie is a large organisation which rates highly on the size, complexity and product range criteria. Most Heinz-Wattie products have a relatively long shelf life (12 – 18 months); however a number of their products have very high promotional volumes relative to base line sales, resulting in excessive stock holdings following promotional activity. In addition, the seasonal production nature of some of the canned products (such as fruit and vegetables) means that some products are only produced for 2 – 3 months per year but are sold all year round. If sales exceed production volumes prior to the next production season there are out of stocks.

New Zealand Dairy Foods is another large, complex organisation with short shelf life products. The majority of New Zealand Dairy Food yoghurt and custard products have limited shelf life and must therefore be carefully managed to minimise aged stock while, at the same time, maximising customer service levels. New Zealand Dairy Foods does not have as diverse product range as Goodman Fielder; however the short shelf life nature of their products increases their relative importance to Progressive.

There is no single definition of size, complexity, product range, or product shelf life in terms of the criteria for relative importance because these factors will differ for each potential VMI relationship. When assessing whether a supplier or customer is relatively important, organisations should consider each of these factors in combination and make an overall assessment.

6.9.2 Win-win attitude

The second critical question relates to whether a win-win attitude is necessary for the success of the relationship or whether a common vision alone can achieve the same relationship. Depending on the breadth of vision, a win-win attitude may be incorporated in the vision and therefore may not be required as a separate critical success factor at the Organisation-level.

The Goodman Fielder and Progressive VMI relationship has a strong win-win attitude as shown by the number of joint initiatives taken, which have ultimately been applied to other Progressive suppliers. Because Bluebird (a Goodman Fielder business unit) was one of the first suppliers to be relocated during the Auckland ambient DC consolidation, a number of issues were identified which were then resolved and applied to other suppliers. These are discussed in further detail below, particularly in relation to the win-win attitude adopted.

On 7 May 2003, the Bluebird products located at the Woolworths Auckland ambient DC were transferred to the Progressive ambient DC. Following the relocation a number of issues were identified particularly with products only sold by Woolworths stores, not Progressive stores. The Woolworths only products created several problems because they had never been set up in the Progressive

computer system before. The problems included deleted products being ordered, incorrect supplier product codes, products allocated to incorrect Buyers, duplicate products being established, incorrect pallet configuration data, incorrect minimum order quantities and no linkage between the Woolworths product code and the Progressive product code. Rather than just fix each problem as they arose, the researcher investigated the root cause of each problem. These were then communicated to Buyers and to the Inventory Manager so the process could be corrected for other suppliers. Initially several of the Buyers couldn't understand why the researcher did not just fix each problem as it arose; however after a couple of days they pro-actively approached the researcher and said "I have a problem because …" Everyone then started to work as a team to resolve the issues as they were identified.

This example shows how the win-win attitude adopted by Goodman Fielder and Progressive meant that problems identified were acted upon and resolved on a timely basis. Priority was given to correcting the problem for Goodman Fielder products and then to correcting the root cause for other suppliers.

The example above also shows how SSM was used. In order to solve the problems arising, the research had to understand the problem situation (step 1) and identify the issues to be investigated (step 2). The corrections required were discussed and a practical solution developed. Finally, the corrections were implemented (step 7).

The win-win attitude adopted between Goodman Fielder and Progressive differs from the attitude adopted by the Heinz-Wattie VMI person. During the Auckland DC consolidation, the Heinz-Wattie VMI person dealt only with the Heinz-Wattie product range. They only dealt with problems on a case-by-case basis as they impacted Heinz-Wattie and, as a result, did not identify the root causes of the problems impacting other suppliers.

By adopting a win-win attitude Goodman Fielder was able to not only identify and correct the root causes for their product range, but they were also able to help Progressive solve the problem for all suppliers. This difference in attitude was

also reflected in comments made by several teams at Progressive who said, "We are using Goodman Fielder as a trial to...." Goodman Fielder benefited from being the trial supplier by realising the benefits of the trial first and by being able to drive process improvement initiatives across the whole supply chain. Goodman Fielder worked closely with Progressive to maximise the benefits for both parties, whereas Heinz-Wattie followed the process established by Goodman Fielder. New Zealand Dairy Foods were not involved in the Auckland ambient DC consolidation process because their products were supplied through the chilled DCs.

Based on the action research conducted during the Auckland ambient DC consolidation, it appears that adopting a win-win attitude is key to the success of the relationship for both parties. Having a shared vision alone, such as Heinz-Wattie and Progressive, does not result in the same level of benefits as adopting a win-win in conjunction with the shared vision.

6.9.3   Timing of the win-win attitude

The third critical question of the justification plan considers whether the win-win attitude must be agreed and established prior to the commencement of the Nurture stage or whether it can be developed over time, in conjunction with the confidentiality, respect, openness and trust and integrity factors.

Based on the findings in the previous section adopting a win-win attitude is key to maximising the success of VMI and supply chain relationships. As long as the shared vision has an objective of realising benefits for both organisations, the win-win attitude, discussed in the previous section, is a supporting factor to the relationship and should therefore be included with the other supporting factors in the Nurture stage of the Organisation-level framework. The stronger the win-win attitude adopted the greater the benefits realised.

Positioning the win-win attitude in the Nurture stage of the framework, rather than the Develop stage, reflects the supporting nature of this factor, which should already be included, to some extent, in the shared vision. The position of the win-win attitude in the Nurture stage is supported by the Heinz-Wattie VMI

relationship with Progressive, which shares a win-win attitude but has not leveraged and developed this factor to the same extent as Goodman Fielder.

6.9.4 Completeness of Stage 3 factors

The fourth critical question seeks to determine whether all the factors identified in Stage 3 are actually critical or whether some of the factors are subsets of others and can therefore be eliminated from the framework. This section considers each of the Nurture factors, particularly in relation to their role in the Auckland ambient DC consolidation.

Applying and justifying the Nurture factors during the Auckland ambient DC consolidation case study reinforced the importance of these factors to the researcher. The action research process of intend/plan, act, review, intend/plan, act, and review ... helped the researcher realise the critical importance of these factors in the Goodman Fielder VMI relationship with Progressive. Everyday actions taken by the researcher were reflected upon in light of these factors. The importance of investing time and energy into further developing the relationship, particularly in relation to confidentiality, respect, openness and trust and integrity strengthened the relationship.

The researcher often applied the confidentiality factor particularly when people from the Progressive team were discussing other suppliers. During the Auckland ambient DC consolidation, daily conversations between the Buyers often involved discussion about out of stock situations, product deletions and new products from other suppliers. The researcher applied a high standard of confidentiality, choosing not to participate in these conversations, and did not relay any of these conversations to other people at Goodman Fielder, except where the information was publicly available. Similarly, when the researcher notified Progressive of potential supply issues, product deletions, promotional activities and new product launches this information was kept confidential and not communicated to other suppliers. These examples indicate how the confidentiality factor is critical to the relationship. If either party considers that confidentiality is being breached the relationship will not be as open or effective.

Trust and integrity is another key factor in the VMI relationship at the Organisation-level. If the VMI person does not have a high standard of integrity and is not trustworthy the relationship will not work. From Progressive's perspective, they would not have been willing to invest resources in a relationship where sensitive information about their organisation was shared with competitors or where the VMI person dishonestly used information on other suppliers to gain competitive advantage for their organisation. The trust and integrity relationship strengthened during the Auckland DC consolidation project when confidential information was communicated amongst the Buyers during their daily project update meetings. Any breach of trust would have resulted in the immediate removal of the VMI person and could have potentially terminated the whole VMI relationship.

Openness was another key factor in the success of the VMI relationship and is closely related to the win-win attitude. During the Auckland ambient DC consolidation project Progressive were open in their communication to the VMI people. They discussed problems being encountered and sought to work together to resolve them. Similarly, Goodman Fielder was open in their communication to Progressive about out of stock situations, pending deletions and initial difficulties in achieving 7-day deliveries. By adopting an open relationship, both organisations were able to maximise their flexibility and work together to resolve issues. Although openness is closely related to the win-win attitude factor it is not a subset. Both Heinz-Wattie and Goodman Fielder had open relationships with Progressive; however the extent of the benefits realised from the adopting the win-win attitude differed. The openness factor is more concerned with two-way relationships and frank and regular discussions regarding potential supply and distribution difficulties along with potential supply chain changes.

Respect for each other was another key factor identified during the South Island DC consolidation. The importance of this factor was emphasised during the Auckland DC consolidation particularly when Goodman Fielder and Progressive recognised different priorities but respected each other's perspective. For example, when the Bluebird products were relocated to the Progressive DC, Progressive immediately demanded 7-day deliveries. Historically, Bluebird had

only supplied product into the Progressive DC Monday to Saturday. Arranging resources and transportation for Sunday deliveries was not feasible with only a couple of days notice. By leveraging their VMI relationship, Goodman Fielder and Progressive were able to mutually agree to move towards 7-day deliveries, but over a longer time frame that enabled Goodman Fielder to source the necessary labour and transport resources at a reasonable cost. The result was a 2-week delay in moving to 7-day deliveries. Because Progressive knew that Goodman Fielder were pro-actively working on 7-day deliveries and respected their situation and investment in VMI, they were less demanding than they were for other suppliers.

Based on the action research conducted during the Auckland ambient DC consolidation case study it appears that all of the factors identified in the first-cut Organisation-level framework are required. None of the factors appear to be subsets of others. Each factor is required to some extent, to enable the whole VMI relationship to achieve its vision.

6.9.5 Completeness of the framework

The final critical question aims to determine whether the list of 7 critical success factors identified during the South Island DC consolidation project is complete. It challenges the researcher to consider other factors influencing the success of the supply chain relationship at the Organisation-level.

This question is answered by triangulating the factors identified in the first-cut framework with five other research findings which were selected because of their focus on identifying key determinants of successful strategic alliances and partnerships. This triangulation process incorporates stage 6 of SSM described in section 4.3.3.

According to Applegate (2001), a well-designed and controlled strategic alliance planning process contains four phases: concept, analytic, development and pre-operation. The concept phase includes assessing strategic and technical fit.

Strategic and technical fit considers whether the business concept and strategy provides a choice among potential partners. "Companies should look for value as

a leader and not get drawn into a deal with the first potential partner who has an idea for the market that matches the company's current interest" (Applegate, 2001, p.45). This concept is covered by the relative importance factor in the Organisation-level framework which considers factors such as size, complexity, product range and product shelf life factors when determining which organisations should form VMI relationships. In conjunction with assessing the relative importance factor, the VMI and supply chain relationship vision should be discussed and agreed between the organisations to ensure there is a consistent, compatible and aligned supply chain strategy. For example, in the action research case study, both Goodman Fielder and Progressive were focused on improving their supply chain operations through increased customer service levels and reduced inventory. Both organisations were willing to work together to achieve the common goals.

The researcher found that the technical fit concept discussed by Applegate (2001) lacks support as a critical factor in VMI and strategic supply chain relationships. The main reason for this is that suppliers and retailers in the food industry do not rely on each other's technical know-how to the same extent as other industries and strategic alliances. This is evidenced by initiatives such as EDI, which have not been adopted globally, even though they have been found to improve supply chain efficiencies. Rather, organisations can achieve supply chain efficiencies through business process re-engineering and CRP practices without EDI (Clark and Hammond 1997).

Brouthers, Brouthers and Wilkinson (1995) developed the 'Four C's' model for successful international strategic alliances. The four C's are

- Compatible goals
- Co-operative cultures
- Complementary skills
- Commensurate risk

The compatible goals factor is equivalent to the term shared vision used in the first-cut framework and reflects the need for partners to work towards a common goal. The co-operative cultures factor is aligned, to some extent, with the win-win attitude factor in the first-cut framework where partners are required to work together. The first-cut framework indicates a lack of support for a specific complementary skills factor because, unlike an international strategic alliance which may be formed between unrelated organisations, VMI and strategic supply chain relationships bring together organisations already working together in a supply chain. These organisations already have complementary skills (manufacturing and retailing). The objective of a supply chain relationship is to strengthen and leverage existing skills, processes and systems rather than enter into a new market segment. The commensurate risk factor states that each party should assume risk in proportion to the resources they commit. This is supported by the win-win attitude of the first-cut framework where the organisations agree to work together and implement changes, hopefully for the benefit of one or more parties.

According to Hill and Jones (1998) the success of strategic alliances is a function of:

- Partner selection
- Alliance structure
- Management of the alliance

A good strategic partner helps the organisation achieve its strategic goals, shares the organisations vision for the purpose of the alliance and is unlikely to exploit the alliance opportunistically. These factors are supported by this research through the shared vision and win-win attitude factors. The first-cut framework does not explicitly address the threat of exploiting the alliance opportunistically. VMI relationships in the food industry are established between organisations with shared goals, such as improving the supply chain, and complementary skills, such as retailing and manufacturing. The researcher judged the risk of one organisation exploiting the alliance opportunistically as low given that the majority of supply chain initiatives adopted by one organisation also benefit the other organisation.

The main way an organisation could exploit the relationship for their exclusive benefit would be through breaches of trust or confidentiality. For example, if Goodman Fielder used access to the Progressive systems to obtain confidential information on competitors this could potentially benefit Goodman Fielder and not Progressive; however obtaining this information would require a breach of the confidentiality, trust and integrity factors included in the first-cut framework.

According to Hill and Jones (1998), 'walling off' critical technology, establishing contractual safeguards, agreeing to swap valuable skills and technologies and seeking credible commitments should be adopted by the strategic alliance to reduce the probability of opportunism by the alliance partner. The action research case studies between Goodman Fielder and Progressive do not show support for the relationship structure to address these factors. VMI and strategic supply chain relationships are between complementary organisations in a value chain and are, therefore, established to improve supply chain activities rather than to develop new products, technology and skills or to enter new markets. As a result, VMI and strategic supply chain relationships do not appear to require the same structural safeguards as a strategic alliance relationship. This highlights a key difference between the nature of supply chain relationships and strategic alliances.

Hill and Jones (1998) found that managing an alliance successfully means building interpersonal relationships among managers from both organisations, managing cultural differences and learning from partners. The first-cut Organisation-level framework shows support for these points through the shared vision and openness factors. The process of developing a shared vision encourages managers from both organisations to establish and build interpersonal relationships. The openness factor requires regular and open communication between all levels of the VMI and supply chain relationship. Managing cultural differences was not identified as a key success factor in the Goodman Fielder and Progressive action research case study; rather, it was found that as long as both organisations had a shared vision, supported by a win-win attitude, confidentiality, trust and integrity then the VMI and supply chain relationship was successful. While this worked for Goodman Fielder and Progressive it may not be

applicable for all organisations in the New Zealand food industry and is a potential gap in the first-cut framework.

Mentzer et al. (2000) researched the nature of **inter-firm partnering** in supply chain management. Their research identified the following partnering antecedents as key factors influencing the partnership:

- Interdependence
- Conflict
- Trust
- Commitment
- Organisational compatibility
- Top management vision

The interdependence antecedent is addressed by the relative importance factor in the first-cut Organisation-level framework. The more interdependent an organisation is on another organisation, the more important they must be to each other. The trust and top management vision antecedents are directly covered in the first-cut Organisation-level framework. Commitment is covered in the following Management-level framework section in the 'obtain management buy-in' factor. The conflict and organisational compatibility factors are not directly covered by the first-cut framework and should be considered in the final Organisation-level framework. These are discussed in further detail below.

Handfield and Nichols (2002) outline the steps needed to create trust and collaboration in the supply chain. They describe four steps:

- Alliance conceptualisation
- Alliance pursuit
- Alliance selection
- Alliance implementation

The need to develop a supply chain alliance is usually driven by the expectation of performance improvements in response to environmental changes such as new competitors, industry consolidation and major technology changes. These factors are addressed by this research in the Industry-level framework.

During alliance pursuit, initiating firms clarify and define their new strategies and then decide to pursue an alliance. Schmitz, Frankel and Frayer (as cited in Handfield and Nicols, 2002, p.158) studied ECR alliances and found that the most successful alliances occurred when the relationship was developed around materials, products or services that are strategically important to both partners. This is addressed in the first-cut Organisation-level framework through the relative importance factor. According to Handfield and Nichols, the alliance partners must then align their expectations of potential benefits, timeframes for achieving the benefits and trustworthiness of the other organisation and parties. Alignment is important because it implies that the sets of mutual benefits projected are congruent for both parties. They also identified trust as another important factor in evaluating a potential alliance partner because within the integrated supply chain trust must be developed between not only the alliance, but also between multiple partners located across the supply chain. The shared vision and trust factors in the first-cut Organisation-level framework incorporate Handfield and Nichols' alignment and trust concepts.

Alliance selection requires a commitment, normally in the form of an agreement, between the partners covering criteria for managing the relationship and the processes that will be used to resolve any foreseeable problems. These factors are similar to Mentzer et al.'s (2000) organisational compatibility and conflict concepts which appear as gaps in the first-cut Organisation-level framework. Handfield and Nichols (2002) also explain that, in addition to these agreements on strategic effectiveness, strategic alliance partners should also agree on a number of specific joint operating standards covering procedures, roles and responsibilities, performance measures, information sharing and responsiveness time frames. These factors are partly covered by the shared vision, win-win attitude and openness factors in the Organisation-level framework and partly by

the monitoring factors in the Management-level framework discussed in Chapter 7.

Table 8 below summarises the key factors identified in the first-cut Organisation-level framework and compares them to the other research findings discussed above.

Key factor	First cut org'n-level framework	Applegate (2001)	Brouthers, Brouthers & Wilkinson (1995)	Hill and Jones (1998)	Mentzer, Min and Zacharia (2000)	Handfield and Nichols (2002)
Relative importance	√	√				√
Shared vision	√	√	√	√	√	√
Confidentiality	√			√	√	
Win-win attitude	√		√	√	√	√
Respect	√					
Openness	√			√	√	√
Trust and integrity	√			√		√
Conflict management					√	√
Organisational compatibility		√	√	√	√	√

Table 8: Triangulation of Organisation-level framework

This table indicates that the first-cut framework does not include the factors of organisational compatibility and conflict management which are addressed by the other researchers. In contrast, respect is only identified as a key factor in the first-cut framework.

All four comparisons identified organisational compatibility as a key success factor in strategic alliance relationships. Compatibility was not highlighted in this research mainly due to the strong shared vision and win-win attitude adopted by both Goodman Fielder and Progressive. Because both organisations were focused on a common goal they were able to effectively work together; however a lack of cultural fit can lead to many problems in strategic alliance relationships.

According to Seligman (2001, p.38) "A signed contract is only one half of the battle and most issues at that stage are surmountable. Many alliances fail to instil the risk outlook and continue to operate as individual companies. To fail to change behaviours is to fail to acknowledge that you have created a new enterprise operating in a new market." The VMI relationship between Goodman Fielder and Progressive resulted in both organisations changing their behaviours and becoming more open and trusting in their relationship. Cultural fit was not considered a critical success factor for the Goodman Fielder and Progressive VMI relationship because unlike a strategic alliance, the VMI relationship did not require a significant investment in resources or technology and there was a low level of critical know-how sharing. In contrast, this triangulation section has identified the importance for potential VMI and strategic supply chain relationships to consider cultural fit. Cultural fit encompasses alignment of goals, cost structures, management philosophy, policies and procedures and management capability. Alignment of these factors will assist organisations develop successful supply chain relationships. This supported findings by Gattorna and Walters (1996, p.189) who state "Management of partnerships/alliances is essentially a matter of collaboration if the venture is to succeed."

Conflict management was identified by two of the researchers discussed above. Given the informal nature of the Goodman Fielder and Progressive relationship and their willingness to work together and learn from mistakes, conflict management was not required. This triangulation section highlights the need for conflict management to be incorporated into the Organisation-level framework to provide organisations with formal processes to resolve any conflict that may arise. Various case studies including General Motors and Daewoo (Hill and Jones, 1998) highlight the need for organisations to have an exit process if the strategic relationship does not work out as planned.

In contrast to the conflict and compatibility factors, respect for others was only identified by this research as a key success factor. Upon further reflection and review, the respect factor is actually a subset of the shared vision and win-win attitude factors. In the action research case study, the example of respect given

could be incorporated into the shared vision and win-win attitude of the organisations based on their willingness to work together to share benefits.

In summary, based on the triangulation above, it appears that the final Organisation-level framework should have compatibility and conflict management factors added and the respect factor removed and incorporated into the win-win and shared vision factors.

6.9.6 Summary

The Organisation-level framework has been kept simple with the 7 key factors identified in the first-cut Organisation-level framework. Simplicity was a key consideration in developing the framework to maximise its practicality and workability for the food industry. Changes to the first-cut Organisation-level framework have been debated above in accordance with Stage 6 of SSM through triangulation and the use of additional cycles of action research. Two additional factors (compatibility and conflict management) have been identified for inclusion in the final framework, while one factor, respect for each other, has been identified as a subset of the shared vision and win-win factors.

6.10 Final Organisation-level framework

This section formally presents the final Organisation-level framework based on the first-cut framework, modified by the results from the Auckland ambient DC consolidation case study and triangulation. The framework is presented pictorially, in Figure 20 below, with each factor then defined.
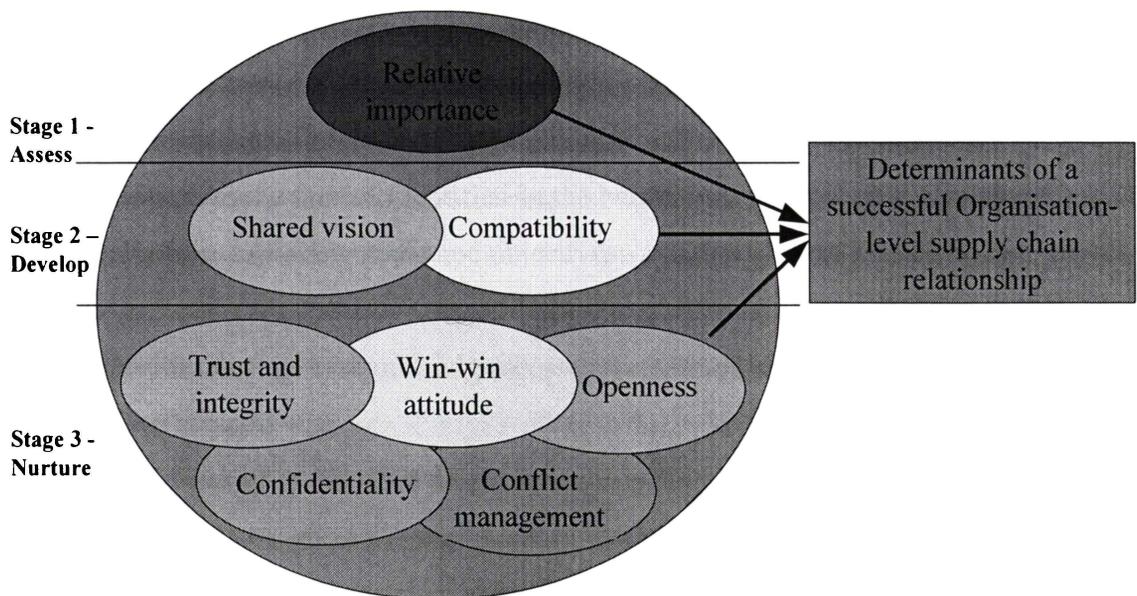
Figure 20: Final Organisation-level Framework

The framework above shows the key factors required at an Organisation-level to develop a successful VMI and strategic supply chain relationship. Without all of these factors, organisations will not be able to achieve the maximum benefit from VMI and strategic supply chain relationships.

Stage 1 (Assess) requires organisations interested in entering a VMI relationship to ask themselves the question "Are the organisations relatively important to each other?" In answering this question organisations should consider the following:

- Size of each organisation in terms of volume and dollars
- Complexity of the organisations in terms of business units and IT platforms
- Product range including number of product categories and number of products within each category
- Nature of the products including shelf life, likelihood of excess aged stock and promotional versus base line sales

The larger, more complex the organisations are, the greater the relative importance. Organisations that are considered relatively important to each other should then proceed to the Develop stage.

Stage 2 (Develop) of the Organisation-level framework requires organisations planning on entering a VMI and supply chain relationship to develop a shared vision and ensure they have compatible organisational cultures. The shared vision should incorporate the factors identified in the Nurture stage. It should also cover some or all of the following goals and objectives:

- Development of systems and processes for both organisations to adopt and move forward with
- Improvement of financial practices between both companies
- Increase customer service levels to at least x%
- Reduce inventory holdings by at least x% or $x
- Increase forecast accuracy to at least x%
- Maintain sales values of at least $x

In order to maximise the benefits of the VMI relationship the shared vision should be agreed upon by Senior Management from both organisations. Without top down support for the relationship, there is unlikely to be sufficient investment in time and resources to fully leverage the benefits from the relationship.

The compatibility factor requires management to look at cultural and strategic fit of the organisations. This includes consideration of management styles, corporate cultures, polices and procedures, long-term strategies and technological capabilities.

Stage 3 (Nurture) requires both organisations to establish and continuously build upon the founding factors of adopting a win-win attitude, maintaining confidentiality, building trust and integrity, communicating openly and developing conflict management procedures. These factors are mutually dependent. A breach in any of these factors is likely to change the relationship, potentially resulting in termination of whole the VMI relationship. These factors should not be taken for granted rather, they should be continuously developed and strengthened to maximise the outcomes of the VMI relationship.

In order to establish and maintain these factors the following should be considered at the time the VMI relationship is established:

- Developing a code of ethics between the organisations
- Signing a confidentiality agreement
- Documenting agreed goals and objectives
- Establishing formal communication channels and regular meetings
- Selecting the appropriate VMI resource
- Reporting achievements and progress against the agreed goals and objectives
- Documenting conflict resolution processes

6.11 Answers to Organisation-level secondary research questions

This section answers the Organisation-level secondary research questions identified in the literature review and summarised in section 3.4. Each question is restated and then answered.

6.11.1 Secondary research question #2

What types of retailer-vendor relationships are most appropriate for the New Zealand food industry?

The Organisation-level framework does not specify exactly what retailer-vendor relationship should be used. Instead, the Organisation-level framework starts by asking "Is the other organisation relatively important to us?" Any organisation intending on entering a VMI and supply chain relationship should answer this question positively before proceeding with developing a supply chain relationship and establishing a shared vision. The process of developing a shared vision and setting long-term goals and objectives will clarify the nature of the relationship required for the VMI and strategic supply chain relationship going forward.

As Mentzer et al. (2000) noted organisations which are relatively important to each other are more likely to develop a strategic or operational relationship rather than a transactional relationship because of their willingness to invest time and

resources in the relationship. This willingness arises from the perceived benefits of establishing and maintaining the relationship, outweighing the associated costs.

6.11.2 Secondary research question #4

Are the research findings from a UK food industry strategic partnership applicable to the New Zealand food industry?

This question investigates whether findings from the UK food industry are applicable to the New Zealand food industry. Siemienuich, et al. (1999) researched partnering arrangements in the UK FMCG industry using a case study between a large retailer and manufacturer. The findings from this case study included:

- The need for both suppliers and retailers to develop a corporate strategy policy encompassing all business operations, particularly supply chain, finance and marketing

- The need to clearly communicate the corporate strategy policy to all employees, along with implementation guidelines and the required skills for each position

- The potential to establish a cross-functional 'strategic supply chain management group' to further develop the policy and strategy

- The need to recognise both informal and formal working practice and the importance of personal relationships at all levels of the organisations

- The need to develop an IT policy that is consistent with the overall strategy towards customer-supplier relationships

These findings suggest that supply chain relationships should be based on a formal corporate strategy policy with well documented implementation guidelines, a formal cross-functional working group to manage the relationship going forward and an IT policy consistent with the overall supply chain relationship strategy. At the same time, the research also recognised the importance of informal working and personal relationships.

These findings do not appear to be necessary for the success of VMI relationships in New Zealand which tend to be more informal and evolve over time, as evidenced by the Goodman Fielder and Progressive relationship. Both Goodman Fielder and Progressive shared a common vision and adopted a win-win attitude; however this was not formalised and incorporated into corporate strategy policies. Senior management buy-in to the process, supported by a number of 'quick wins' in the specific product categories reinforced the benefits of the VMI relationship. The relationship has continued to evolve with both organisations becoming more open and willing to try new initiatives in the hope that additional benefits will be realised.

Therefore, while the UK findings are not directly applicable to the success of VMI relationships in New Zealand, the underlying theme of the findings support the Organisation-level framework factors of shared vision, win-win attitude, openness, and the Management-level framework factor of management-buy in.

6.11.3 Secondary research question #12
Can findings from the US grocery industry be applied to the New Zealand food industry?

Clark and Hammond (1997) researched the relationship between business process re-engineering and EDI in the US grocery industry. They found "Differences in environment were significant factors influencing retailer performance. Companies outside the US may have significant differences in these external factors that would limit the use of this approach" (p.263). They gave examples of long lead times for imported products and high costs of real estate as potential factors influencing the benefits of CRP and EDI initiatives.

The New Zealand food industry is the focus of this research. The Organisation-level action research highlighted a number of benefits for both Goodman Fielder and Progressive because of their VMI relationship during the DC consolidations. These included improved customer service levels, reduced freight costs, minimal excess inventory and a stronger working relationship. Clark and Hammond (1997) also identified the benefits of improved customer service and lower

inventory levels in their research. While the New Zealand food industry has potentially unique characteristics, as discussed in section 5.5.3, the benefits of VMI are consistent with the US.

In summary, although external environmental factors such as lead times on imported products and real estate costs vary between New Zealand and the US, this research as found that the benefits of VMI, CRP and EDI are similar in both countries.

6.11.4 Secondary research question #13
What process is required to develop supply chain partnerships?

The Organisation-level framework presented in section 6.10 identifies 8 key factors for successful VMI and strategic supply chain relationships at an Organisation-level. These factors are presented in three stages. These stages describe the process organisations should follow to develop and maintain successful Organisation-level VMI and supply chain relationships.

6.11.5 Secondary research question #14
What factors are unique to food industry supply chain partnerships?

The Organisation-level framework identifies the key determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry and does not identify factors unique to these types of relationships. While this framework has been developed and justified using a New Zealand food industry case study it has yet to be applied in other industries and countries.

Further research is required to confirm whether the factors identified as potentially unique to the food industry and New Zealand in section 5.5, are also unique to food industry supply chain partnerships throughout the developed world.

6.12 Chapter summary

In summary, this phase of the action research, conducted during the Progressive DC consolidations, has resulted in the development of an Organisation-level framework which identifies 8 key elements for successful VMI and supply chain relationships at an Organisation-level. It has also highlighted how action research cycles of intend/plan, act and review can be adopted by organisations to understand why certain things occur and to improve supply chain practices. Finally, international research findings in relation to the key components of successful inter-firm supply chain relationships have been confirmed in a New Zealand context, albeit at a more informal level. The next chapter builds on the Organisation-level framework by identifying key factors for successful Management-level VMI and strategic supply chain relationships.

Chapter 7   Developing a Management-level framework

7.1   Introduction

In December 2001, when the Goodman Fielder and Progressive VMI project commenced, a key focus area was the flour category. This chapter uses action research to understand how Goodman Fielder and Progressive worked together on the flour category, to develop a Management-level framework which identifies the key determinants of successful VMI and supply chain relationships in the New Zealand food industry.

In this chapter, as in Chapter 6, initial scene setting is followed by presentation of action research findings from which a first-cut framework is developed. A justification plan is then outlined and the findings from the justification plan described. From this, a final, revised framework is presented and the key factors explained. Finally the relevant secondary research questions are addressed.

7.2   The Goodman Fielder and Progressive VMI arrangement

During the latter part of 2001 Goodman Fielder had very low customer service levels to Progressive, particularly in the flour category. The situation had deteriorated to the extent that Progressive was unable to purchase sufficient flour stock to cover promotional activities, resulting in no flour on supermarket shelves during promotions. During this time, Goodman Fielder had focused on improving forecasting accuracy and had increased safety stock levels for the flour category; however these initiatives had very little impact on overall flour customer service levels to Progressive.

The extent of these problems resulted in Goodman Fielder and Progressive Senior Management agreeing to establish a VMI project role in December 2001 for a trial period of 6 months with a possible extension for an additional 6 months if significant benefits could be demonstrated. The key focus of the role was to fulfil the purpose of improving the working relationship between Progressive and Goodman Fielder by addressing customer service, promotional processes and VMI.

An introductory meeting was held between Goodman Fielder and Progressive at the end of November 2001. Attendance by Senior Management from both Goodman Fielder and Progressive showed both organisations commitment to the project. The Position Scope document was discussed and agreed by both parties with a project commencement date of 1 December 2001.

The goals agreed between Goodman Fielder and Progressive were:

- Improve Goodman Fielder's understanding of Progressive's business
- Improve customer service with Progressive
- Reduce number of out of stocks and improve planning
- Improve invoice accuracy and resolve any outstanding disputes
- Look for opportunities to improve financial practices between both companies
- Establish processes and systems for both companies to adopt and move forward with, linking into demand management

The VMI project role was not a 'true' VMI role in the accordance with the definition of VMI (refer to the Glossary) because the responsibility for placing orders remained with Progressive and did not transfer to Goodman Fielder. For the purposes of this research, the term 'VMI' has been used to refer to the Goodman Fielder VMI project role because, except for physically placing orders, all other aspects of the role are in line with the definition of VMI. The VMI person obtained access to Progressive inventory levels, dispatch volumes and store sales volumes. As the Goodman Fielder VMI Project Manager, the researcher was able to influence the orders placed and regularly worked with the Progressive Buyers to determine the quantities to be ordered.

7.3 How Goodman Fielder and Progressive worked together

7.3.1 Documenting Goodman Fielder and Progressive processes

The first stage of the VMI project role involved documenting processes by interviewing people at both Goodman Fielder and Progressive. The processes were documented from each person's perspective and then a consolidated process prepared for each organisation, using generalisations across product categories where necessary. During the documentation process a number of process control weaknesses and breakdowns were identified. These were collated for further discussion and action.

The key findings from a Progressive perspective were that although the Category Managers prepared a forecast for the Buyers to purchase to, the forecast was often too late, inaccurate and did not always reflect late changes to the promotional program, advertising and price points. In addition, some Category Managers made the assumption that the supplier could always supply and therefore did not communicate late changes to the promotional program, advertising and price points to the supplier to enable them to adjust production volumes accordingly. Furthermore, there was no forecast versus actual reporting in place to provide feedback to the Category Managers on their forecast accuracy. Another weakness identified was untimely communication of deleted items resulting in the Buyers continuing to place orders for products which suppliers had discontinued manufacturing.

From a Goodman Fielder perspective, the key findings were that there was no clear link between the promotional program and the monthly sales forecast volumes. As a result, if one customer significantly exceeded forecast sales then all customers could be short delivered even though their orders were in line with forecasted volumes. Another weakness identified was lack of reporting on short dated stock arising from over-forecasting for a number of months and lack of visibility of aged stock in the various IT systems. Consequently, even though the computer system showed stock on hand, the stock could not be delivered to customers because it was short dated or had expired. The end result was that fresh stock was not produced because the system was still showing stock on hand, and

customers were short delivered because there was no fresh stock available and the only stock on hand was close to, or past, its expiry date.

Based on discussions with Senior Management from both Goodman Fielder and Progressive, in relation to the findings above, a number of key focus areas were agreed. The key focus areas were to develop a 12-month rolling promotional forecast, ensure product status data was correct, review and resolve daily out of stock issues and review the back to school promotional forecasts. The researcher, in conjunction with Progressive, worked through each focus area and developed action plans to improve and implement new processes and procedures.

The process described above incorporates stages 1 and 2 of SSM described in section 4.3.3. By documenting the processes at both organisations the researcher was able to develop an understanding of the problem and identify the issues to be investigated. Interviews were conducted with multiple people in both organisations to develop an understanding of the situation from multiple perspectives. This enabled the researcher to avoid imposing a particular structure on the situation.

7.3.2   Solving the flour category problems at Progressive

This section discusses the action research conducted on the flour category at Progressive.

The second stage of the VMI project role, following documentation of the systems and processes, involved both organisations working closely on the flour category to address the poor customer service levels for the category. From a Progressive perspective, Goodman Fielder consistently under supplied housebrand flour, particularly during promotions and often under supplied Goodman Fielder branded products. The situation had deteriorated to the extent that supermarket shelves were often empty during promotions resulting in lost revenue to both Progressive and Goodman Fielder. (Refer to Appendix 11 for background on the flour category).

In December 2001, when the VMI project commenced the key issue facing both Goodman Fielder and Progressive was the poor customer service levels for the flour category. The key steps taken by the researcher were:

- Understand and document the flour forecasting and purchasing process
- Identify weaknesses
- Develop and implement recommendations and solutions
- Track and review outcomes
- Further improve and enhance processes

The first stage involved understanding and documenting the flour forecasting and purchasing processes through discussions with the Progressive Category Manager, the Progressive Buyer and the Goodman Fielder Key Account Manager. During this stage several key weaknesses were identified.

Firstly, the Progressive Category Manager forecasts were often inaccurate. The Category Manager did not have any incentive to spend time ensuring the forecast was accurate and therefore used to come up with generic forecasts for each product, regardless of the type of promotion and price point. For example, forecasts were submitted with 1000, 1000, and 1000 for each variant rather than pro-rated across variants based on history.

Secondly, the forecasted volumes were accepted by the Buyer with no questioning or challenging as to their reasonableness, and keyed directly into the PROMIS system as additional demand (PROMIS is the Progressive inventory management and purchasing system). Approximately 70 – 80% of the forecasted volumes were purchased the week prior to the promotion based on the demand in PROMIS. When the Buyers placed the purchase order they did not question the validity of the volumes suggested and simply placed an order.

Thirdly, when the Goodman Fielder customer services team received the orders they did not question the volumes. They accepted the order and keyed them into SAP (the Goodman Fielder sales and manufacturing system). The volumes were

then dispatched to Progressive as long as sufficient stock was available. There was no communication of short deliveries to Progressive to enable them to re-order later.

The process of identifying these 3 weaknesses as root causes of the flour problem demonstrate how part of stage three of SSM was applied in this action research. Refer to Appendix 12 for a CATWOE of the flour situation which defines the customers, actors and owners of the system along with the transformation process and environmental constraints.

During the promotion, stores would order product from the Progressive DCs as required. At the end of the promotion, Progressive would often have no stock left because the forecast was too low or would have high stock levels remaining because the forecast was too high. Because flour baseline volumes are low relative to promotional volumes any excess stock remaining after a promotion took a long time to sell through. It was very rare for the final stock on hand to be representative of 2 – 3 weeks baseline sales.

While the problems described above caused problems in the supply chain, another more serious distortion also occurred. This phenomenon is known as the bullwhip effect (Lee et al., 1997). From a Goodman Fielder perspective sales during the promotion were, for example, 1000, 1000, and 1000. Using this historical data to forecast future demand they forecasted 1000, 1000, 1000 for the next similar promotion.

If there had been out of stocks during the promotion the future forecast was too low and resulted in out of stocks during the following promotion. If the volumes purchased by Progressive had not been dispatched to stores then, even though, actual sales from a Goodman Fielder perspective were 1000, 1000, 1000, actual Progressive DC dispatches to stores may have only been 100, 100, 100. Goodman Fielder would then forecast 1000, 1000, 1000 for the next similar promotion; however Progressive would not purchase any stock because they still had 900, 900, 900 remaining in stock. The impact of this was that Goodman Fielder had 1000, 1000, 1000 of product which could not be sold and Progressive have 900,

900, 900 of product which they still had to sell. The combined impact of this was to have excessive pipeline stock of 1900, 1900, and 1900. For housebrand stock in particular, where Progressive was the only customer, the excess stock eventually resulted short dated and expired stock.

It took the researcher a few weeks to understand the full implications of the above scenario. In order to explain this concept easily to the Progressive Category Managers and Buyers and the Goodman Fielder Key Account Manager a series of graphs were prepared which showed Goodman Fielder sales to the Progressive DC (vertical bars), relative to the Progressive DC dispatches to stores (horizontal line). Examples of the graphs are shown in Figure 21 below. (Note: quantity refers to the number of selling units (bags/cases)).

Champion self raising 1.5kg

Champion highgrade 5kg
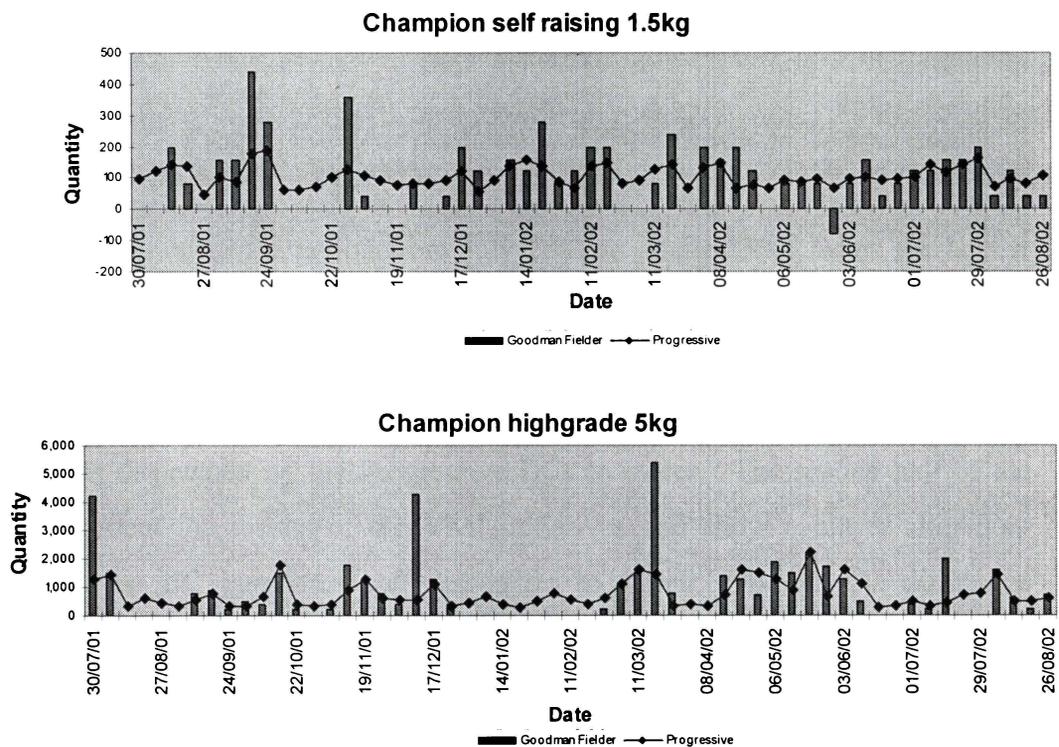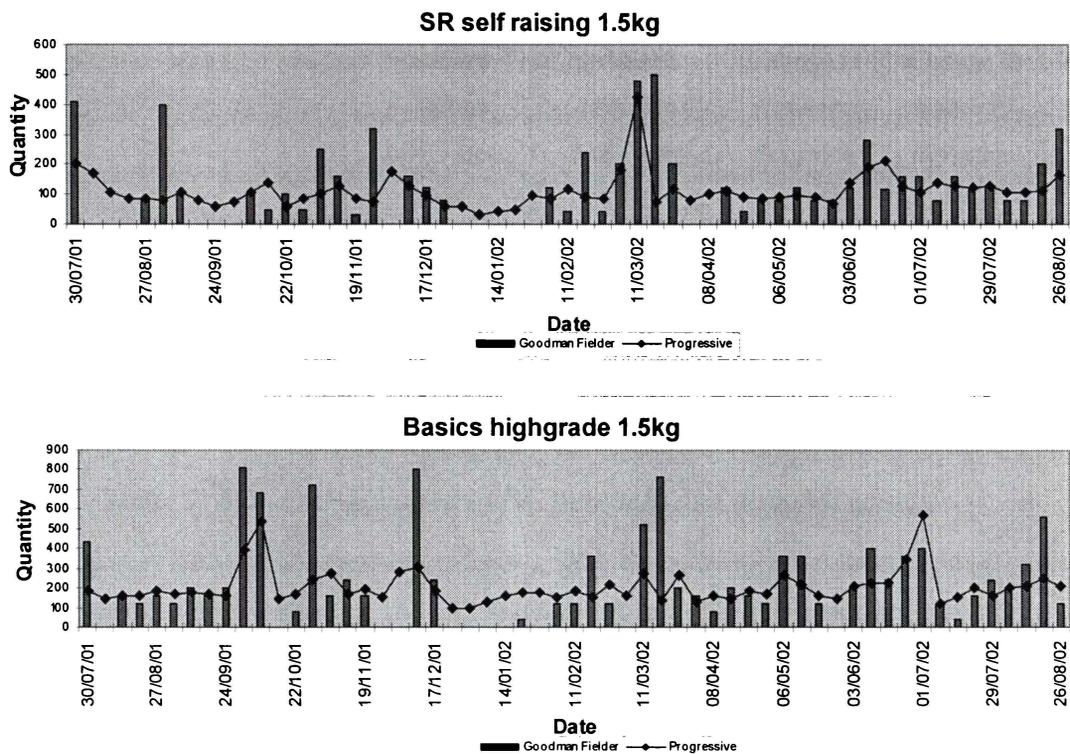
Figure 21: Progressive flour purchase and dispatch volume comparisons

These graphs cover the period from July 2001 to August 2002 when the largest impact of the VMI Project can be seen. The first half of the graphs are prior to the VMI project and show large gaps between the quantities sold (selling units) by Goodman Fielder/purchased by the Progressive North Island DC and the quantities dispatched by the Progressive DCs to stores. The second half of the graphs reflect the results of the VMI initiatives and show a closer alignment between the DC purchases and dispatches to stores. Overall the difference between the DC purchases and dispatches for the total flour category fell from an average of 1,585 units per week in the period July to December 2001 to an average of 305 units per week in the period January to August 2002. This represents an 81% drop in the average weekly difference between DC flour purchases and dispatches. The improvement has been maintained at a similar level since August 2002.

This can be further demonstrated by the lower standard deviation of purchase less dispatch volume differences as shown in Table 9 below, meaning less volatility.

	Standard deviation July – Dec 2001	Standard deviation Jan - Aug 2002	Change in standard deviation (volume)	Change in standard deviation (%)
Champion self raising 1.5kg	106	66	-40	-38%
Champion highgrade 5kg	998	576	-422	-42%
SR self raising 1.5kg	126	98	-28	-22%
Basics highgrade 1.5kg	205	172	-33	-16%

Table 9: Standard deviation of DC purchase and dispatch volumes

The examples above show a 16 – 42% decrease in volatility (standard deviation) between DC purchases and dispatches. These graphs illustrate how Goodman Fielder's ability to see stock on hand levels at Progressive to eliminate the bullwhip effect was a key benefit of VMI. Traditionally, once a supplier sells stock to a customer there is no longer any visibility of stock on hand levels. Suppliers have to assume that stock sold to suppliers is also sold to consumers and that total stock levels in the supply chain are constant. The concept of VMI allows suppliers to manage their customer's stock levels. The benefits gained from not only being able to track stock on hand levels at the customer, but also track customer sales/DC dispatches, enables suppliers to better manage their own forecasts, stock levels and production schedules.

When the researcher presented these graphs to Progressive Senior Management in January 2002, everyone was surprised at the large gaps between the Progressive DC purchases and dispatches. Progressive Senior Management began to appreciate that the flour out of stocks were not due solely to Goodman Fielder being unable to supply the volumes ordered, but were also due to the erratic purchasing patterns by Progressive. Once Progressive Senior Management understood the problem they were fully supportive of the VMI initiatives to close the gaps. Two key priorities were agreed: (1) to improve promotional forecasting and (2) to improve buying patterns. These priorities were addressed through further action research cycles.

In conjunction with improving the forecast accuracy, the researcher also worked with the Buyers to improve their purchasing patterns. Historically because the Buyers had been unable to rely on Goodman Fielder to supply the product, they were unwilling to take the risk that Goodman Fielder could supply at short notice during the promotional period. To overcome this barrier Goodman Fielder first had to prove that they could supply flour at short notice. This took several months to resolve due to internal process changes required at Goodman Fielder.

The researcher worked closely with the Progressive Inventory Manager to change the buying habits. To help the Buyers change their flour purchasing patterns several initiatives and guidelines were developed related to the timing of promotional flour purchases. In conjunction with these changes, the Buyers also increased the number of times per week they ordered flour. Rather than ordering flour twice weekly, flour stock levels were reviewed daily and orders placed up to 5 times per week, as necessary. The graphs in Figure 22 below show how the Progressive DC average weeks flour stock holdings for two products have decreased over time (30 December 2002 – 30 June 2003). (Note: stock holding information is not available for periods prior to December 2002 because the researcher did not collect this at the time).
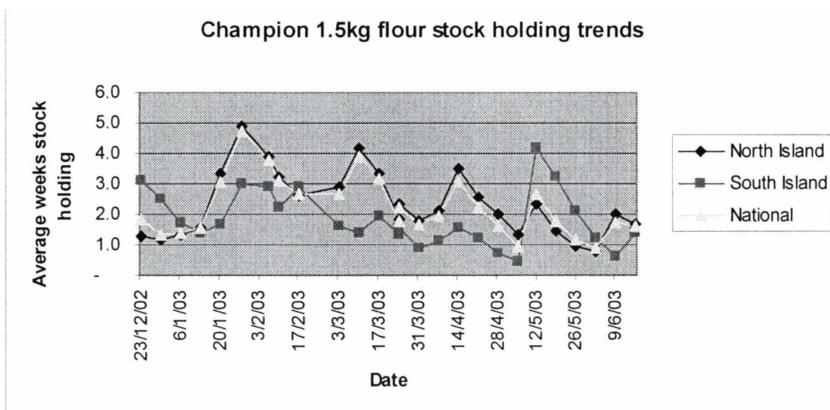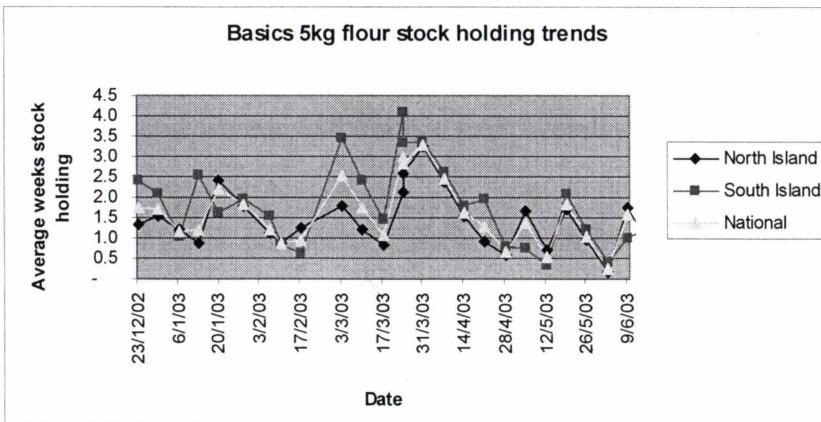
Figure 22: Progressive flour stock holding trends

Not all products had the same reduction in stock holding as the two products shown in Figure 22 above. For example, Elfin 5 kg stock levels were showing a steady decrease until a promotion in March 2003 was over forecast and the Buyers purchased to forecast rather than to the guidelines of 50% of forecast in the week prior to the promotion, 20% early during the promotion week and the final 30% as required. As shown in Figure 23 below the excess stock purchased in March took approximately 6 weeks to sell through, during which time Progressive did not purchase any Elfin 5kg flour from Goodman Fielder.
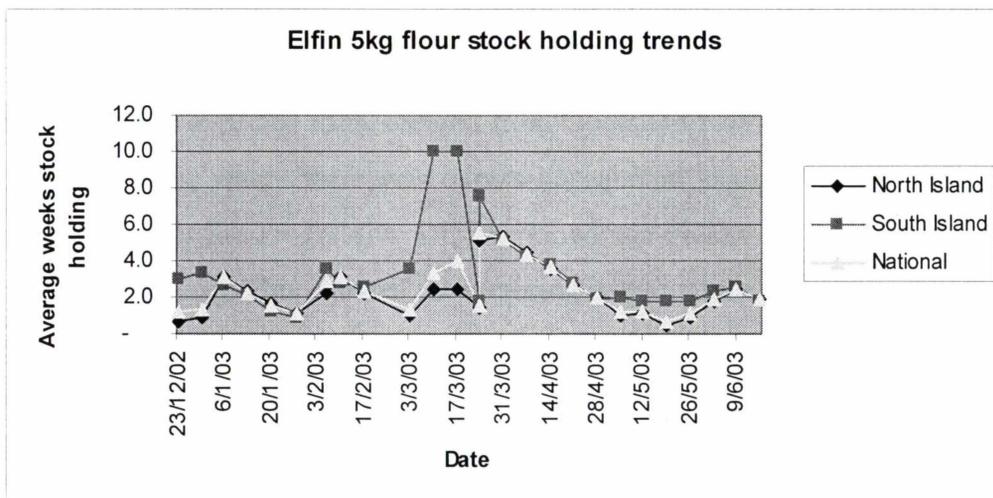
Figure 23: Progressive Elfin 5kg flour stock holding trends

Stock on hand levels continue to be monitored through the weekly flour-tracking sheet. Occasionally, if the forecast is too low, or the Progressive Buyer over orders, inventory levels jump to more than 3 weeks stock on hand; however

generally flour stock levels have stabilised at approximately 1 to 2 weeks stock on hand. By lowering stock levels and the associated holding costs, both Goodman Fielder and Progressive were able to reduce their overall supply chain costs.

From a Goodman Fielder perspective, the reduction in flour stock holdings by Progressive resulted in a flow on effect of a one-off volume drop (Saipe and Geiger, 1996). This volume drop reflects the impact of reducing stock levels throughout the total supply chain. If Goodman Fielder had not taken a one-off volume drop to reflect the de-stocking by Progressive, the excess stock holdings would have shifted from Progressive to Goodman, negating any of the benefits described above.

The third leg in closing the gap between the DC purchases and dispatches to store was improving the communication between Goodman Fielder and Progressive. Several initiatives were implemented to improve the communication including stock on hand reporting, notification of promotional forecasts, communication of late changes to promotional activity and aged housebrand stock reporting.

Progressive stock on hand was reported to Goodman Fielder weekly through the flour tracking update sheets. Commentary and colour coding helped identify those products with more than 3 weeks stock on hand in the Progressive DCs which were not expected to be ordered from Goodman Fielder for several weeks. In several cases, where there was excess housebrand stock with 2 – 3 months stock on hand at the Progressive DC, the Goodman Fielder forecast was deleted until further notice. This allowed the recurring impact of the bullwhip effect to be stopped. Only when the Progressive stock on hand levels dropped to 2 – 3 weeks was the forecast re-established in the Goodman Fielder system.

Promotional forecasts and late changes to promotional activity were also communicated through the weekly flour tracking update sheets. Overall the Goodman Fielder sales volume (units) forecast accuracy improved; however there were still variances each month as shown by Figure 24 below. The majority of sales volume (unit) forecast variances related to late notification of promotional activity. The graphs below cover the period prior to Progressive's acquisition of

Woolworths. After the Woolworths acquisition the information was no longer available from either the Progressive or Goodman Fielder systems on a comparable basis.
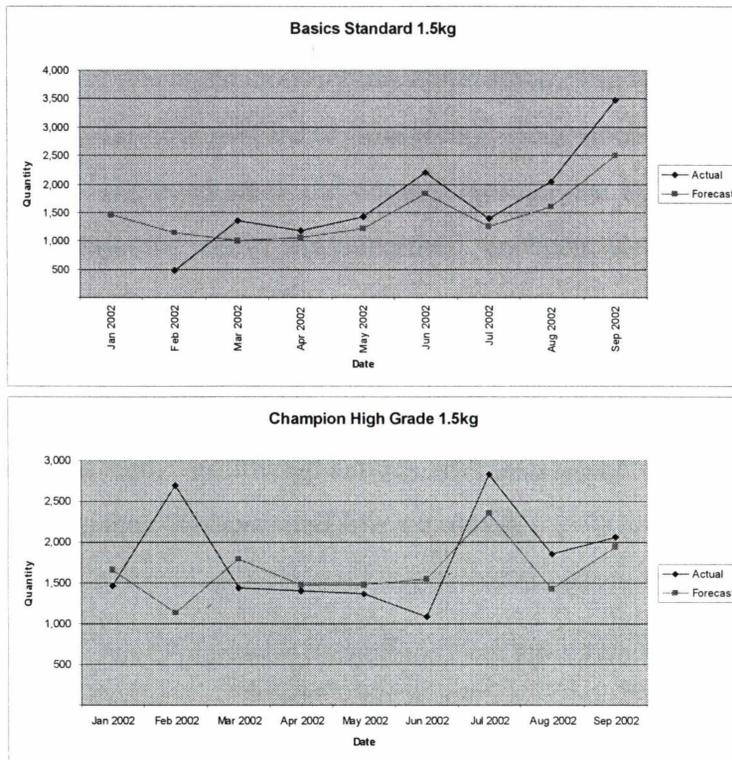
Figure 24: Goodman Fielder flour sales forecast accuracy trends for Progressive

Further improvements in sales forecast accuracy have been achieved by initiating weekly forecast reviews at Goodman Fielder. While the forecasting process is still manual, the weekly reviews enable the forecast to be updated to reflect current Progressive DC inventory levels and late changes to the promotional program. Increased forecast accuracy has enabled both organisations to reduce their inventory holding levels because of greater certainty of future sales demand. Lowering inventory levels helps reduce overall supply chain costs. In order to take the forecasting process to the next level, further investment in technology is required by both Goodman Fielder and Progressive to automate and integrate forecasts.

The researcher also initiated aged stock reporting for all Progressive housebrand stock. Historically, Progressive had only been notified of aged housebrand stock on hand at Goodman Fielder when it expired. Negotiations were then required on

who was responsible for the cost of the product to be disposed of. Aged housebrand stock reporting was a pro-active initiative and showed all housebrand stock on hand with less than 120 days shelf life remaining.

Figure 25 below shows how within 3 months of the aged stock reporting commencing, all of the aged housebrand flour stock had been purchased from Goodman Fielder and how no further housebrand flour stock became aged in the following month. The aged stock did not sell through just because of aged stock reporting. A combined effort was required between Goodman Fielder and Progressive to clear the aged stock through regional and store specific housebrand flour promotions with discounted prices to consumers. Aged housebrand stock continues to be monitored through weekly reporting by the Goodman Fielder Customer Services team. Follow up actions are taken to sell the stock prior to the stock reaching less than 90 days shelf life remaining.
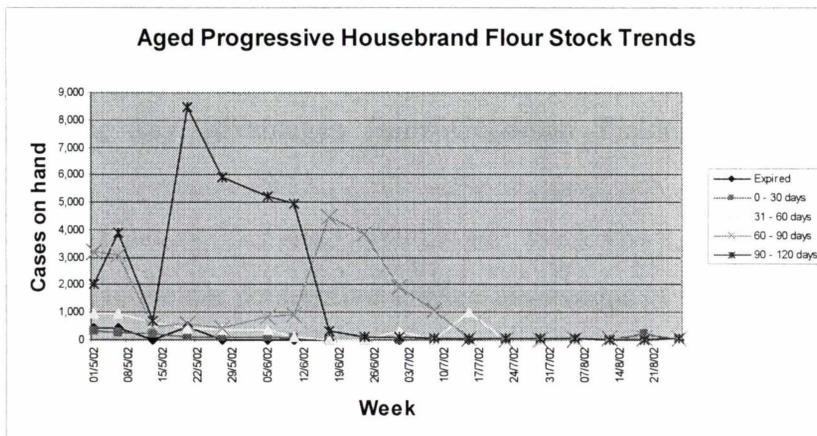
Figure 25: Goodman Fielder aged housebrand flour stock trends

The examples above show how VMI and supply chain activities and relationships can be improved through increased communication. Initially, this communication complicated the system because it was new and the roles and responsibilities of the people receiving the information were unclear (Saipe and Geiger, 1996). For example, the aged housebrand report was generated weekly and circulated via e-mail by the researcher. Follow up actions were required by Distribution, Demand Management and Customer Services to actually eliminate the aged stock. These

actions took place outside of established systems and processes in the short-term until an effective process could be developed and implemented.

Throughout this focus period the flour category showed significant growth. Eighteen months after the start of the VMI flour initiatives the retail flour category was a $21.5m category growing at 2.3% annually. Goodman Fielder branded products had 51.5% market share, housebrand products had 39.6% market share and other brands had the remaining 8.9% market share. Of the total retail flour category Progressive accounted for $7.3m, representing 5.3% annual growth in the flour category, 3.0% above the total category growth of 2.3% (Source: AC Neilson, 15 June 2003). Part of this above average growth in the category can be explained by the VMI project initiatives described above, particularly because of increased customer service levels and reduced out of stocks.

7.3.3 Key advantages of working together at a Management-level

There were a number of key advantages to both Goodman Fielder and Progressive of working together at a Management-level on the flour category. This section summarises the key advantages from Goodman Fielder and Progressive's perspective.

From a Goodman Fielder perspective the key advantages of working closely with Progressive at a Management-level included:

- Developing an understanding Progressives systems and processes (*)
- Obtaining visibility of Progressive DC dispatches to stores and DC stock holdings (*)
- Increasing forecast accuracy, particularly in relation to promotional uplifts and housebrand flour, leading to manufacturing efficiencies due to less late changes to production schedules for non-forecasted promotions and out of stocks (*)
- Reducing flour stock holdings, particularly of housebrand flour, while at the same time increasing customer service levels due to better alignment of

Progressive DC purchasing levels with dispatches to stores and improved forecasting (*)

- Eliminating aged housebrand stock and establishing ongoing aged housebrand stock reporting
- Improving communication on upcoming promotional activities including forecasted volumes, price points and whether the promotion is advertised (*)
- Growing overall flour sales in Progressive annually 3% faster than total market growth (*)
- Enhancing Goodman Fielder's working relationship with Progressive (*)

From a Progressive perspective the key advantages of working closely with Goodman Fielder at a Management-level included:

- Better understanding of the implications of inaccurate and untimely promotional forecasting on the total supply chain (*)
- Increasing flour customer service levels to stores (*)
- Reducing flour inventory holdings across all DCs by 11% in the 9 months following the start of VMI project (*)
- Growing overall flour sales annually 3% faster than total market growth (*)
- Enhancing Progressive's working relationship with Goodman Fielder (*)

(*) Advantages unique to Goodman Fielder and Progressive due to the VMI relationship.

In summary, by working closely with together on the flour category Goodman Fielder and Progressive were able to improve customer service levels through more accurate forecasting and better communication, while at the same time reducing total inventory levels and growing the flour category at above average growth rates. The following section identifies the key findings and insights from the flour category action research.

7.4 Key findings and insights

The flour category VMI action research case study has shown how two organisations working together at a Management-level can achieve advantages over and above normal arms length supplier/customer relationships. This section analyses the key advantages for Goodman Fielder and Progressive of working together on the flour category VMI project in order to identify key findings and insights which can be applied to other product categories and suppliers in the New Zealand food industry.

A number of advantages of working together unique to Goodman Fielder and Progressive were identified in the previous section. Having a VMI person on-site at Progressive on a daily basis, responsible for managing the flour category forecasts, inventory and customer service levels, however, is only the foundation to enabling both organisations realise these benefits. In the researcher's judgment, without understanding each organisations internal processes and information requirements, adopting a continuous improvement attitude, learning from mistakes and being open to change these advantages would not have been realised to the same extent. These attributes are discussed in further detail below and generalised where possible for use in other product categories and organisations in the food industry.

Understanding each organisations internal processes and information requirements is a key advantage in enabling organisations to work together better at a Management-level. By documenting the forecasting, purchasing and supply processes at each organisation, the researcher was able to identify the information requirements of each organisation, along with the process weaknesses and issues. For example the Goodman Fielder forecasting process requires forecasts to be finalised 2 – 3 months in advance. Once Progressive was aware of this information requirement they worked with Goodman Fielder to extend their promotional forecast lead-time from 2 – 3 weeks to 6 – 8 weeks. This then enabled Goodman Fielder to increase their forecast accuracy and improve production efficiencies by reducing late changes to production schedules for non-forecasted promotions. The result was both organisations increased their

customer service levels, reduced safety stock holdings, eliminated aged stock and grew the overall flour category.

This indicates that where organisations understand each other's internal processes and information requirements there are benefits to be gained by both organisations. In the researcher's judgment, other organisations in the food industry could benefit from documenting and understanding each other's internal processes and information requirements.

Adopting a continuous improvement attitude was also critical to the success of the flour category VMI project. Although process weaknesses and issues were identified during the initial process documentation phase, not all of these could be resolved immediately. Short-term temporary solutions were required while medium and long-term solutions were developed. For example, forecasting accuracy and measurement was identified as a key weakness during the process documentation phase. The short-term solution to this was for the researcher and Progressive Category Manager to meet on a weekly basis and agree on forecasts going forward using historical data and assumed price points. While this was effective for the flour category, weekly meetings and manual forecasting is not practical for every product category supplied by every organisation in the food industry. The long-term solution for this is to develop an automated forecasting tool which is communicated to all interested parties, including suppliers and buyers.

Learning from mistakes was another key factor in the success of the flour category VMI project. Because this was the first time in New Zealand that a supplier had worked with a retailer in a VMI role there were no tried and tested processes to follow. Rather, ideas and potential solutions were generated through identification of issues and discussions with people involved in the process. Ideas were often implemented using a 'trial-and-see' approach. Some of the ideas and potential solutions worked successfully the first time they were implemented; others were less successful and required further modifications.

For example, during the flour category VMI project it was agreed that the Buyers would purchase 50% of the forecast in the week prior to the promotion, 20% early during the promotion week and the remaining 30% as required. Although this sounds good in theory, there were several occasions when actual volumes significantly exceeded the forecast. Rather than penalise the Buyers for not purchasing enough, the Category Manager and researcher worked with the Buyers to reduce the out of stocks. Goodman Fielder provided same day deliveries in some situations where they had sufficient stock available and could arrange the necessary transportation. In a couple of situations where no stock was available, the product on promotion was substituted with a similar product from a different brand. Both of these initiatives helped to reduce out of stocks and increase customer service levels.

During their weekly meetings, the researcher and the Progressive Category Manager discussed the previous weeks forecast accuracy to try and improve the forecast going forward. Large over and under forecasts were analysed to identify the causes. Sometimes the cause could be explained by factors such as promotional clashes and seasonal impacts, while other times no logical explanation could be found. The findings from reviewing the forecast accuracy each week were used to improve the forecasting process going forward. Using the forecast results to improve performance going forward formed part of the action research cycle of plan, act and review.

These examples show that by working together, and adopting an attitude of learning from mistakes, organisations in the food industry can realise supply chain benefits. This factor is closely aligned to adopting the 'win-win' attitude described in the Organisation-level framework in section Chapter 5.

Being open to change, willing to try need ideas and adopting suggestions was also important to the success of the flour category VMI project. The flour category VMI project was continuously evolving through initiatives raised by both Goodman Fielder and Progressive. Often a change initiated by one organisation impacted the other organisation so open communication and a willingness to try new ideas was required. For example, originally the Progressive Buyers placed

flour orders twice a week. During the flour category VMI project, the Progressive Buyer suggested moving to daily orders to increase flexibility and further reduce stock holdings while at least maintaining customer service levels. The impact of this suggestion on Goodman Fielder was to increase the number of orders received and correspondingly the number of deliveries required. Rather than dismiss this suggestion because of the additional workload on Goodman Fielder Customer Services and Dispatch, Goodman Fielder agreed to this change in the hope of eliminating the requirement for urgent orders and smoothing volumes and workload. The result of this initiative was as hoped – less urgent orders and smoother volumes.

In the researcher's judgment, being open to change is another factor organisations in the food industry can adopt to improve supply chain relationships. Establishing trial projects for a limited time and reviewing the outcome enables both organisations to participate in initiatives which could potentially benefit both organisations.

7.5   Critical success factors

This section reflects on the key benefits, findings and insights in the previous sections and develops a set of critical success factors required at a Management-level in order to develop a successful VMI and supply chain relationship.

Goodman Fielder and Progressive started working together on the flour category in January 2002 as part of the VMI project initiatives. A number of benefits were realised by both organisations. The following factors were considered critical to the success of the flour category case study and the resulting benefits:

- Senior Management buy-in
- Understanding internal processes
- Understanding information needs
- Identifying gaps
- Tracking dispatches from the DC to stores
- Monitoring DC stock levels

- Agreeing promotional forecasts
- Monitoring aged stock
- Communicating promotions

Senior Management buy-in to the flour category VMI project was critical to the success of the project. Without Senior Management support the project would not have received the same level of investment and focus. The initial stages of the project required a higher level of Senior Management support to ensure that all key players bought into the process. For example, when the weekly flour meetings were initiated, the Progressive Category Manager was often unable to meet the researcher, or had to cut the meetings short, because of other 'priorities' and lack of commitment to the flour category VMI project. As soon as Progressive Senior Management stepped in and attended the weekly meetings, focus within the organisation increased. Senior management buy-in also helped establish a culture of continuous improvement, learning from mistakes and willingness to change.

Understanding the internal processes and information requirements of both organisations was key to identifying the process weaknesses and gaps. The documentation process highlighted process weaknesses in both organisations, some of which could be resolved immediately, while other weaknesses required a medium to long-term solution. Documentation of each organisations systems and processes provided a basis for management discussion and agreement on prioritisation of action plans based on the gaps identified.

Goodman Fielder's access to the Progressive system was critical in minimising the bullwhip effect and being able to better manage supply chain customer service and inventory levels. Tracking the Progressive DC dispatches to stores was important from a Goodman Fielder perspective to enable them to forecast future promotions based on volumes dispatched to stores rather than sales to the DCs. Similarly, monitoring Progressive stock on hand levels on a weekly basis enabled Goodman Fielder to identify potential over stocks at Progressive, particularly housebrand, highlighting the need to reduce the Goodman Fielder sales forecast to reflect the DC overstock.

Communicating upcoming promotions and the forecasted promotional volumes was another critical success factor in the flour category VMI case study. Not only were promotions communicated but the planned promotion price and whether the promotion was advertised were also communicated. Advertising and pricing can have significant impacts on volumes so early communication of these factors helped align Goodman Fielder production volumes and schedules with sales to Progressive.

Another critical success factor in the flour category VMI project was the establishment and communication of aged housebrand stock reporting. Reporting of aged housebrand stock, not only highlighted the extent of aged stock on hand from a Goodman Fielder perspective, it also enabled Progressive to adjust their promotional activity going forward to avoid any aged stock write offs. For example, regular reporting of aged Signature Range wholemeal flour stock on hand with expiry dates enabled Progressive to schedule additional South Island promotions and in-store specials to sell the stock before it expired, thereby preventing the need to dispose of expired stock.

The critical success factors listed above are mutually dependent. Without all of these factors the benefits of the flour category VMI project would not have been realised to the same extent. For example, if Progressive Senior Management did not commit to the flour category VMI project, there would not have been an improvement in the forecasting lead-times or accuracy. Similarly, if both organisations had not been willing to share promotion details, forecasts, sales, stock on hand and aged stock information, then the improvement in customer service levels and reduction in stock would not have been as significant.

Other organisations in the food industry could improve their supply chain by adopting these critical success factors across key product categories.

This section has identified 9 factors critical to the success of the Goodman Fielder and Progressive flour category VMI project. By adopting these key insights and critical success factors food industry VMI and strategic supply chain relationships

could be improved in New Zealand. The following section discusses the key findings from an action research perspective.

7.6 Key findings from an action research perspective

This section evaluates the flour category VMI project in terms of meeting the 15 key characteristics of action research described by Eden and Huxham (1996) and reflects on how action research, particularly critical reflection, has impacted the work of the researcher.

7.6.1 Management-level assessment of action research characteristics

The validity and robustness of the flour category action research is assessed in Table 10 below in relation to Eden and Huxham's fifteen key characteristics. The estimated achievement score is based on the researchers judgement of how well the characteristic was addressed during the research as defined in section 4.4.7. The scores range from 0 to 4, with 4 being the highest level of achievement.

	Characteristic	Method of incorporation into research	Estimated achievement
1	Integral involvement by the researcher with an intent to change the organisation	The researcher was fully involved in the flour category VMI case study. She initiated ideas and implemented recommendations from both a Goodman Fielder and Progressive perspective to maximise the flour category supply chain benefits to both organisations	4
2	Must have implications beyond those required for action or generation of knowledge in the domain of the project	The key findings and critical success factors have implications for product categories and suppliers beyond the domain of the flour category and Goodman Fielder. The findings specific to the flour category will be applied and justified in other product categories. The critical success factors are more generic and once justified, through further cycles of action research will be applicable to other product categories and suppliers.	3

	Characteristic	Method of incorporation into research	Estimated achievement
3	Explicit requirement to elaborate and develop theory	The key purpose of researching the implications of the flour category was to develop theory on the benefits of VMI and supply chain relationships specific to the New Zealand food industry.	3
4	Theories developed must be supported or developed through action research	There was a clear focus on deriving theory from practice. The critical success factors from the flour category were developed from the key findings identified during the action research. The robustness and validity of the critical success factors are applied and justified through further action research cycles and a continued review of existing theory and literature.	3
5	System of emergent theory	This research seeks to develop theory out of the research, rather than to test pre-determined theories in research. The flour category VMI case study was the foundation for developing the Management-level framework. The justification plan and further action research cycles will be used to help ensure the initial research findings are complete and robust.	3
6	Incremental theory building – cycle of developing theory to action to reflection to developing theory	The flour category VMI case study was the first key cycle in the Management-level research. The flour category VMI case study was planned, implemented and reflected upon with key findings and critical success factors identified for further application in other product category case studies, within the main action research case study.	3
7	Descriptive theory must recognise the practical implications in the final documentation	The Management-level framework developed has a practical focus rather than deep theoretical basis. The flour category research is documented in a manner which recognises the practical aspects of action research.	3

	Characteristic	Method of incorporation into research	Estimated achievement
8	Systematic reflection	The flour category VMI case study was continuously reflected upon to identify next steps, key findings and critical success factors. The process was then documented for application and further reflection with other product categories.	3
9	Process of exploration of data must be either replicable or be capable of being explained to others	The process adopted during the flour category action research is documented to enable others to understand and replicate the plan-act-reflect process followed if necessary. The process of analysing the data has been described to enable others to replicate the process.	3
10	Writing about research is an important aspect of theory exploration and development	The flour category research findings were documented throughout the research period in order to capture key findings and theory to be applied and justified in subsequent research cycles.	3
11	Adherence to characteristics 1 – 10 is a necessary but not sufficient condition for action research	Noted that characteristics 1 – 10 are concerned with internal validity and require characteristics 12 – 15 for external validity.	3
12	Reflection and data collection processes can not be captured by other approaches	The work Goodman Fielder and Progressive did on the flour category was the first of kind in New Zealand. The project scope, methods and outcomes were continuously evolving. Findings from one process were modified and applied to other areas for discussion and reflection.	3
13	Triangulation methods should be fully exploited and reported	Obtaining feedback from key stakeholders at both Goodman Fielder and Progressive was used as a form of triangulation. In addition, existing literature from other countries and industries was used to further develop and validate the Management-level theory.	2

	Characteristic	Method of incorporation into research	Estimated achievement
14	Validity and applicability of the results depends on the history and context of the research	The purpose of the Management-level research was to develop a framework applicable to the general New Zealand food industry. In order to develop a general framework, the context of the flour category and its applicability to the wider industry, were carefully considered.	3
15	Theory must be disseminated in such a way to be of interest to a wider audience than those integrally involved with the action/research	The purpose of the research is to develop a framework relevant to the New Zealand food industry. The final thesis will be presented with 3 stand-alone, yet integrated, frameworks – Industry-level, Organisation-level and Management-level.	3

Table 10: Review of Characteristics of Action Research - Management-level

Based on the above, the flour category research appears to have met, in the range of 2 – 4, the fifteen key characteristics of action research as identified by Eden and Huxham (1996). The researcher judged that the first characteristic of integral involvement by the researcher was met in full, while Characteristic 13 received the lowest score (2 out of 4). All other Characteristics achieved an estimated score of 3. These highest and lowest scoring characteristics are discussed in further detail below.

Eden and Huxham's (1996, p.530) first action research characteristic requires "… integral involvement of the researchers in an intent to change the organisation. This intent may not succeed … and the change may not be as intended." This characteristic was judged to have been met in full because the researcher led the VMI project and worked with both Goodman Fielder and Progressive to bring about change in relation to the flour category.

In relation to Characteristic 13, Eden and Huxham (1996) state that triangulation "… should be used as a dialectical device which powerfully facilitates the incremental development of theory." To improve the estimated achievement of

this characteristic the justification plan will be designed to incorporate triangulation through additional case studies and comparison with literature.

7.6.2 Use of critical reflection

A key component of action research is critical reflection. By treating the flour category VMI project as an action research case study, the researcher was encouraged to critically reflect on the processes and methods used by both Goodman Fielder and Progressive throughout the project. If this project had been treated as consulting work, rather than research, there would not have been the same depth of critical reflection. Reflection occurred throughout the whole project, resulting in instant ah-ha's, short and medium-term ideas for next steps, and longer-term suggestions and recommendations for other product categories.

An example of an instant ah-ha was early on in the project when the aged housebrand flour in the South Island was being sold at heavily discounted prices. Progressive had almost purchased all of the aged stock on hand at Goodman Fielder when suddenly more aged stock started appearing on the Goodman Fielder aged stock report. Reflecting on this, the researcher identified the impact of the bullwhip effect (Lee et al., 1997). Rather than continue to try and sell the aged stock the researcher reviewed the whole process and identified a breakdown in communication which was causing additional flour to be produced each time large purchases of the aged stock were made. The underlying process was fixed which not only solved the housebrand flour problem, but also stopped potential problems for other products.

This instant ah-ha evolved into expanding circulation of the weekly aged housebrand stock report to include the Goodman Fielder Demand Management team. Demand Management were able to manually override the volumes of aged stock cleared each week to prevent addition production being scheduled. Without critical reflection on the process and project as a whole the instant ah-ha may have been overlooked and the true cause not identified. By reflecting on the impact of additional aged housebrand stock, the root cause of the problem was identified and processes changed to prevent further cases of excess stock.

A longer-term suggestion for other product categories was identified when reflecting on the key findings and critical success factors of the flour category. Before reflecting on the whole process, the willingness to try new ideas and willingness to change factors tended to be taken for granted by the researcher and were not considered fundamental factors in the success of the whole VMI relationship. Based on this insight, additional time was invested in measuring and reporting the benefits realised from trial initiatives so they could be incorporated into everyday processes and procedures.

7.6.3 Summary

In summary, the flour category VMI case study appears to have met, to some extent, Eden and Huxham's characteristics of action research. The process of critically reflecting on the research resulted in the researcher gaining several key insights which have been used to develop theory at the Management-level. This theory will contribute to knowledge of the New Zealand food industry. The following section uses the critical success factors, identified through action research, to develop a first-cut Management-level framework.

7.7 First cut of the Management-level framework

This section draws the findings from the previous sections together to develop a first-cut Management-level framework, based on the flour category case study, which can ultimately be generalised for the New Zealand food industry.

In section 4.4.4 the process used to develop the Management-level framework was presented. The key steps were (1) understand systems and processes, (2) understand the product category, (3) plan, implement, reflect and refine processes, (4) develop a Management-level framework, (5) apply to other categories and (6) validate through triangulation.

The purpose of the Management-level framework was to identify potential inputs and factors impacting on VMI practices, in order to develop successful VMI relationships in the New Zealand food industry, as shown in Figure 26 below.
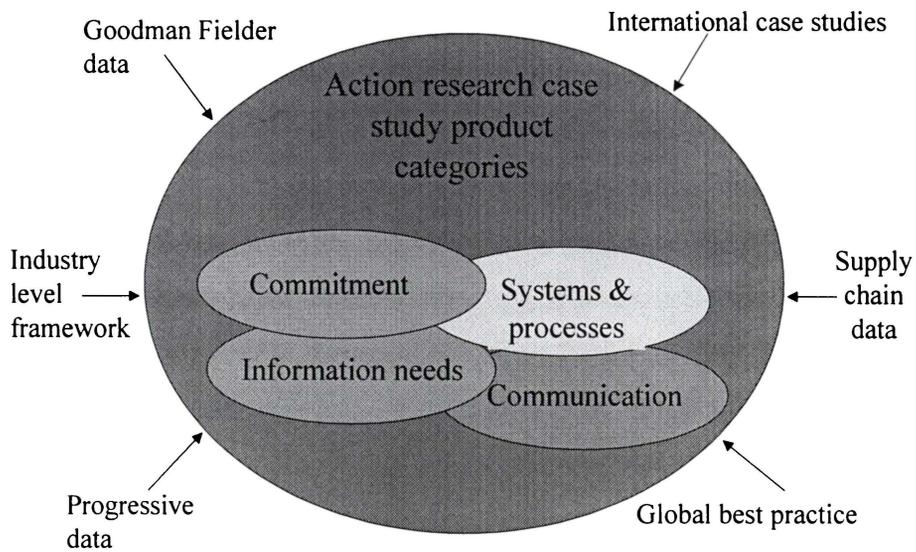
Figure 26: Factors to be considered in the Management-level Framework

The flour category was selected as the Management-level case study. The flour category VMI case study was planned, implemented, documented and reflected on by both Goodman Fielder and Progressive. Action research was used to capture the key advantages, findings, insights, critical success factors and contributions to knowledge.

The 9 critical success factors identified in the flour category VMI case study form the basis of the first-cut Management-level framework. Based on the action research conducted to-date, there appear three stages in developing a successful VMI and supply chain relationship at the Management-level. The first stage is to obtain management buy-in to VMI concepts and the relationship. The second step is to document and understand the internal processes and information requirements at each organisation and identify the gaps. Stage 3 involves tracking the DC dispatches to stores, monitoring DC stock levels, agreeing promotional forecasts, monitoring aged stock and communicating promotional details. The factors in each of the 'Initiate, 'Document' and 'Execute' stages are shown in Figure 27 below.

Stage 1 –
Initiate

Stage 2 -
Document
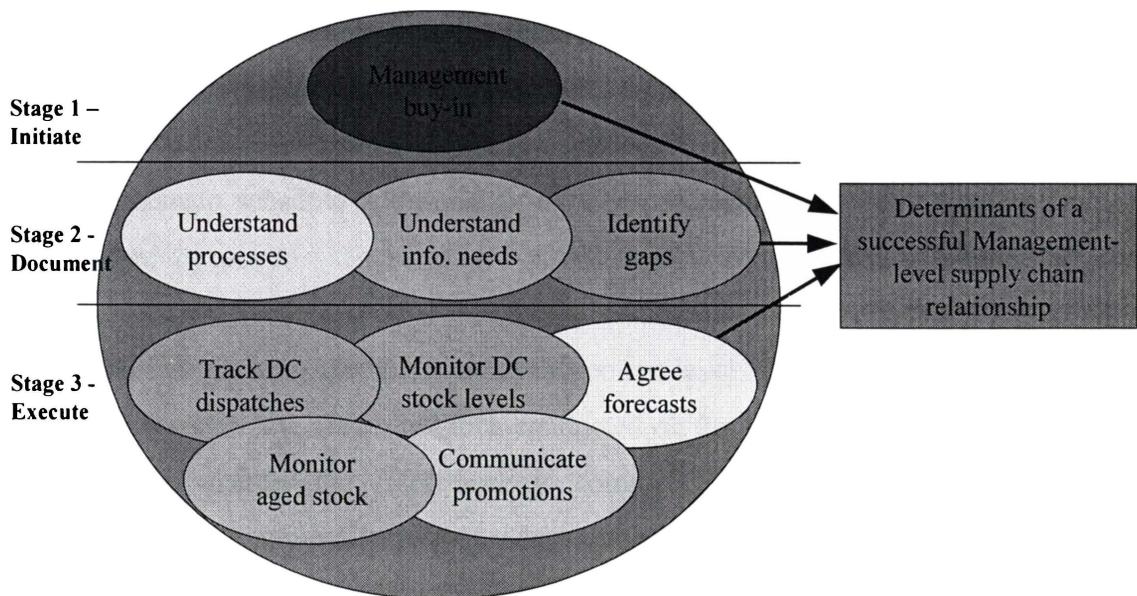
Stage 3 -
Execute

Figure 27: First cut of Management-level framework

Stage 1 (Initiate) involves obtaining management buy-in to the concept of VMI and the associated supply chain relationship. A VMI relationship will not be successful if there is a lack of support from Senior Management from the supplier or retailer. The need for Senior Management support was shown during the flour category VMI case study when initially the researcher was unable to get appropriate time and support from the flour Category Manager.

Stage 2 (Document) is critical to enable both organisations understand each other's internal processes and information requirements. This understanding helps establish the information requirements and lead-times for the factors in Stage 3. Process gaps need to be identified and efforts to close the gaps prioritised by both organisations together. Some of the process gaps may require simple process changes to resolve, while other gaps may require long-term process and systems changes.

Stage 3 (Execute) provides the supplier with access to key information to better manage their production schedules and stock levels. This information is not typically available to organisations without VMI relationships. By having access to retailer stock movement and stock on hand information, suppliers are better able to align production volumes with sales to stores. This information is critical in reducing the bullwhip effect discussed by Lee et al. (1997). In addition to stock

movement and stock on hand levels, access to promotional details and forecasts also assists the supplier better manage their supply chain activities. Finally, supplier housebrand aged stock reporting provides a feedback loop to the retailer, enabling them to schedule additional promotions, if required, to sell the excess stock before it expires.

The 9 critical factors and first-cut Management-level framework have been developed based on the action research conducted on the flour category. In order to determine whether the framework is complete, practical and robust the framework will be applied in other product categories before being finalised for application to other food organisations.

The process of designing the first-cut Management-level framework described above represents stage 4 of SSM. Stage 4 is described as: building conceptual models of the systems named in the root definitions. The following section describes the justification plan adopted for the other product categories in line with stage 5 of SSM which requires the researcher to compare the conceptual models with real world actions.

7.8   Justification of the first-cut Management-level framework

The justification plan comprises a number of critical questions to which answers are sought. This section lists the critical questions, explains the rationale for them and then answers them using further product categories as further case studies within the main action research case study.

The following critical questions were identified through discussions with employees from Goodman Fielder and Progressive Middle Management, and represent a summary of the key points raised.

1.   Is Senior Management buy-in sufficient or does there need to be buy-in at all levels of each organisation?

2.   Is an understanding of the product category required to understand the processes and information needs in the Develop stage?

3.   How do the attributes of the product category such as promotional sensitivity, shelf life, inventory holding costs, and production lead times impact on the critical success factors at the Management-level?

4.   Are tracking DC dispatches, monitoring DC stock levels, agreeing forecasts, monitoring aged stock and communicating promotions all critical success factors in order for the VMI relationship to work at the Management-level? Are any of these factors subsets of other factors?

5.   Are there any other factors considered critical to the success of the Goodman Fielder and Progressive VMI relationship at the Management-level?

These questions are answered below based on action research conducted on the cookie, oil and chilled spread categories between December 2002 and October 2003. This period is later than the flour research period, reflecting the cyclical nature of action research and additional smaller case studies within the main case study.

7.8.1   Management buy-in

The first critical question considers the level of management buy-in required in order to make the VMI relationship successful and asks whether top level buy-in is sufficient or whether buy-in is required at all levels of the organisation.

Because the flour category was the first product category to be managed through the VMI relationship, all initiatives were fully supported by Senior Management in both categories. Senior Management buy-in at both Progressive and Goodman Fielder was critical in initiating the VMI relationship and deciding to focus on the flour category. Without the support of Senior Management of both organisations there would not have been the same level of focus on the category. Continued Senor Management focus on the category from Progressive's perspective enabled the key initiatives to be implemented.

Once the flour category initiatives were established with processes and systems in place, the researcher extended these processes to several other categories including chilled spreads, oils and cookies. Middle Management at Progressive

and Goodman Fielder selected these categories due to forecasting, supply and/or inventory issues. These categories did not require Senior Management buy-in from a Progressive or Goodman Fielder perspective because both organisations were already familiar with the flour category initiatives and benefits. Middle managers were willing to extend the flour category findings to other categories because they had seen the benefits from the flour category. For the cookie, oil and spread categories occasionally significant issues were raised to a Senior Management level to expedite a resolution; however most issues were resolved at a Middle Management level. An example of an issue elevated to a Senior Management level was continued lack of focus on forecasting the oil category which had resulted in very high stock levels in Progressive's DCs. Once the Progressive Category Manager was told about the importance of the VMI relationship action plans and process improvements were implemented.

Based on the findings from the cookie, spread and oil action research case studies, it appears that once Senior Management have brought into the concept of VMI, day-to-day execution and process improvement initiatives can be managed at lower levels in the organisation. Senior Management buy-in is critical at the beginning of the project to ensure the correct level of resources are allocated to the category; however after the project is established, Middle Management become responsible for identifying and implementing process improvements.

Although Middle Management buy-in to the VMI relationship by both Progressive and Goodman Fielder was required to execute the day-to-day VMI initiatives, it was not critical to the overall outcomes of the relationship because of the ability of Senior Management to mandate Middle Management support. For example, when the oils Category Manager was slow to follow through on process improvements and did not meet regularly, Senior Management at Progressive intervened and required the Category Manager to participate in the VMI initiatives. Ultimately, in order to develop an effective working relationship with a shared goal of improving the supply chain, some form of Middle Management buy-in is required. This may be voluntary or may be top-down driven by Senior Management.

In summary, Senior Management buy-in to VMI initiatives at both organisations is critical to the overall success of the project. Middle management buy-in is required in order to execute the project; however this buy-in does not have to be voluntary and can be driven from Senior Management if required.

7.8.2 Understanding the product category

The second critical question relates to whether an understanding of the product category is essential to the success of VMI relationship at a Management-level. The first-cut framework assumes that once an understanding of the internal processes and information requirements has been developed this can be applied to any product category without developing a detailed understanding of the category.

The first stage of the Management-level case study involved documenting the processes at both Goodman Fielder and Progressive. This documentation stage enabled both organisations to gain a better understanding of their internal processes and systems while also gaining an understanding the other organisation's processes. Key findings from the documentation stage were generic in nature and could be applied to multiple product categories.

While the nature of product categories varies depending on the number of products, volume, promotional sensitivity, shelf life and temperature; the forecasting, production, inventory holding and buying processes and systems do not vary significantly within an organisation. For example, although flour is highly promotionally driven, ambient in temperature and has a relatively long shelf life, the process used by Goodman Fielder to forecast sales is the same as spreads which are less promotionally driven, chilled in temperature and have varying lengths of shelf life. Similarly, the process used by Progressive to forecast promotions and buy stock is consistent across all product categories.

The consistent forecasting, production, inventory holding and buying processes at both Goodman Fielder and Progressive, regardless of the type of product, indicate that understanding the product category is not fundamental to the success of VMI initiatives. Further evidence of this is the flow-on benefits of the VMI initiatives on other product categories at Goodman Fielder. Although only a limited number

of product categories were focused on in detail, understanding the Progressive processes enabled other Goodman Fielder categories, such as pasta, to benefit.

In summary, it appears that understanding the product category is not critical to the success of VMI initiatives as long as the processes and systems related to the product category are known and understood by both organisations.

7.8.3   Impact of product attributes

The third critical question considers the impact of product attributes on the critical success factors at the Management-level to determine whether different frameworks are required for different product attributes or whether a general framework can be applied to all product categories.

The critical success factors in Stage 3 of the first-cut Management-level are tracking DC dispatches, monitoring DC stock levels, agreeing forecasts, monitoring aged stock and communicating forecasts.

Based on action research conducted on other categories in the Goodman Fielder portfolio it appears that these factors are relevant to all categories regardless of their attributes. For some categories, such as oils which have a shelf life in excess of 12 months, monitoring aged stock is not as critical to the overall supply chain as shorter shelf life products, such as cookies. For higher value products, such as oil, tracking DC dispatches and monitoring DC stock levels is important in order to minimise the cash invested in inventory holdings. For products with high holding costs, such as chilled spreads which require refrigeration, monitoring DC stock levels and communicating forecasts is important.

7.8.4   Completeness of Stage 3 factors

The fourth critical question seeks to determine whether all the factors identified in Stage 3 are actually critical or whether some of the factors are subsets of others and can therefore be eliminated from the framework.

Using the findings from the flour category, action research was used to improve the supply chain efficiency and effectiveness for cookies. This category is highly

sensitive to promotional activity and has very low base line sales. When the researcher first focused on this category, the frequency of promotional activity had decreased and buying levels were not aligned with the promotional activity. Because of the reduced promotional frequency and high buying levels relative to DC dispatches, the excess stock left after a promotion remained in the Progressive DC until at least the next promotion 1 to 2 months later. This resulted in products being dispatched to stores with limited shelf life remaining.

For example, Goodman Fielder if sells a cookie with an initial shelf life of 6 months to Progressive 3 – 4 weeks after production the product will have approximately 5 months shelf life remaining when it is received by the DC. If the product is purchased in anticipation of an upcoming promotion in 2 weeks time and does not sell through, then it may still be in the DC 6 - 8 weeks after it was purchased, leaving approximately 3 months shelf life remaining. If the buying levels were so high that the stock did not sell through after the second promotion (which was the case with several variants) the stock remained in the DC for a further 4 – 6 weeks, finally being dispatched to stores with approximately 2 months shelf life remaining. This example shows how each of the Stage 3 critical success factors is important, particularly tracking DC dispatches and monitoring DC stock levels.

Inventory holding costs are a key influence on the efficiency of a supply chain. Chilled spreads require refrigeration and therefore have higher holding costs than ambient products which can be stored in a non-temperature controlled warehouse. By implementing the Management-level critical success factors of tracking DC dispatches, monitoring inventory levels, agreeing forecasts and communicating promotional activity both Goodman Fielder and Progressive were able to reduce their chilled spread stock holdings while increasing customer service levels. Figure 28 below shows how Progressive average weeks stock on hand has declined from 2.5 weeks to 1.5 weeks over a period of 12 months for Sunrise spread based on a linear trend line. The period below reflects the action research period for this product category (this category was focused on after the initial flour action research cycle to help justify the first cut framework).
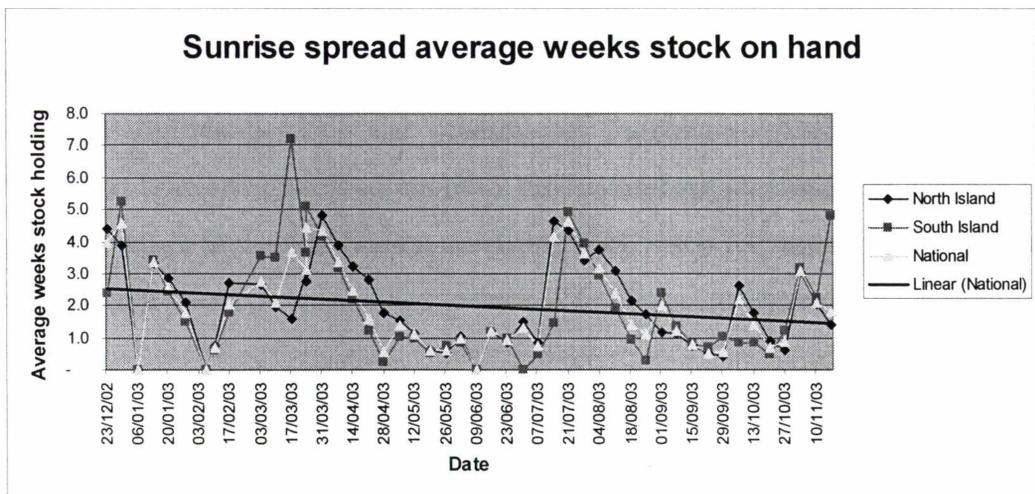
Figure 28: Sunrise Spread Progressive DC stock on hand trends

An oil category action research case study was used to trial the flour-tracking template in another category. The purpose of the tracking template is to monitor DC dispatches and stock on hand levels and communicate promotional activity and forecasts in order to reduce inventory levels throughout the supply chain. Oil is a higher value category than flour and therefore high stock holdings have a greater impact on working capital relative to lower cost products. A key factor in the success reducing oil stock levels, at both Goodman Fielder and Progressive, was understanding the promotional sensitivity in order to improve forecast accuracy. The following example shows findings from the flour category case study were applied to the oil category case study to reduce overall stock levels.

Oil volumes are highly promotionally driven and have very low base line sales. Prior to the researcher focusing on the oil category promotional activity tended to follow a pattern of a small monthly promotion followed by a large advertised promotion and then no promotional activity for another 2 – 3 months. As a result, large volumes of stock were purchased for the advertised promotion. If the forecast was too high, the excess stock was more than sufficient to cover the base line sales until the next promotion meaning that Progressive stock holdings were very high following the advertised promotion. In addition, Goodman Fielder sales were very high in the lead up to the promotion and then non existent for the next 2 – 3 months. Because of the bullwhip effect, Goodman Fielder produced replenishment stock immediately following the promotion, which was not sold

until at least the next promotion. This meant that not only were Progressive stock levels higher than required, Goodman Fielder stock levels were also higher than needed. By restructuring the promotional program to have the advertised promotion followed by a small monthly promotion both organisations were better able to manage forecast accuracy, minimise stock levels and reduce the impact of the bullwhip effect.

Based on the cookie, oil and spread action research case studies, monitoring aged stock appears to be a subset of monitoring overall stock levels and therefore does not need to be shown as a critical success factor in the Management-level framework. As long as total stock on hand levels are monitored there does not appear to be a requirement to separately monitor aged stock.

Therefore, in answer to the fourth critical question, except for the monitoring aged stock factor, all other Stage 3 factors are required, to some extent, in order to establish a successful VMI and strategic supply chain relationship.

7.8.5 Completeness of the framework

The final critical question aims to determine whether the list of 9 critical success factors identified during the flour category VMI case study is a complete. It challenges the researcher to consider other factors influencing the success of the VMI relationship at the Management-level. This question was answered through discussions with other VMI representatives at Progressive and Goodman Fielder who had recently implemented VMI practices. The outcomes of these discussions are described below. The first-cut framework is then compared against international VMI literature to triangulate the finding and ensure the framework is complete and robust.

The first-cut Management-level framework has been applied within Goodman Fielder by extending its use from the flour category to other categories using a general template to track key information. Each week the template was used to gather, track and analyse data on a number of categories. Out of stocks, excess stock and upcoming promotions were highlighted on the tracking sheet and communicated to key Goodman Fielder and Progressive stakeholders in the

category. This approach has worked successfully with all steps considered necessary in order to maximise the supply chain benefits.

Some of these critical success factors have been shared with other VMI representatives at Goodman Fielder who work with other suppliers and with some of the VMI representatives from other organisations working at Progressive. The importance of management buy-in, tracking DC volumes and stock levels, agreeing forecasts and communicating promotional activity are common across most VMI roles. The VMI representatives who have taken time to document and understand processes and systems have made greater inroads into improving the effectiveness of their VMI relationship.

One of the weakest links in the Goodman Fielder and Progressive supply chain is the agreeing of forecasts. Although the researcher tracks weekly volumes through the Progressive DCs, reports stock on hand levels and notifies the Key Account Managers of upcoming promotions, there is no formal link of this information back into the Goodman Fielder demand forecasting process. As a result, even though promotions are forecasted in the Progressive system and communicated to Goodman Fielder, there are still occasions when Goodman Fielder is unable to supply promotional demand. The main reason for the out of stock situation is usually due to either the promotion not being forecasted or Production not producing the volume forecasted.

The first-cut of the Management-level framework includes agreeing forecasts. If this step is performed correctly, Goodman Fielder should be able to forecast all promotional activity as long as the step of 'communicating promotions' is also performed; however the first-cut Management-level framework does not include ensuring that Production actually produces the volumes forecasted. This is a critical step in the supply chain process which should be incorporated into the final framework.

Other VMI people at Progressive who have been unable to supply promotional stock often reinforce the importance of producing the forecasted demand. As at February 2003, VMI practices had been operating for less than 6 months for the

majority of other VMI representatives at Progressive and, as a result, these suppliers were still establishing systems to maximise the benefits of VMI in their organisations. Most of the recent VMI representatives have come to Progressive in a traditional VMI role where they are responsible for managing inventory levels at Progressive and placing purchase orders. The majority of them have not invested time in documenting processes, understanding information requirements or identifying systems gaps. This has reduced the benefits they have realised in the short-term because they are continuously 'fire fighting' short-term issues rather than addressing the underlying root causes. This reinforces the importance of the Document stage of the Management-level framework.

Vermond (1999) found that at Lever Ponds in Canada a strong VMI education program enabled them to not only reduce some customers inventory by 30 – 40%, but also enabled them to increase forecast accuracy from non-existent to 75%. The Document stage of the first-cut Management-level framework focuses on developing an understanding of the systems, processes and information requirements to identify potential gaps. Based on the experience of Lever Ponds, developing an understanding should also include education and training of key personnel involved in the VMI process.

Vermond (1999) also found that Heinz Canada dismantled their VMI program because of poor results in the first 2 years. "The [forecast] accuracy was never what the grocery community expected it to be because the linkage between the buyer and who was making the feature [advertising] decisions and promotion decisions were still weak" (p.3). This emphasises the importance of the 'communicate promotions' factor in Stage 3 of the Management-level framework.

In summary, based on discussions with other VMI representatives at Progressive and Goodman Fielder, and ongoing findings through the action research case studies conducted on the cookie, oil and spread categories, it appears that the Management-level framework requires another critical success factor to ensure that forecasted volumes are produced. In addition, the Stage 2 factors should incorporate educating and training key personnel involved in the VMI relationship as well as understanding the systems, processes and information requirements.

7.9 Final Management-level framework

This section formally presents the final Management-level framework based on the first-cut framework, modified by the action research results from the cookie, oil and spread categories. The framework is presented pictorially in Figure 29 below, with each factor then defined.
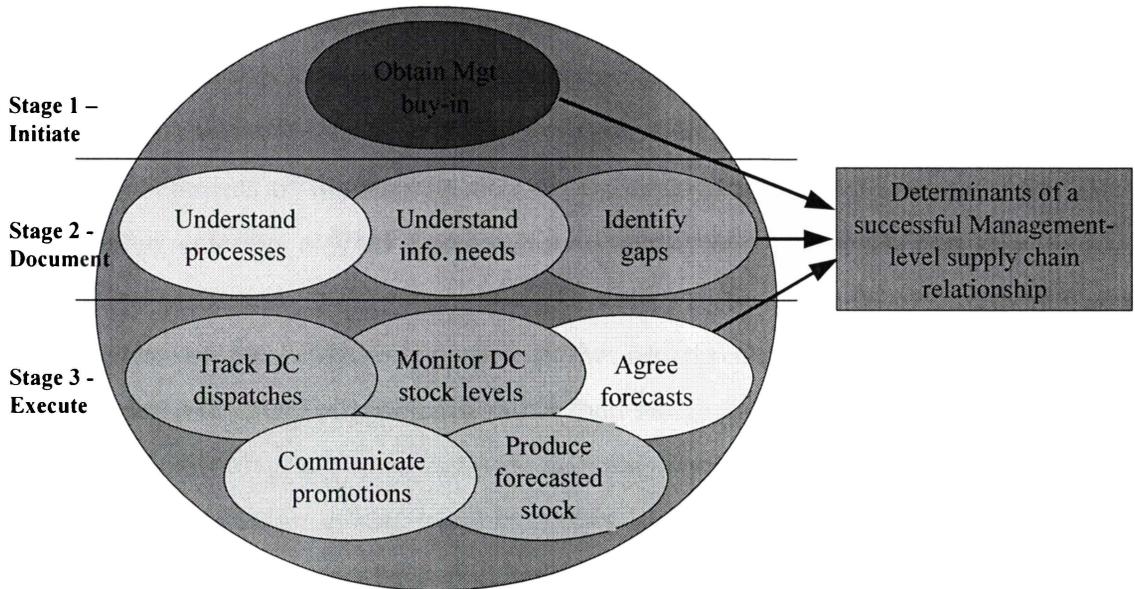
Figure 29: Final Management-level framework

The framework in above shows the key success factors required at a Management-level to make VMI practices work. Without all of these factors, management will not be able to achieve the maximum benefits from VMI and strategic supply chain relationships.

The first stage (Initiate) requires management of both organisations to buy-in to the concept of VMI. For some organisations this requires a fundamental change in the way the business operates by shifting from a closed to open book approach. This factor is consistent with the Stage 2 of the Organisation-level framework, described in section 6.10, which requires the organisations to develop a shared vision. Management buy-in should encompass the following factors:

- Commitment to invest in VMI resources
- Willingness to change internal processes and systems for the benefit of both organisations

- Agreement to share information historically held exclusively within the organisation

- Commitment to act upon and resolve supply chain problems in a timely manner

Unless management from both organisations are willing to invest in VMI practices there is no benefit in progressing to the Stage 2 of the Management-level framework.

Stage 2 (Document) of the Management-level framework requires organisations interested in entering a VMI relationship to understand processes, document information needs and identify any gaps. This stage is fundamental to the long-term success of the VMI relationship if the organisations involved want to eliminate the root cause of problems, rather than reacting to day-to-day problems as they arise.

The following steps should be completed by the organisations involved in the VMI relationship prior to proceeding to the Execute stage of the Management-level framework.

1. Document the current supply chain processes at the supplier and retailer

2. Identify process gaps, control weaknesses, inefficient use of resources and inconsistent processes at both organisations

3. Document best practice supply chain information requirements for both organisations in order to enable the Execute stage of the Management-level framework to be implemented

4. Identify information gaps between what is currently available and what both organisations require going forward

5. Confirm and validate the results of steps 1 to 4 through further discussions and meetings with as many people involved in the processes as possible

6. Develop a best practice supply chain process that meets the needs of both organisations

7. Agree on an action plan and timeframe to address the items identified in steps 2 and 4 above in order to achieve the best practice supply chain process in step 6

8. Educate and train key personnel involved in the VMI relationship on the VMI systems, processes and information requirements

Stage 3 (Execute) of the Management-level framework covers the information requirements which need to be managed on a day-to-day basis in order for both organisations to realise their shared supply chain vision described in the Organisation-level framework in section 6.10. Initially a manual process should be established to track DC dispatches, monitor DC stock levels, agree forecasts, produce forecasted stock and communicate promotions for a limited number of categories. The purpose of performing these tasks manually is to develop a detailed understanding of the processes at both organisations and to clearly identify the information requirements needed going forward. Over a period of time some or all of these processes should be automated to reduce errors and extend the scope of product categories covered. Automation of these functions may require investment in technology by both organisations. The willingness of each organisation to invest in the technology will depend on the perceived cost versus benefit. The investment in supply chain technology is consistent with the findings in the Industry-level framework in section 5.9.

Ideally the factors in Stage 3 (Execute) should be developed as follows:

- Track DC dispatches – volumes dispatched from the retailers DC to stores should be communicated back to the supplier on a regular basis to provide a more accurate view of store demand, rather than DC purchases to minimise the impact of the bullwhip effect.

- Monitor DC stock levels – stock on hand levels at each retailer DC should be reported regularly to identify products with excess or no stock on hand. Action plans should be developed to move any excess stock on hand through additional promotional activity or increasing the number of stores selling the product. Products with no stock on hand should be investigated. Additional orders should be placed if the supplier has stock

available, otherwise the product should be put on hold to inform stores of that it is unavailable.

- Agree forecasts – promotional forecasts should be agreed between the retailer and supplier along with the proposed promotional buy-in period. The forecast should cover not just the expected volumes to be sold to customers, but also an additional allowance for increased stock levels in stores to cover the promotion.

- Communicate promotions – the retailer should work with the supplier to provide timely notification of promotional activity. In particular, advertised promotions, multi-buy deals (e.g. 2 for $5) and lower than average pricing should be clearly communicated to enable the supplier to ensure the forecast reflects the anticipated volumes to be sold. Any changes to the promotional activity, such as cancellations, amended pricing and advertising should be communicated as soon as the change has been made in order to give the supplier as much time to react as possible.

- Produce forecasted stock – once the forecast has been agreed, the supplier should make a commitment to have the forecasted stock on hand prior to the promotion. Any potential supply issues should be identified early in the process and communicated back to the retailer in order for the promotional activity to be changed if necessary.

7.10 Answers to Management-level secondary research questions

This section answers the Management-level secondary research questions identified in the literature review and summarised in section 3.4. Each question is restated and then answered.

7.10.1 Secondary research question #6

What are the implications of forward buying practices for the New Zealand food industry?

Forward buying practices in the New Zealand food industry vary throughout the industry. Historically, all major retailers participated in forward buying. Suppliers who had sales targets to achieve encouraged these practices.

Since the consolidation of the Progressive and Woolworths DCs, Progressive has stopped the practice of forward buying. There are three key reasons for this change. Firstly, since the DCs have been consolidated, there is less excess storage capacity available in the DCs to hold surplus inventory. Secondly, the high promotional frequency of products across banners, together with 2 – 3 week buy-in discount periods, means that products tend to be purchased at a discounted level everyday, thereby reducing the benefit of forward buying. Finally, suppliers who have moved to scan based discounts, rather than off invoice discounts to reduce total discounts and increase profitability, have also encouraged the change in forward buying practice. Scan based discounting discourages forward buying because discounts are only given on products actually sold to end users through the store checkout scanners.

In contrast, Foodstuffs stores participate in forward buying practices. A key reason for this practice is that the stores are often individually owned and operated. Each storeowner seeks to maximise their profit and therefore tends to buy as many products as possible on promotion to minimise purchases at full cost. These investment buys do not impact suppliers as much as forward buying by DCs because individual store volumes are significantly lower than regional DC volumes.

Based on the findings above, there is no clear industry pattern of forward buying practices across the New Zealand food industry because the two dominant retailers in have adopted different attitudes towards forward buying. The negative impact on inventory holdings of forward buying on the industry as a whole, is reduced, because forward buying tends to be practiced by individually owned and operated Foodstuffs stores rather than the centralised DC operations of Progressive.

7.10.2 Secondary research question #8

Can international VMI partnership research findings be applied to the New Zealand food industry and, if so, what are the results?

International VMI findings (refer to literature review section 2.3.4) showing that suppliers are attracted to VMI because it mitigates the uncertainty of demand, thereby dampening the peaks and valleys of production and allowing smaller buffers of capacity and inventory have been found to be true in the Goodman Fielder and Progressive case study. The Management-level research findings showed that by tracking DC dispatches, monitoring DC stock levels, agreeing forecasts, communicating promotions and producing the forecast, suppliers can increase customer service while at the same time reducing inventory holdings. Promotional activity can be realigned to smooth demand and minimise the impact of the bullwhip effect.

Similarly, international research has shown that from the retailer's perspective, service levels improve and, in times of critical shortage, inventory rebalancing across customer DCs can be achieved through visibility of total supply chain inventory levels (Waller et al., 1999). This has been shown to be true in the case study between Goodman Fielder and Progressive in New Zealand. By closely tracking DC dispatches in conjunction with DC stock levels and agreed forecasting, customer service levels can be improved and inventory rebalanced across DCs as required.

Saipe and Geiger (1996) identified a number of pros and cons of VMI as summarised in Table 11 below.

Pros of VMI	Cons of VMI
Fosters cooperation in the supply chain	Vendors administrative costs increase
Fast way to improve results	Hard to use with volume discounts and special pricing
Maximises in-stock position/minimises out of stocks	Complicates the system in the short-run
Reduces overall supply chain costs	Retailer risks loss of control/flexibility
Sales are higher for vendor and customer	Manufacturer takes one-time volume reduction
	Minimal benefits for manufacturer until critical mass

Table 11: Pros and cons of VMI

(Source: Adapted from Saipe and Geiger, 1996, p.4)

All of the pros identified by Saipe and Geiger were realised in the Goodman Fielder and Progressive relationship. The supply chain relationship between both organisations improved as evidenced by the case study findings above. The quick wins in the flour category, such as the reduction of aged stock discussed in section 7.3.2, show how VMI can bring about fast improvements. The flour category case study also documented how VMI practices helped minimise out of stock positions, reduce overall supply chain costs and increase sales.

In contrast, only some of the cons were realised. From Goodman Fielder's perspective, administrative costs increased to cover the cost of the VMI resource, a one-time reduction in volume occurred as the initial DC over stock positions were eliminated and the system was complicated in the short-term as new information was communicated outside existing systems and processes. These difficulties were discussed in section 7.3.2.

From Progressive's perspective there was no loss of control/flexibility because the VMI arrangement was not a 'true' VMI relationship in terms of the definition of VMI because the responsibility for buying remained with Progressive. There were two main reasons for this. Firstly, the key focus of VMI project initially was to document and understand the systems and processes, from both Goodman Fielder and Progressive's perspective, to identify process and control weaknesses and gaps. This enabled the root cause of the problems to be identified and the necessary short and long-term solutions to be developed and implemented as required. Secondly, Progressive were able to retain control of the buying during the VMI project, delaying the need for a final decision on whether a 'true' VMI relationship was required, until an initial assessment of the VMI project benefits had been completed. This approach benefited both Goodman Fielder and Progressive. Goodman Fielder benefited by utilising their VMI resource to address underlying systems and process issues impacting supply chain activities across multiple product categories in both organisations. Progressive benefited by retaining control of the buying while realising other VMI benefits such as reduced inventory, increased customer service levels and increased sales.

Goodman Fielder was able to realise benefits from the Progressive VMI project without implementing VMI practices with other customers to gain critical mass. For example, elimination of aged housebrand stock and improved housebrand forecasting benefited Goodman Fielder by reducing stock levels. This did not require critical mass of VMI practices. Similarly, by correcting product master data details in the Progressive system, Goodman Fielder were able to maximise full pallet/layer orders to reduce warehousing and distribution costs. Volatility in demand from other customers partially offset the benefits from the Progressive VMI project, particularly for Goodman Fielder branded products sold to all customers.

The Goodman Fielder and Progressive case study did not show support for Saipe and Geiger's finding that VMI is hard to use with volume discounts and special pricing. In contrast, it was found that VMI enabled both Goodman Fielder and Progressive to better manage forecast accuracy and stock levels of products with high promotional sensitivity.

7.10.3 Secondary research question #9
What supply chain efficiencies can be realised in the New Zealand food industry through VMI without EDI?

The Goodman Fielder and Progressive case study used VMI practices without EDI. As shown in the Management-level research findings, benefits were realised by both organisations by adopting VMI without EDI. Overall sales grew, customer service levels improved and inventory levels reduced. The extent of the VMI benefits was limited to a few key product categories because of the limited resource available to manage the process manually; however, indirect benefits were realised by other product categories as a result of system and process changes in both organisations. The New Zealand based research findings are therefore consistent with the international findings by Clark and Hammond (1997).

7.10.4 Secondary research question #11

Does information sharing through VMI reduce competitiveness in a concentrated industry, such as New Zealand?

The New Zealand food industry is concentrated from a supermarket retailer perspective with the two major players having approximately 95% market share. In contrast there are a large number of suppliers to the industry.

This research has demonstrated how Goodman Fielder and Progressive have benefited by working together in a VMI relationship. The results of the flour category research show how Goodman Fielder and Progressive were able to grow the category at above market growth rates, while at the same time reducing inventory levels and increasing customer service. The Organisation-level framework identified confidentiality, trust, and integrity as key determinants of successful Organisation-level relationships. By incorporating these values into their relationship, Goodman Fielder and Progressive were able to realise a number of benefits through VMI. This indicates that by combining the Organisation and Management-level factors into a VMI relationship, retailers and suppliers can remain competitive and grow market share in a concentrated retail environment.

This is supported by the recent growth of VMI relationships at both Foodstuffs and Progressive. Both organisations have identified VMI as a key initiative in their supply chain strategies and are adopting VMI and EDI initiatives to improve supply chain operations. As described in the Industry-level framework, the need to increase profitability may actually be driving the need for VMI and strategic supply chain relationships.

In summary, this research has found that concentration of retailers may actually be a key driver, rather than prohibitor, of VMI relationships as retailers seek to increase profitability in a highly competitive market.

7.11 Chapter summary

This chapter has identified, through action research, the key determinants of successful VMI and strategic supply chain relationships at a Management-level. The framework has been kept simple with 9 key factors identified. Simplicity was a key consideration in developing the framework to maximise its practicality and workability for the New Zealand food industry. This chapter has also highlighted how action research cycles of intend/plan, act and review, in conjunction with SSM, can be adopted by management to understand why certain things occur and to improve practices. The next chapter draws together the results from the industry, organisation and management-level chapters and presents conclusions from the research.

Chapter 8   Discussion, conclusions, recommendations

8.1   Introduction

This research has used action research to identify the key determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry. The key findings have been presented in a series of interrelated frameworks which can be applied by other organisations in the New Zealand food industry, enabling them to develop successful VMI and strategic supply chain relationships. In addition, key findings from an action research perspective have been identified.

This chapter summarises the key findings from the research and presents conclusions on the research questions discussed in Chapter 3. Contributions to knowledge, both from a supply chain perspective and an action research perspective are described. Personal insights and learnings are then presented along with the limitations of this research. Finally, opportunities for further research are outlined.

8.2   Summary of research problem

This research set out to address the primary research question:

What are the key determinants of successful vendor managed
inventory and strategic supply chain relationships in the New Zealand
food industry?

Although research has been conducted on parts of this research problem before, a holistic view, covering industry, organisation and management-level factors, had not been researched previously in an oligopolistic food industry context. Further, action research methods had not been applied to a VMI relationship in the New Zealand food industry before. This combination of factors provided the researcher with an opportunity to contribute to knowledge, not only through development of a practical, robust, integrated framework, but also through action research insights. It also provided the researcher with an opportunity to document

the advantages and disadvantages of developing a VMI and supply chain relationship in the New Zealand food industry.

In section 1.2 it was questioned whether VMI practices are actually required in the New Zealand food industry. International research findings reveal benefits from VMI and supply chain relationships from both a supplier and retailer perspective. This research supports international findings, and clearly shows how supply chain benefits can be realised through VMI relationships in New Zealand. The nature of the benefits is diverse and varies across product categories, suppliers and retailers. This research identified a number of benefits of working together at an Organisation-level from both a retailer and supplier perspective. These benefits were described in section 6.4.5, including several benefits unique to VMI relationships. Chapter 7 presented a number of benefits from working together at a Management-level. These provide strong evidence that supply chain benefits that can be realised through VMI relationships in the New Zealand food industry.

As a result of this research, three interrelated frameworks have been developed to assist organisations in the New Zealand food industry establish successful VMI and strategic supply chain relationships. Each results chapter has described the process followed to develop the frameworks and documented the justification plan used to ensure that the frameworks are complete, robust, practical and can be generalised. Several smaller case studies within the main action research case study, along with a comparison to literature, were used to validate and triangulate the initial research findings, providing the researcher with further opportunities to generalise the research findings.

During the literature review a number of potential research questions were identified. These were presented as secondary research questions in section 3.4 and categorised into industry, organisation and management-level questions. The questions were then answered in the relevant results chapters.

The following sections summarise the final three frameworks and explain their contributions to knowledge, from a practioner, academic and action research perspective.

8.3 Conclusion from the Industry-level findings

The Industry-level research sought to identify the key determinants of successful VMI and strategic supply chain relationships using the food industry as the unit of analysis. The New Zealand food industry formed the basis of this research, and as a result, the findings may be limited to food industries demonstrating similar characteristics. The final framework provides the reader with a holistic Industry-level framework, tailored to food industries in countries demonstrating certain characteristics.

The Industry-level framework provides a model for practioners to follow when determining whether the food industry they operate in displays characteristics supportive of supply chain initiatives. Seven factors impacting the success of Industry-level supply chain relationships were identified. These were presented in section 5.9.

The Industry-level framework begins with developing an understanding of the industry structure and applying several of Porter's (1980) forces to evaluate industry profitability. As Wright and Lund (2003, p.140) found "Over the last decade, large supermarket chains have become increasingly dominant through their significant buying power, direct sourcing of product, and the sale of generic and 'house brands'." Porter's (1980) five forces model supports this and indicates that most organisations in the food industry have limited ability to raise prices to earn greater profits. As a result, participants in the food industry must reduce costs to remain competitive and grow profits.

Establishing supply chain relationships can help organisations reduce costs. This is evidenced by Wal-Mart which has successfully pursued this strategy by forming partnerships with vendors to reduce inventory and other logistics costs for both the retailer and the vendor (Mentzer et al., 2000). Information and communication technology advancements have also helped facilitate coordination and cost savings.

The Develop stage of the Industry-level framework identifies developing long-term relationships, investing in supply chain technology and adopting supply chain best practice as means of increasing industry profitability. These steps are expanded on in the Organisation and Management-level frameworks.

The Industry-level framework was developed using a New Zealand food industry case study. The New Zealand food industry has an oligopoly of retailers, with many small to medium-sized suppliers. The oligopolistic structure of the supermarket retailers is unique to New Zealand with the two major retailers comprising 95% of total supermarket sales. In contrast, countries such as the UK, US and Australia have lower levels of industry concentration. For example, the top 5 retail chains in the UK have 64% share and the top 20 food retailers in the US account for 59% of total grocery sales (New Zealand Trade and Enterprise, 2003). In Australia, the two main supermarket retailers have 78% market share. As a result, these research findings may be limited to concentrated food industries. There is an opportunity for further research to determine whether this framework can be applied in less concentrated food industries and is discussed further in section 8.9.

The New Zealand food industry supply chain initiatives are closely aligned with the Australian food industry. A major reason for this is that Progressive is 100% owned by Foodland Association Limited, an Australian company. As a result, there is a high level of knowledge sharing between New Zealand and Australia in relation to supply chain initiatives and findings. Industry consolidation and moves towards retailer owned and operated DCs are evidence of common supply chain trends.

The research identified several factors potentially unique to New Zealand which may limit the applicability of this research to other countries. Because of the small size and geographical diversity of New Zealand, economies of scale and return on investment are more difficult to achieve than in countries with high-density populations. Mergers, acquisitions and growth of exports evidence this. The Progressive acquisition of Woolworths in 2002 is an example of organisations consolidating in order to improve returns on supply chain

investments, such as DCs and IT systems. Export oriented organisations range from large suppliers, such as Fonterra and Zespri, to small niche suppliers, such as Aunt Betty's. Mergers, acquisitions and exports are initiatives adopted primarily by the capital-intensive manufacturers in the food industry to reduce over-capacity and improve return on capital and technology investments. Exporting provides suppliers to the industry with an opportunity to reduce their reliance on the two key supermarket retailers and leverage their investments in capital and technology.

These factors help explain why the New Zealand food industry has been slow to adopt global supply chain initiatives, such as DCs, VMI and EDI. The dominance and power of the retailers has resulted in industry supply chain initiatives being driven by the retailers, rather than suppliers. The Woolworths acquisition in 2002 resulted in internal focus by the two remaining supermarket retailers and therefore reduced the opportunity for retailer-supplier supply chain initiatives. The retailers have now realised, that in order to remain competitive and increase profitability, they must improve supply chain efficiencies by adopting global practices such as DCs, EDI and VMI. The first step has been to establish a DC infrastructure which then enables initiatives such as VMI to be developed. Simultaneously, EDI initiatives have been adopted to reduce transaction-processing costs and build a foundation for greater supply chain information sharing. VMI practices are now emerging globally as suppliers and retailers seek to reduce costs to maintain and grow profitability.

These supply chain initiatives are in line with Bowersox and Cooper's (1992) fourth major evolution in the food industry, discussed in section 2.3.1, where integrated retailers are trying to push inventory holding responsibility 'up the channel' towards manufacturers.

Answers to the Industry-level secondary research questions provided several theoretical insights.

Firstly it was found that supply chain research findings from the New Zealand forestry industry are also relevant to the New Zealand food industry. The

common industry characteristics have been incorporated into the Industry-level research findings as potential limitations on the application of the framework to other, less concentrated, food industries in the developed world.

Secondly it was found that countries, such as New Zealand, with small regional populations are likely to experience industry consolidation in order to establish and operate efficient and effective DCs. This is due to the high fixed costs associated with operating DCs and the ability of larger organisations to exert their power over other industry participants. In New Zealand, consolidation of the major supermarket retailers enabled Progressive to leverage their size and power to require suppliers to support their DC infrastructure, thereby increasing volumes and reducing the average cost per unit of DC operations. This finding is consistent with the Australian food industry which has experienced increased usage of DCs by the two dominant supermarket retailers, Coles and Woolworths (Wright and Lund, 2003).

Finally, three factors were identified as attributing to the slowness of the major New Zealand food industry retailers to adopt VMI practices: internal focus during the Woolworths acquisition, focus on establishing DC operations, and mixed results of overseas VMI experiences. The Woolworths acquisition resulted in an internal focus by Progressive and Foodstuffs during 2002. Once the acquisition was finalised and integration began, both Progressive and Foodstuffs then began to adopt supply chain initiatives including the establishment of DCs and VMI relationships.

This research has demonstrated the benefits of VMI for the New Zealand food industry through greater adoption of VMI and global supply chain initiatives.

8.4 Conclusions from the Organisation-level findings

The Organisation-level research sought to identify the key determinants of successful VMI and strategic supply chain relationships using individual organisations as the unit of analysis. A New Zealand food industry action research case study between a large supermarket retailer and a large supplier

formed the basis of this research, and as a result, the findings may be limited to organisations and food industries demonstrating similar characteristics.

The Organisation-level framework provides a model for practioners to follow when establishing VMI and strategic supply chain relationships in the New Zealand food industry. Eight key factors impacting the success of Organisation-level VMI and supply chain relationships were identified. These were presented in section 6.10.

Determining the relative importance of the organisation's suppliers and customers is critical. If both organisations are not relatively important to each other then it is unlikely that the VMI or supply chain relationship will be successful. This has been shown to be true in the New Zealand food industry which has an oligopoly of supermarket retailers and a large number of suppliers.

In the New Zealand environment the two major supermarket retailers do not have the resources to develop relationships with all their suppliers. Rather, their focus is on establishing relationships with key suppliers in order to maximise their supply chain benefits, vis-à-vis their investment in the relationship. This indicates, that in an oligopolistic retail environment, small suppliers are less likely to have the opportunity to develop VMI and supply chain relationships with the major supermarket retailers relative to large suppliers. In contrast, small suppliers to the industry are more likely to develop supply chain relationships with distributors, wholesalers and small retailers which are not key customers of the larger suppliers to the industry.

This means that, in New Zealand, Progressive is more likely to establish a VMI and supply chain relationship with large suppliers, such as Goodman Fielder, than small regional suppliers, such as niche pie manufacturers. Similarly, local cafes are more likely to develop supply chain relationships with small regional retailers, such as niche pie manufacturers, than larger suppliers, such as Goodman Fielder. This is because of the relative importance factor. This is reinforced by international case studies which demonstrate the success of VMI and supply chain initiatives between large organisations such as Procter & Gamble and Wal-Mart

(Mentzer et al., 2000) and the large retailers and suppliers in Australia (Wright and Lund, 2003).

Once an organisation has established the need for VMI and strategic supply chain relationships, through the Industry-level framework, and determined those customers and suppliers who are relatively important to them, they should then proceed with the Develop and Nurture stages of the Organisation-level framework. These stages are more practical and provide organisations with the tools to create a successful Organisation-level relationship.

The Develop stage of the framework involves establishing a shared vision for the VMI and supply chain relationship and ensuring the organisations are compatible. This stage should be completed at the commencement of the relationship and then regularly reviewed and updated as necessary. The culture of the organisations may develop over time, as noted by Siemieniich, et al. (1999) in their UK FMCG case study.

The Nurture stage of the Organisation-level framework identifies the key characteristics of the relationship which must be established and then nurtured on an on-going basis. These factors must not be permitted to lapse or be damaged because the whole relationship may then collapse. These characteristics should be present at all levels of the relationship to maximise the benefits of the supply chain initiatives adopted. The importance of each of these characteristics may vary over time as the relationship develops and different supply chain initiatives are implemented. For example, the conflict management factor should be focused on at the beginning of the relationship when conflict procedures and agreements are established. It should then take a lower priority while the relationship is operating effectively, and should only become a key factor again when problems in the relationship are experienced.

The breaking point of VMI and supply chain relationships was not determined in this research due to the success of the Goodman Fielder and Progressive relationship and both organisation's on-going commitment to the relationship. There is an opportunity for further research to determine the minimum level of

these characteristics required in order to develop and maintain a successful VMI and supply chain relationship.

Answers to the Organisation-level secondary research questions provided several theoretical insights.

Firstly, this research does not prescribe a single VMI and supply chain relationship structure appropriate for the New Zealand food industry. Rather, it was found that the type and nature of VMI and supply chain relationships should reflect the goals and objectives of the organisations. This finding is consistent with Mentzer et al. (2000) who found that the time and resources invested in strategic relationships should be outweighed by the resulting benefits.

Secondly, this action research case study highlighted the informal nature of New Zealand food industry supply chain relationships relative to the UK. The Goodman Fielder and Progressive relationship has evolved over time based on an initial VMI project scope document agreed by Senior Management in both organisations. Unlike the UK case study, described by Siemienuich et al. (1999), there were been no formal documents in relation to a code of ethics, performance measures, roles and responsibilities or job descriptions. This reflects the informal nature of many New Zealand relationships.

Thirdly, this research found that although external environmental factors such as lead times on imported products and real estate costs vary between New Zealand and the US, the nature of VMI, CRP and EDI benefits are similar in both countries.

Finally, this research did not address secondary research question #14 on factors unique to the food industry. The scope of this research was limited to the food industry and as a result the findings have not been tested in other industries. Section 8.9 discusses further opportunities for research on the application of this framework to other industries.

8.5 Conclusions from the Management-level findings

The Management-level research sought to identify the key determinants of successful VMI and strategic supply chain relationships using a product category as the unit of analysis. A New Zealand food industry action research VMI case study formed the basis of this research, and as a result, the findings may be limited to product categories, organisations and food industries demonstrating similar characteristics.

The Management-level framework provides a model for practioners to follow when determining how to establish successful VMI and supply chain relationship practices. Nine factors impacting the success of Management-level supply chain relationships were identified. These were presented in section 7.9.

The Initiate and Document stages of the framework provide the foundations for successful Management-level VMI and supply chain relationships which best facilitate the initiatives identified in the Execute stage.

Obtaining management buy-in to the VMI and supply chain initiatives is critical to the ongoing success of the relationship. As noted in the literature review, researchers have found that one of the key barriers to fully realising the benefits of VMI is a lack of top-level management support. Management buy-in should be established in conjunction with Stage 2 of the Organisation-level framework which involves developing a shared vision and ensuring organisational compatibility. By involving key stakeholders in the initial vision setting process, management buy-in should be easier to achieve. As Wong (1999, p.787) found "Inspired by cooperative goals, the supply partner is more willing to invest in the relationship with its buying partner and become more helpful and contributive to the relationship." This is supported by Bagchi and Skjoett-Larsen (2002, p.92) who state "Supply chain integration may fail to blossom without organisational integration among supply chain partners." Thus, by integrating factors from the Organisation-level framework with factors from the Management-level framework, superior VMI and supply chain relationships can be formed.

Stage 3 (Execute) of the management level framework identifies the key information requirements for a successful VMI and supply chain relationship. The importance of each of these factors will vary depending on the nature of the VMI relationship and the product categories involved; however all factors are required, to some extent, to ensure a successful VMI and strategic supply chain relationship.

This research identified product shelf life, demand volatility and holding costs as the key product attributes influencing the importance of the Stage 3 factors. In combination, the Stage 3 factors provide transparency of supply chain information, for both retailers and suppliers, to minimise the impact of the bullwhip effect (Lee et al., 1997). This was a key benefit of the Goodman Fielder and Progressive Management-level VMI relationship, and emphasises the importance of these factors in successful VMI and supply chain relationships. These findings are consistent with Saipe and Geiger's (1996, p.4) research which found that VMI "… fosters co-operation in the supply chain – forms partnerships and cross-functional lines of communication that can help to improve the pipeline process and relationships."

This research found that monitoring DC stock levels was particularly important for products with one or more of the following characteristics: high value, short shelf life and high storage costs. Tracking DC dispatches, monitoring stock levels, agreeing forecasts and communicating promotional activity were key in minimising the bullwhip effect described by Lee et al. (1997), particularly for products, such as flour and cookies, with high promotional uplift and low base line sales. Agreeing forecasts was particularly important for housebrand products made exclusively for Progressive because, unlike Goodman Fielder branded products, no stock is held for other customers.

In this research, VMI was not implemented in its true sense because the supplier, Goodman Fielder, did not take full responsibility for order taking. Rather, Goodman Fielder used VMI as an opportunity to work with Progressive to communicate information and re-engineer supporting systems and processes. The Stage 3 information on inventory levels, sales volumes, forecasts, promotional

activity and production requirements was communicated manually via weekly tracking sheets on selected product categories. In other VMI relationships, where the supplier has full responsibility for ordering, this information may be communicated in the form of purchase orders and promotional forecasts. VMI relationships that have also adopted EDI may communicate this information transparently based on store sales generating replenishment orders. There is an opportunity for further research on the application of the Stage 3 Management-level factors to other VMI and EDI environments.

Answers to the Management-level secondary research questions provided several theoretical insights.

Firstly, it was found that in the New Zealand food industry the two main supermarket retailers have adopted different attitudes to forward buying practices. Progressive have moved away from forward buying practices while Foodstuffs have retained them, particularly in the individually owned and operated stores. The main reason for the difference is the need for the individually owned and operated Foodstuffs stores to minimise their purchase costs in the absence of greater purchasing power through high volume DC purchases by retailers, such as Progressive. In support of the move away from forward buying practices, suppliers to the industry have begun to implement everyday low pricing strategies and scan-based discounting, particularly in Progressive. These changes in the New Zealand industry indicate strong support for Thomas et al. (1995) findings that in concentrated industries, it is less costly for a critical mass of operators to be formed to eliminate forward buying practices. In this research, it can be surmised that the Woolworths acquisition enabled Progressive to gain sufficient critical mass to eliminate forward buying practices without reducing the associated purchase price benefits relative to Foodstuffs.

Secondly, the benefits to Progressive and Goodman Fielder of implementing VMI are consistent with international research findings. The action research case study results demonstrated that VMI increases customer service levels, reduces inventory levels and minimises the bullwhip effect. These are consistent with international VMI research findings by Lee et al. (1997), Saipe and Geiger (1996)

and Waller et al. (1999). These action research results were achieved without the use of EDI, which supports the findings of Clark and Hammond (1997). An important benefit of VMI to both Progressive and Goodman Fielder was improved communication and a stronger working relationship at all levels of management.

Offsetting these benefits were several costs. From Goodman Fielder's perspective there were additional VMI and supply chain relationship resource costs and a one-time volume reduction as the initial DC stock levels were decreased. From Progressive's perspective there were additional costs in terms of additional resource required to manage the VMI relationship and increased discounting to reduce the initial excess stock levels. These costs are consistent with the disadvantages of VMI identified by Saipe and Geiger (1996).

Finally, this research has shown how industry concentration may be a key driver, rather than prohibitor, of VMI relationships as organisations seek to increase profitability in a highly competitive and oligopolistic market. Traditionally, VMI has been considered a potential threat to competitiveness in a concentrated industry due to greater sharing of cost, financial, and supply chain information. As Sankaran et al. (2004, p.4) noted "Several New Zealand manufacturers struggle to establish genuine partner-style relationships with vendors who, of economic necessity, continue to supply their competitors – a challenge that may not prevail in larger economies elsewhere in the world." This research on the New Zealand food industry has shown that the benefits of VMI outweigh the perceived loss of competitive advantage due to greater information sharing. In the action research case study, the VMI focus on the flour category enabled Progressive and Goodman Fielder to grow the category faster than total market growth while, at the same time, lowering inventory levels and improving customer service levels. Further research is required to establish whether this rationale can be applied in other industries and countries.

8.6 Conclusions from an action research perspective

Action research methods were adopted in this thesis mainly to provide the researcher with flexibility in response to the rapidly changing food industry while, at the same time, enabling the researcher to fully immerse herself in the situation with an intent to change. This section assesses Eden and Huxham's (1996) characteristics of action research on an overall basis and then summarises the contributions of this research to knowledge from an action research perspective.

8.6.1 Overall assessment of action research characteristics

Table 12 below summarises the researcher's judgement on how each of Eden and Huxham's (1996) fifteen key characteristics of action research were incorporated into the overall research based on the scoring defined in section 4.4.7. The scores range from 0 to 4, with 4 being the highest level of achievement.

	Characteristic	Method of incorporation into research	Estimated achievement
1	Integral involvement by the researcher with an intent to change the organisation	The researcher lead the Goodman Fielder and Progressive VMI project with direct responsibility for improving the supply chain through reduced inventory and improved customer service.	4
2	Must have implications beyond those required for action or generation of knowledge in the domain of the project	The purpose of the research was to develop series of interrelated framework relevant to the New Zealand food industry. The key findings were described in general terms where possible rather than in situation-specific terms.	3
3	Explicit requirement to elaborate and develop theory	The researcher continuously sought to raise broader questions that were of interest to a wider community who work in a wide variety of contexts. The ultimate objective was to develop a practical model for food industries throughout the developed world.	3

	Characteristic	Method of incorporation into research	Estimated achievement
4	Theories developed must be supported or developed through action research	There was a clear focus on developing and elaborating theory from practice rather than visa versa. A literature review was used to provide theoretical support and justification for the action research findings.	3
5	System of emergent theory	The purpose of this research was to develop theory out of the research rather than to test pre-determined theories in research. The research was structured so the Industry-level framework, which provided background information, was developed in conjunction with the Organisation and Management-level frameworks. The first-cut frameworks were developed, justified and refined prior to the final frameworks being presented.	3
6	Incremental theory building – cycle of developing theory to action to reflection to developing theory	The research was cyclical in nature with clear planning, implementation, reflection and re-planning stages. Smaller case studies within the main action research case study were used to justify and validate the initial research findings.	3
7	Descriptive theory must recognise the practical implications in the final documentation	There was a clear focus on developing and elaborating theory from practice rather than visa versa. The final frameworks have a practical focus rather than deep theoretical basis. The research was documented in a descriptive manner which recognises the practical aspects of action research.	3
8	Systematic reflection	Reflections were formally documented with clear links to the implementation and re-planning phases of action research. A researcher's journal was maintained throughout the research and contained observation notes, methodological notes and personal notes.	3

	Characteristic	Method of incorporation into research	Estimated achievement
9	Process of exploration of data must be either replicable or be capable of being explained to others	A method of data exploration was developed to ensure that the outcomes of data exploration were not based on intuition alone but were based on a formal process of integrating records of reflection, planning, implementation and re-planning.	3
10	Writing about research is an important aspect of theory exploration and development	The written research process followed the latter stages of an action research project methodology (Figure 10).	3
11	Adherence to characteristics 1 – 10 is a necessary but not sufficient condition for action research	Noted that characteristics 1 – 10 are concerned with internal validity and require characteristics 12 – 15 for external validity.	3
12	Reflection and data collection processes can not be captured by other approaches	This research utilised the cyclical nature of action research and the critical reflection requirements to develop theory. The research actions and outcomes were continuously evolving in response to changes in the industry, such as Progressive's acquisition of Woolworths. Findings from one process were modified and applied to other areas for discussion and reflection.	3
13	Triangulation methods should be fully exploited and reported	A literature review and case studies were used to compare and contrast the action research findings with theory to ensure the final frameworks developed were complete and robust. Smaller case studies within the main action research case study were used to justify and validate the initial research findings.	3
14	Validity and applicability of the results depends on the history and context of the research	The purpose of this research was to develop a framework applicable to the New Zealand food industry. In order to develop a general framework the context of the case study and its applicability to the wider industry were carefully considered	2

	Characteristic	Method of incorporation into research	Estimated achievement
15	Theory must be disseminated in such a way to be of interest to a wider audience than those integrally involved with the action/research	The purpose of the research was to develop a framework relevant to the New Zealand food industry. The final thesis has been presented with 3 stand-alone, yet integrated, sections – Industry-level framework, Organisation-level framework and Management-level framework.	3

Table 12: Review of characteristics of action research - overall

Based on the above, the overall research appears to have met, in the range of 2 to 4, all fifteen key characteristics of action research as identified by Eden and Huxham (1996). The majority of characteristics were estimated to have achieved a score of 3 out of 4, reflecting incorporation of the characteristic into the research at a detailed-level, with limited opportunity for additional focus. The characteristics with outlying scores of 2 and 4 are discussed and justified below.

The first characteristic of integral involvement by the researcher was the highest scoring with an estimated achievement of 4 out of 4. This reflects that, in the researcher's judgment, the characteristic was fully incorporated into the research. Eden and Huxham (1996, p.530) state "… action research must be concerned with intervening in action; it is not enough for the researcher simply to study the action of others." This research was designed to provide the researcher with integral involvement in the case study with the ability to change the organisations involved. Chapters 6 and 7 demonstrate how the researcher was integrally involved in the VMI project and provide examples of actions taken by the researcher to implement change. As a result, this factor was given a score of 4.

The fourteenth characteristic was ranked the lowest with a score of 2 out of 4. This reflects the characteristic being incorporated into the research at a medium-level with some further opportunity for focus. As Eden and Huxham (1996, p.537) state "The history and context for the intervention must be taken as critical to the interpretation of the likely range of validity and applicability of the results

of action research." Although this research was based on a New Zealand food industry case study, the findings have been presented for application by organisations in food industries throughout the developed world. The findings are potentially limited to organisations in concentrated food industries, displaying similar characteristics to the New Zealand food industry, such as over capacity in process industries, acceptance of technology spill over and concentration of retailers. Further research is required to understand the context of global food industries to assess the validity, applicability and generalisation of these research findings.

8.6.2 Contributions to knowledge from an action research perspective

This research shows how action research, supported by soft systems methods, can be used to study VMI and strategic supply chain relationships. The cyclical nature of action research, along with the requirement for critical reflection, was incorporated into the research using multiple case studies within the main case study.

By adopting an action research approach to the Goodman Fielder and Progressive case study the researcher was encouraged to use repeated cycles of intend/plan, act and review to analyse the situation, implement changes and observe the outcomes. The initial planning stage involved the researcher developing the primary research question and determining how to answer it. Actions were then taken at the Management and Organisation-levels. The emphasis on critical reflection throughout the action research cycles encouraged the researcher to step back from the situation and view the actions and outcomes from a more holistic perspective. Academic and industry insights were incorporated into the critical reflection process via the literature review. The action research cycle used in this research, along with the inputs and outputs of the process are shown in Figure 30 below.
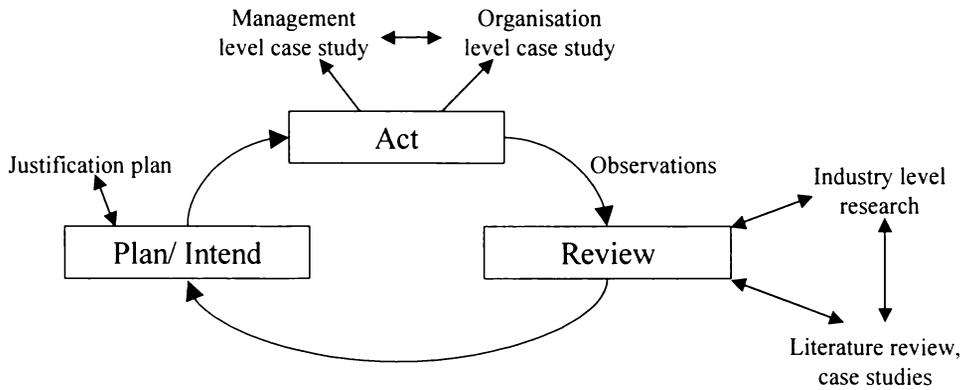
Figure 30: Inputs and outputs of the action research cycle

(Source: Adapted from Dick, 1993, p.5)

The use of case studies within the main action case study emphasised the cyclical nature of action research and enabled the researcher to validate and justify the initial research findings through further cycles of action research.   Supporting these larger cycles, were smaller cycles within each case study.   As Dick (2000b. p.5) states "There are cycles within cycles, within yet other cycles."   The use of multiple case studies is best demonstrated Figure 31 below showing the spiral of action research.
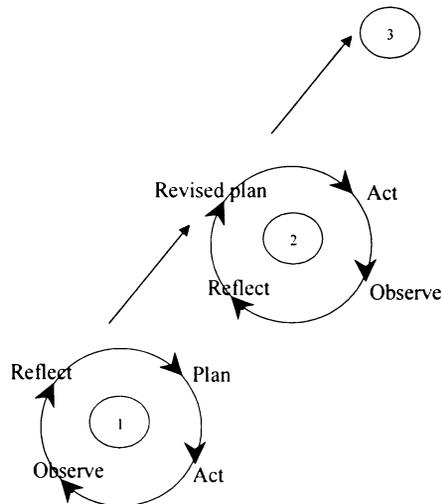
Figure 31: The spiral of action research

(Source: Zuber-Skerritt, 2001, p.15)

Using the Management-level framework as an example, the first cycle can be represented by the flour category action research case study which involved cycles of developing ideas, taking actions and reflecting on the VMI flour initiatives.

These cycles resulted in the development of the first-cut framework. The Management-level justification plan was then developed and formed the revised plan which was then applied in the second spiral through the cookie, spread and oil category case studies. Multiple cycles of acting, observing outcomes, reflecting and planning occurred within these categories as the researcher incorporated prior findings and theory from the literature to refine and improve the processes. The outcome of the second spiral was the final Management-level framework.

The critical reflection process required the researcher to step back and regularly and systematically reflect on what went well and what did not go well. As Dick (2002, p.3) noted "With regular, critical and systematic reflection we can have more confidence in our research conclusions. Without it we may overlook some important evidence." The trust and openness factors in the Organisation-level framework are examples of how insights from the critical reflection process were incorporated into the final framework. Without formally stepping back from the day-to-day project and reflecting on the VMI relationship and the key determinants of its success, these factors may have continued to be taken for granted and not nurtured and developed. Instead, because of the critical reflection process, these factors were identified as key determinants for successful VMI and strategic supply chain relationships.

Triangulation formed an important part of the research by providing an objective benchmark against which the action research findings could be compared to ensure that knowledge was being advanced appropriately. The initial findings were triangulated through further action research cycles, using multiple case studies within the main action research case study, and comparison with literature.

This research has also shown how SSM was used in conjunction with action research methods to develop VMI and supply chain relationship theory. SSM encouraged the researcher to step out of the real world and apply systems thinking to the situation before re-immersing herself in the real world action research case study. SSM helped the researcher integrate theory with practice in a structured manner. Conceptual models were developed from both the literature review and

observations from the action research case studies. Figure 32 below shows how Checkland and Scholes' (1989) SSM framework was applied in this research.

Key

→ Checkland's SSM process flow

----► Additional process flows incorporated into this action research
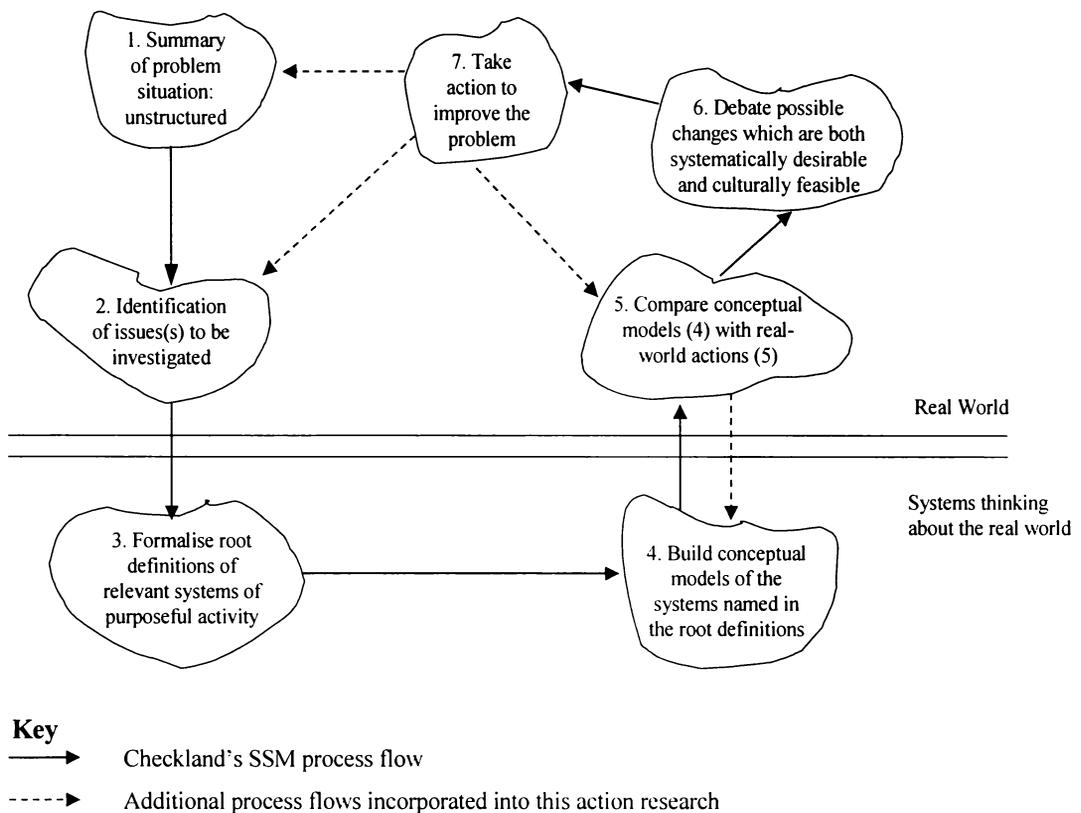
Figure 32: How SSM was applied in this research

(Source: Adapted from Checkland and Scholes, 1989)

The dotted lines indicate how action research cycles were incorporated into the SSM model. Rather than apply steps 1 – 7 in a sequential order, the researcher used outcomes of the SSM steps to feedback into previous steps. For example, in the Organisation-level action research the actions taken during the South Island DC consolidation (step 7) were used to clarify the problem situation (step 1) and identify further issues to be investigated (step 2). The justification plan posed questions, debating the first-cut framework (step 6), which were then used to take further actions through the North Island ambient DC consolidation and refine the framework (step 5). Triangulation of the action research findings through a literature review helped compare and contrast the real world findings with systems thinking about the real world (step 4).

These findings suggest that action research, used in conjunction with SSM, can be adopted by organisations in everyday practice, to assist with the development of knowledge. The process of critical reflection followed by repeated cycles of intend/plan, act and review can help organisations understand why certain practices happen and assist them to learn from both mistakes and successes. Using a case study within a case study approach enabled the researcher to incorporate findings from the first case study into further case studies. It also provided an opportunity to validate the initial research findings through a further, clearly defined, action research cycle. These findings support Dick's (1997, p.5) claims that action research "… is most effective when the end result emerges from the data. The conclusions drawn are data-based, preferably drawing the data from multiple sources. The conclusions emerge slowly over the course of the study."

These findings are perhaps best summarised by Pirsig (in Outward Bound, 1989, p.2) "You look at where you're going and where you are and it never makes sense, but then you look back at where you've been and a pattern seems to emerge. And if you project forward from that pattern, then sometimes you can come up with something." This philosophy holds true from an action research perspective.

8.7   Personal insights and learnings

The action research methods used in this thesis encouraged me to take time out of my busy day–to–day activities to critically reflect on things going on around me.

The PhD requirement to add contribution to knowledge through research encouraged me to not only look at the VMI relationship between Goodman Fielder and Progressive, but to develop further understanding and insights through a literature review. International research and case study findings helped guide me through this research.

Through the literature, I learnt not only what and how supply chain and VMI initiatives are used overseas, but I developed an understanding of why these practices have been adopted. Understanding 'why' these practices are used

overseas provided me with confidence to discuss these with Goodman Fielder and Progressive and recommend their implementation in New Zealand. For example, understanding Lee et al.'s (1997) bullwhip effect enabled me to clearly and simply explain the flour category graphs showing the gaps between DC purchases and DC dispatches (refer to section 7.3.2). This technical understanding helped me to identify the root causes of the problem and thus develop more permanent solutions, rather than continuing to address the symptoms of repeated out of stocks/excess stocks.

My role as both an employee of Goodman Fielder, and a researcher, has demonstrated how action research can be applied in a practical business situation. Action research enables the researcher to immerse themselves in the situation with an intent to change. A lot of businesses establish project teams to affect change. A key difference between this and action research is the requirement for formal critical reflection. Project teams often conduct post-implementation reviews as a one off review. In contrast, action research requires the researcher to regularly reflect on key actions, findings and outcomes. These are supported by academic insights from literature which help explain 'why' certain actions and outcomes occur. The ah-ha's and insights arising from the reflection process demonstrate how value can be added to organisations by taking time out to reflect on actions and outcomes with an intent to further improve processes and systems.

Finally, this research journey has enabled me to develop strong reflective skills which I now apply on a daily basis. I am more critical of the status quo now and often challenge existing practices by considering why things are done the way they are. I am more willing to try new ideas and observe what happens in order to learn from the process while at the same time potentially achieving a positive result. As Law (as cited in Outward Bound, 1989, p.6) stated "Experience is a hard teacher because she gives the test first, the lesson afterward."

Goodman Fielder and Progressive have adopted a 'trial-and-see' approach in relation to their VMI relationship. This attitude has enabled both organisations to adopt VMI initiatives that may not have otherwise been adopted. For example, traditionally Woolworths ordered oil products on a Tuesday and Thursday.

During the oil category action research it was noted that the DC was often short of stock on a Monday morning. A trial was established to increase the ordering frequency to Monday, Tuesday and Thursday. While this involved additional work for the Woolworths Buyer and risked increasing overall inventory levels, the resulting benefits of a more timely response to weekend DC dispatch volumes, less out of stocks on key product lines and no increase in overall stock levels resulted in the revised buying frequency being maintained.

In summary, this research has been a personal journey for me. During this research period, I have gained a greater understanding of VMI and strategic supply chain relationships and have developed research and critical reflection skills. These provide me with a 'toolbox' of skills to apply in further real-world situations. This research has also provided me with an opportunity to contribute to academic knowledge from both a supply chain relationship and an action research perspective.

8.8   Limitations

This section summarises the potential limitations of this research, particularly from a general application perspective.

This research was conducted using an action research case study from the New Zealand food industry. Section 5.5 discussed those factors potentially unique to the New Zealand food industry and to New Zealand as a country which may limit further application of this framework to other food industries in the developed world.

It was found that the high degree of supermarket retailer concentration in New Zealand has a strong influence on the industry structure, supply chain initiatives and profitability. In New Zealand, the two main supermarket retailers have approximately 95% market share. This differs from other food industries which have a lower degree of concentration of retailers. As a result, these research findings may need to be modified and further adapted to apply to less concentrated food industries in other countries.

Section 5.5.3 identified four key factors potentially unique to the New Zealand food industry which may further limit the general application of this framework to other countries. It was found that in New Zealand there tends to be over-capacity in process industries, high levels of capital investment, acceptability of technology spill over to competitors, and concentration of industries. These factors can partially be attributed to the small, geographically diverse market place in New Zealand. In order to provide adequate returns to shareholders organisations are consolidating and rationalising operations, seeking export opportunities to grow volumes and leveraging investments in technology through exports.

The use of a single case study is another potential limitation of these research findings to food industries throughout the developed work. In order to increase the general applicability of these research findings multiple case studies within the main action research case study were used to justify and refine the initial research findings. Triangulation methods were used where possible to add further robustness to the findings and justify the inclusion and/or exclusion of key factors highlighted in the first-cut frameworks.

8.9   Opportunities for further research

Research is a continuous process as indicated by the ongoing cycles of action research. There is no clear beginning and no clear end to the action research cycles. As a result while this research has contributed to knowledge, as summarised in this chapter, there are opportunities to build upon this knowledge and investigate the validity of the findings in different environments. The conclusion sections above identified a number of future potential research areas. This final section discusses potential future research directions based on the findings of this and other international research.

8.9.1   Application of findings to other industries and countries

This research was conducted in New Zealand, a highly concentrated food industry. As a result there is an opportunity to validate these findings in less concentrated food industries throughout the developed world. There is also an

opportunity to consider the relevance of these findings in other highly concentrated industries throughout the world. These research opportunities can be summarised as follows:

- Is this framework applicable in less concentrated food industries throughout the world?
- Can this framework be generalised to other industries and countries throughout the developed world?
- Is industry concentration is a key driver, or prohibitor, of supply chain initiatives in other industries and countries?
- Can the Stage 3 (Execute) Management-level factors be generalised for application in other VMI and EDI environments?

These research opportunities could be studied via action research case studies in other countries.

8.9.2 Testing the boundaries of the frameworks

This research identified the key determinants of successful supply chain relationships. The minimum level required for each determinant was not assessed. Further research is required to understand why some VMI relationships have failed and the breaking point of the relationship. Any interesting question could be:

- What is the minimum level required for each Organisation-level characteristic in order to develop and maintain a VMI and supply chain relationship?

In most cases this research would need to be performed following the disestablishment of a VMI or supply chain relationship on a case study basis.

8.9.3 Further supply chain research in New Zealand

From a New Zealand food industry perspective there is a need for further research on the impact of rationalisation of key supermarket retailers on both consumers

and suppliers. In addition, there is a need to study the impact on the total New Zealand food industry supply chain of Progressive requiring their suppliers to centralise their supply through DCs versus Foodstuffs continuing to require direct-store-deliveries.

From a more general perspective, the uniqueness of the New Zealand food industry provides the opportunity for further research. Interesting research propositions arising out of this research include:

- The delay in adoption of global supply chain initiatives, due to retailer consolidation, has cost the New Zealand food industry $x
- Oligopolistic industries require more efficient and effective supply chains, relative to monopolistic industries, in order to maintain and grow profitability

These research opportunities could be studied via quantitative methods using surveys and questionnaires.

8.10 Final summary

The idea for this research first arose in 2001 when various senior personnel at Goodman Fielder and Progressive claimed that there were opportunities for the New Zealand food industry to improve its supply chain through adoption of global industry initiatives and development of long-term supply chain relationships. This comment subsequently led to a VMI relationship being established between Goodman Fielder and Progressive, with the researcher being appointed as VMI Project Manager. The prospect of being able to observe and influence the situation unfolding provided the researcher with an opportunity to contribute to knowledge, on VMI and strategic supply chain relationships in the New Zealand food industry, through action research.

This thesis has followed the Goodman Fielder and Progressive VMI relationship from its establishment in 2001 through the acquisition and integration of Woolworths to today where the relationship is continuing to go from strength to

strength as new initiatives are identified, piloted, reviewed and then implemented across other product categories, DCs and suppliers as appropriate. At the time of submission of this thesis, the researcher was still working as the Goodman Fielder VMI Project Manager with Progressive.

The success of this relationship has been recognised at a number of levels within both organisations as demonstrated by the quotes below.

> Just wanted to thank you for all the great work you were doing lately, especially in regard to the PEL [Progressive] acquisition of WW [Woolworths] and ensuring that the liaison with XXX [Business Account Manager] in particular was at exceptional levels (e-mail from CEO of Goodman Fielder New Zealand, October 2002).

> Hi there,
> Just wanted you to know what a pleasure it is to deal with XXX and YYYY [the researcher] - efficient, helpful, 'normal' people. As you well know - I do not get that many in this job! (e-mail from Progressive Category Manager, October 2003).

> Thanks XXXX [the researcher] and all concerned. The Bakeries appreciate the quick response and help with the issues on these products (e-mail from Progressive Bakery Manager, July 2003)

The key outcome of this research is a working model comprising three integrated frameworks, which identify the key determinants of successful VMI and strategic supply chain relationships in the New Zealand food industry. The frameworks, which are presented in chapters 5 through 7, reflect the key industry, organisation and management-level factors impacting on VMI and supply chain relationships in New Zealand. These frameworks are practical models which have been applied in practice using the Goodman Fielder and Progressive action research case study. Further research is required to determine the general applicability of these frameworks to less concentrated food industries in the developed world.

A secondary outcome of this research is the contribution to knowledge from an action research perspective. This research was the first time that action research methods had been used to study VMI and supply chain relationships in the New Zealand food industry. The research findings indicate that action research,

supported by SSM, can be applied in a VMI and supply chain relationship situation to bring about change. Furthermore, the critical reflection component of action research can be used to gain critical insights into why certain things occur, providing justification for further action.

The findings of this research can be summed up by an anonymous quote (Outward Bound, 1989, p.28):

> "Coming together is a beginning
> Keeping together is progress
> Thinking together is unity
> Working together is success"

References

Applegate, D. B. (2001). "Controlling joint venture risk", *Internal Auditor*. June 2001, pp. 44 – 49.

Bagchi, P. K. & Skjoett-Larsen, T. (2002). "Integration of information technology and organisations in a supply chain", *The International Journal of Logistics Management*, Vol. 14, No. 1, pp. 89 – 108.

Birchfield, D. (2002). "Supply change management", *Management,* March 2002, pp. 50 – 54.

Bowersox, D. & Cooper, M. (1992). *Strategic marketing channel management*, McGraw-Hill Inc, Singapore.

Brandenburger, A. M. (1996). *Coopetition*, Doubleday.

Brickley, J., Smith, C. & Zimmerman, J. (1997). *Managerial economics and organisational architecture*, McGraw-Hill, New York.

Brouthers, K. D., Brouthers, L. E. & Wilkinson, T. J. (1995). "Strategic Alliances: Choose your partners", *Long Range Planning*, Vol. 28, No. 3, pp. 18 – 25.

Buchanan, J. (1997). "An introduction to the soft systems methodology", *Notes prepared by Dr John Buchanan.*

Burn, D. (1999). "Rising to the occasion: Food manufacturers and logistics providers' distribution solutions and value-added services", *Food in Canada*, Vol. 59, No. 2, pp. 26 – 30.

Buzzell, R., Dew, M., Flaherty, T., Jaikumar, J., Quelch, J. & Salmon, W. (1987). "Trade promotion and food distribution costs", study conducted for the Food Marketing Foundation, N. P., mimeo, December 1987.

Carol, R. (1999). "Two heads are better than one", *Grocery Headquarters*, Vol. 65, No. 1, pp. 49 – 53.

Carter, J. R. (1990). "The dollars and sense of electronic data interchange", *Production and Inventory Management*, Vol. 31, No. 2, pp. 22 – 26.

Chapman, P., Christopher, M., Juttner, U., Peck, H. & Wilding, R. (2002). "Identifying and managing supply chain vulnerability", *Journal of Logistics Management*, May 2002, pp. 59 - 64.

Checkland, P. (1981). *Systems thinking, systems practice,* Chichester, Wiley.

Checkland, P. (1991). "From framework through experience to learning: The essential nature of action research." In Nissen, H. E., Klein, H. K., & Hierschheim, R. (Eds), *Information systems research: Contemporary approaches and emergent traditions*, pp. 1 – 7. Amsterdam: Elsevier.

Checkland, P. & Holwell, S. (1998). "Action Research: Its nature and validity", *Systemic Practice and Action Research*, Vol. 11, No. 1, pp. 9 – 21.

Checkland, P. & Scholes, J. (1990). *SSM in action*, Chichester, Wiley

Cheung, K. L., & Lee, H. L. (2002). "The inventory benefit of shipment coordination and stock rebalancing in a supply chain", *Management Science*, Vol. 48, No. 2, February 2002, pp. 300 – 306.

Clark, T.H. & Hammond, J.H. (1997). "Reengineering channel reordering process to improve total supply chain performance", *Production and Operations Management Society*, Volume 6, Number 3, pp. 248 – 265.

Clemons, E. K., Row & M. C. (1992). "Information technology and industrial cooperation: The changing economics of coordination and ownership", *Journal of Management Information Systems*, Fall 1992, Vol. 9, No. 2, pp. 9 – 28.

Corbett, C. J. & Blackburn, J. D. (1999). "Partnerships to improve supply chains", *Sloan Management Review,* Vol. 40, Issue 4, pp. 71 – 82.

Coriolis Research (2003). "Eight reasons to work in FMCG", *NZ Herald*, 16 July 2003, p. H8.

Coriolis Research (2001). "Fast Moving Consumer Goods Retailing in New Zealand", Report to Progressive Enterprises, June 2001, Auckland, New Zealand.

Coughlan, P. & Coghlan, D. (2002). "Action research for operations management", *International Journal of Operations & Production Management*, Vol. 22, No. 2, pp. 220 – 240.

Dick, B. (1993). *You want to do an action research thesis?* Retrieved 2 August 2002, from http://www.scu.edu.au/schools/sawd/arr/arth/arthesis.html

Dick, B. (1997). *A beginner's guide to action research.* Retrieved 2 August 2002, from http://www.scu.edu.au/schools/sawd/arr/guide.html

Dick, B. (1999). *Sources of rigour in action research: addressing the issues of trustworthiness and credibility.* Retrieved 30 August 2002, from http://www.scu.edu.au/schools/gcm/ar/arp/rigour3.html

Dick, B. (2000a). *Postgraduate programs using action research*. Retrieved 2 August 2002, from http://www.scu.edu.au/schools/gcm/ar/arp/ppar.html

Dick, B. (2000b). *Cycles within cycles*. Retrieved 30 August 2002, from http://www.scu.edu.au/schools/gcm/ar/arp/cycles.html

Dick, B. (2002). *Action research: Action and research*. Retrieved 30 August 2002, from http://www.scu.edu.au/schools/gcm/ar/arp/aandr.html

Dick, B. & Swepson, P. (1997). *Action research FAQ: "Frequently asked questions" file*. Retrieved 30 August 2002, from http://www.scu.edu.au/schools/gcm/ar/arp/arfaq.html

Dyer, J. H. (1996). Specialised supplier networks as a source of competitive advantage: Evidence from the auto industry. *Strategic Management Journal*, Vol. 17, pp.271 – 291.

Dyer, J. H., Cho, D. S. & Chu, W. (1998). Strategic supplier segmentations: The next "best practice" in supply chain management. *California Management Review*, Vol. 40, Issue 2, pp. 57 – 77.

Eden, C. & Huxham, C. (1996). "Action research for the study of organisations", *Handbook of Organisation Studies*, Thousand Oaks, Sage Publications, London, pp.526 – 542.

El-Ansary, A. & Stern, L. W. (1972). "Power and measurement in the distribution channel", *Journal of Marketing Research*, Vol. 9, pp. 47 – 52.

Ellram, L. (1991). "Supply chain management: The industrial organisational perspective", *International Journal of Physical Distribution and Logistics Management*, Vol. 21, No. 1, pp. 13 – 22.

Ellram, L. S. & Cooper, M. C. (1990). "Supply chain management, partnerships, and the shipper-third party relationship", *The International Journal of Logistics Management*, Vol.1, No. 2, pp. 1 – 10.

Fernie, J. (1995). "International comparisons of supply chain management in grocery retailing", *The Service Industries Journal*, Vol. 15, No. 4, pp.134 – 147.

Fontana, A. & Frey, J. (1994). "Interviewing: The art of science" in Denzin, N. & Lincoln, Y., *Handbook of qualitative research*, Sage, London, pp. 361 – 376.

Gattorna, J. L. & Walters, D. W. (1996). *Managing the supply chain: A strategic perspective*. Palgrove, US.

Hall, C. (2002). *What is VMI?* Retrieved 10 May 2002, from http://vendormanagedinventory.com/article5.htm

Hammersley, M. & Atkinson, P. (1994). 'Ethnography and participant observation' in Denzin, N. & Lincoln, Y., *Handbook of Qualitative Research*, Sage, London, pp. 248 - 261.

Handfield, R. B. & Nichols, E. L. (2002). *Supply chain redesign: Transforming supply chains into integrated value systems*. Prentice Hall, Upper Saddle, US.

Hill, C. & Jones, G. (1998). *Strategic management theory – An integrated approach*, Houghton Mifflin, Boston, New York.

Hill, C. A. & Scudder, G. D. (2002). "The use of electronic data interchange for supply chain coordination in the food industry", *Journal of Management Operations*, Vol. 20, pp. 375 – 387.

Intentia (2001). *Continuous replenishment program and vendor managed inventory*, Intentia International AB.

Intentia (2003). *Industry trends: Collaboration is the cornerstone of a future-oriented food and beverage company*, Intentia Australia Pty Limited.

Jain, S. C. (1981). *Marketing, Planning and Strategy*, South-Western Publishing Co., Cincinnati, Ohio.

Kiefer, A, W. & Novack, R. A. (1999). "An empirical analysis of warehouse measurement systems in the context of supply chain implementation", *Transportation Journal*, Vol. 38, No. 3, pp. 18 – 27.

Kincheloe, J. (1991). *Teachers as researchers: Qualitative inquiry as a path to empowerment.* London, Falmer.

Kopczak, L. R. & Johnson M. E. (2003). "The supply chain management effect", *MIT Sloan Management Review*, Spring 2003, pp. 27 – 34.

Kulp, S. C. (2002). "The effect of information precision and information reliability on manufacturer-retailer relationships", *The Accounting Review,* Vol. 77, No. 3, July 2002, pp.653 – 677.

Kurt Salmon Associates, Inc. (1993). *Efficient consumer response: Enhancing consumer value in the grocery industry,* Food Marking Institute, Washington DC.

Lambert, D. M., Emmelhainz, M. A. & Gardner, J. T. (1996). "Developing and implementing supply chain partnerships", *International Journal of Logistics Management*, Vol. 7, Issue 2, pp. 1 – 17.

Laughlin, C. (1989). "Why EDI should be the only thing separating brokers, shippers and carriers", *Professional Broker*, (September/October 1989. pp. 20 – 28.

Lee, H. L. & Billington, C. (1992). "Managing supply chain inventory: Pitfalls and opportunities", *Sloan Management Review*, Vol. 33, No. 3, pp. 65 – 74.

Lee, H. L., Padmanabhan, V. & Whang, S. (1997). "The bullwhip effect in supply chains", *Sloan Management Review*, Vol. 38, No. 3, pp. 93 – 102.

Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry*, Beverley Hills, CA: Sage.

Maykut, P. & Morehouse, R. (1994). "Part 1: Building a philosophic foundation for qualitative research", *Beginning qualitative research: A philosophic and practical guide*. The Falmer Press, London, pp. 1 – 25.

Mentzer, J. T. (1999). "Supplier partnering", *Handbook of Relationship Marketing*, Jagdish, N., Sheth & Atul Parvatiyar (Eds.). Thousand Oaks, CA: Sage Publications Inc.

Mentzer, J. T., Min, S. & Zacharia, Z. G. (2000). "The nature of interfirm partnering in supply chain management", *Journal of Retailing*, Vol. 74, No. 4, pp. 549 – 568.

New Zealand Trade and Enterprise (2003). *Economic evaluation of the food Processing sector: A strategic review for New Zealand Trade and Enterprise*. November 2003.

O'Dell, C., Grayson, C. J. & Essaides, N. (1998). *If only we knew what we know: The transfer of internal knowledge and best practice*. New York: Free Press (Simon & Schuster Inc.)

Outward Bound (1989). *The challenge of words*, Cobham Outward Bound School, Anakiwa, New Zealand.

Patton, M. J. (1991). "Qualitative research on college students: Philosophical and methodological comparisons with the quantitative approach", *Journal of College Student Development*, Vol. 32, pp. 389 – 396.

Perry C. (1998). *A structured approach to presenting theses.* Retrieved 30 August 2002, from http://www.scu.edu.au/schools/gcm/ar/art/cperry.html

Porter, M. E. (1980). *Competitive advantage.* New York: Free Press.

Prahalad C. & Hamel, G. (1994). "Seeing the future first", *Fortune*, Vol. 130, No. 18, pp. 72 – 76.

Rose, J. (1997). "Soft systems methodology as a social science research tool", *Systems Research and Behavioural Science*, Vol.14, No. 4, pp. 249 – 258.

Rose, J. & Haynes, M. (1999). "A soft systems approach to the evaluation of complex interventions in the public sector", *Journal of Applied Management Science*, Vol. 8, No. 2, pp. 189 – 212.

Saipe, A. & Geiger, J. (1996). *Global brief on vendor managed inventory.* KPMG Consulting, Toronto, Canada. Retrieved 10 May 2002, from http://www.vendormanagedinventory.com/article3.htm

Sankaran, J., Samson, D. & Wilson, T. (2004). "Supplier partnering in oligopolistic markets: insights from Australasian process industries", Unpublished.

Segil, L. (1998). "Strategic alliances for the 21st century", *Strategy and Leadership.* September/October 1998, pp. 12 – 16.

Seligman, M. (2001). Rules of engagement: How to manage a successful epartnership", *Management.* August 2001, pp. 34 – 39.

Shatzkin, M. (1998), V*endor-managed inventory.* Delivered at the 20th International Distribution and Supply Chain Specialists' Meeting at the Frankfurt Book Fair, 6 October 1998.

Shaw, S. A. & Gibbs, J. (1995). "Retailer-supplier relationships and the evolution of marketing: Two food industry case studies", *International Journal of Retail and Distribution Management*, Vol.23, No. 7, pp.7 – 16.

Siemienuich, C. E., Waddell, F. N. & Sinclair, M. A. (1999). "The role of 'partnership' in supply chain management for fast-moving consumer goods: A case study", *International Journal of Logistics: Research and Applications,* Vol.2, No. 1, pp. 87 –101.

Stern, L. W. and El-Ansary, A. I. (1977). *Marketing Channels.* Prentice-Hall Inc, New Jersey, USA.

Strong, D. M., Lee, Y. W., & Wang, R. Y. (1997) "Data quality in context", *Communications of the ACM*, Vol. 40, No. 5, pp. 103 – 110.

Taras, J., (n.d.). *VendorManagedInventory.com.* Retrieved 10 October 2002, from http://www.VendorManagedInventory.com/definition.htm

Thomas, J.M., Staatz, J.M. & Pierson, T.R. (1995). "Analysis of grocery buying and performance: Implications for industry structure and performance", *Agribusiness*, Vol. 11, No. 6, pp. 537 – 551.

Thompson, A. & Strickland, A. (1997). "Industry and Competitive Analysis" in *Strategic management concepts and cases* (10th Ed), Irwin, Chicago, pp. 68 – 102.

Vergin, R. C., & Barr, K. (1999). "Building competitiveness in grocery supply through continuous replenishment planning: Insights from the field", *Industrial Marketing Management*, Vol. 28, No. 2, pp. 145 – 153.

Vermond, K. (1999). "Vendor managed inventory: Changing relationships, moving inventory", *Logistics & Supply Chain Journal*, February 1999.

Waller, M., Johnson, E. & Davis, T. (1999). "Vendor-managed inventory in the retail supply chain", *Journal of Business Logistics*, Vol. 20, No. 1, pp. 183 – 203.

Westbrook, R. (1995). "Action research: a new paradigm for research in production and operations management", *International Journal of Operations and Production Management*, Vol. 15, No. 12, pp. 6 – 20.

Whipple, J. M. & Frankel, R. (2000). "Strategic alliance success factors", *Journal of Supply Chain Management*, Vol. 36, Issue 3, pp.21-28.

Williams, L. R. (1994). "Understanding distribution channels: An interorganisational study of EDI adoption", *International Journal of Purchasing and Materials Management*, Vol. 15, No. 2, pp. 173 – 203.

Wilson, T. H. & Sankaran, J. K. (2001). "Vendor-manufacturer partnerships in the supply chain: An inductive case study from New Zealand", *Advances in Qualitative Research*, Vol. 3, pp. 205 – 251.

Wong, A. (1999). "Partnering through cooperative goals in supply chain relationships", *Total Quality Management*, Vol. 10, No. 4&5, pp. 786 – 792.

Wright, C. & Lund, J. (2003). "Supply chain rationalisation: retailer dominance and labour flexibility in the Australian food and grocery industry", *Work, Employment and Society*, Vol. 17, No. 1, pp.137 – 157.

Zuber-Skerritt, O. (2001). "Action learning and action research: paradigm, praxis and programs", *Effective Change Management Using Action Research and Action Learning: Concepts, Frameworks, Processes and Applications.* Southern Cross University Press, Lismore, Australia, pp. 1 – 20.

Glossary

Abbreviations

CATWOE = Customer, Actors, Transformation process, Weltanschauung, Owner and Environmental analysis

CPFR = Collaborative Planning, Forecasting and Replenishment

CRP = Continuous Replenishment Processes

DC = Distribution Centre

DSD = Direct Store Deliveries

ECR = Efficient Consumer Response

EDI = Electronic Data Interchange

EDLP = Everyday Low Pricing

ERP = Enterprise Resource Planning

FMCG = Fast Moving Consumer Goods

Foodstuffs = Foodstuffs Group comprising: Foodstuffs Auckland Limited, Foodstuffs Wellington Limited and Foodstuffs South Island Limited

Goodman Fielder = Goodman Fielder New Zealand Limited

IT = Information Technology

KPIs = Key Performance Indicators

Progressive = Progressive Enterprises Limited

SSM = Soft Systems Methodology

VMI = vendor managed inventory

Woolworths = Woolworths New Zealand Limited

Definitions

Action Research – demands an integral involvement by the researcher with intent to change the organisation. This intent may not succeed – no change may take place as a result of the intervention – and the change may not be as intended.

Ambient – shelf stable, dry goods, stored at room temperature.

Continuous Replenishment Processes (CRP) – a vendor managed inventory (VMI) program that eliminates the need for orders in the channel. In lieu of orders, retailers transmit data to the manufacturer on warehouse inventory levels and shipments from warehouses to stores. Using this data, manufacturers determine shipment requirements to maintain acceptable inventory and stock out levels in retailers' warehouses.

Bullwhip effect – the amplification of consumer demand volatility up the supply chain.

Direct-to-Store Deliveries (DSD) – a distribution channel where suppliers deliver product direct to individual stores. Suppliers are responsible for all distribution and inventory holding costs.

Distribution Centre (DC) – a centralised warehouse distribution channel, managed by Key Account retailers, which receives deliveries from suppliers into a centralised location, holds and manages inventory and delivers products to stores. Key Account retailers are responsible for all distribution and inventory holding costs.

Duopoly – two firms in an industry

Electronic Data Interchange (EDI) – orders placed by retailers which are sent electronically to manufacturers for delivery.

Housebrand products–products made on behalf of retailers with branding specific to the retailer.

Monopolistic competition – "… a market structure that is a hybrid between competition and monopoly. In this market structure there are multiple firms that produce similar products. There is free exit and entry into the industry" (Brickley et al., 1997, p.126).

New Zealand food industry – includes all local and international suppliers to the Key Account and convenience food retailers in New Zealand. Key Account retailers include the Foodstuffs Group and Progressive. The convenience channel includes oil, entertainment, mixed business, distributors and wholesalers. The food industry includes fresh fruits, vegetables, meat, seafood and bakery products and shelf stable ambient, chilled and frozen products.

Oligopoly – a market that "… has only a few firms which account for most of the production in the market; products may or may not be differentiated; firms can earn economic profits" (Brickley et al., 1997, p.G-7).

Out of stocks/stock outs – where manufacturers do not have sufficient stock on hand to supply retailers, or where retailer DCs do not have sufficient stock on hand to supply stores or where stores do not have sufficient stock on the shelves to supply consumers.

Safety stock –stock held by suppliers and retailers to cover unexpected fluctuations in demand

Supply Chain Management – "directs and coordinates logistics activities across interdependent organisations that together make a complete market channel for a range of products or services. Its scope encompasses the supplier's supplier to customer's customer" (Birchfield, 2002, p.52)

Technology spill over – sharing the benefits of joint vendor-manufacturer technological developments with competitors to reduce development costs per unit.

Vendor Managed Inventory (VMI) - where the manufacturer is responsible for maintaining the supplier's inventory levels.

Appendix 1 Pitfalls of supply chain inventory management

	Pitfall	Symptoms
1	No supply chain metrics	- Independent and disconnected individual sites - Incomplete metrics - Performance measures not tracked - No attention to measures tracked
2	Inadequate definition of customer service	- Inadequacy of line-item fill rate measure - No measures for response times - No measures for lateness - No measures for backorder profile
3	Inaccurate delivery status data	- Delays in providing delivery information - Inaccuracy delivery information
4	Inefficient information systems	- Inadequate linkage among databases at different sites - Proliferation of operating systems for the same function at different sites - Delays and inaccuracies of data transfer
5	Ignoring the impact of uncertainties	- No documentation or tracking of key sources of uncertainties - Partial information of sources of uncertainties
6	Simplistic inventory stocking policies	- Stocking policies independent of magnitudes of uncertainties - Static stocking policies - Generic and subjective stocking policies
7	Discrimination against internal customers	- No service measures of internal customers - Low priority for internal orders - Inappropriate incentive systems - Jockeying for priority among different internal divisions
8	Poor co-ordination	- No coordination among supplying divisions to complete an order - No system information among multiple supplying divisions - Independent shipment plans
9	Incomplete shipment methods analysis	No consideration of inventory and response time effects

	Pitfall	Symptoms
10	Incorrect assessment of inventory costs	• Omission of obsolescence and cost of rework • No quantitative basis for inventory holding cost assessments
11	Organisational barriers	• Independent performance measures and incentive systems at different sites • Barriers between manufacturing and distribution
12	Product-process design without supply chain consideration	• No consideration of manufacturing and distribution in product-process design • No consideration in design for customisation and localisation • Organisational barriers between design and the supply chain
13	Separation of supply chain design	• Chain decisions without consideration of inventory from operational decisions and response time efficiencies
14	Incomplete supply chain	• Focus on internal operations only • Inadequate understanding of operational environment and needs of immediate and ultimate customers

Table 13: Pitfalls of supply chain inventory management and their symptoms

(Source: Lee and Billington, 1992)

# Appendix 2   Characteristics of good frameworks

The following characteristics were incorporated into the design of the frameworks to improve their readability and usefulness. In summary a good framework captures the key variables and their interrelationships. It has a level of insight and depth in the naming that provides immediate use. It also has the qualities of good information, such as completeness and consistency.

A good framework:

- Can be presented diagrammatically
- Show interrelationships between elements by flowing up, down and/or sideways
- Is supported by detailed descriptions for each component of the diagram
- Is contextual and puts the theory in context through the diagram and/or the detailed descriptions
- Is simple but precise
- Provides depth and insight
- Has qualities of good information such as objectivity, consistency, relevancy (Strong, Lee and Wang, 1997)

Appendix 3   Ethics approvals

University of Waikato ethics approval

```
                "Carolyn COSTLEY" <ccostley@mngt.waikato.ac.nz> on 01/10/2002 13:17:12

To:     <kim.dorling@goodmanfielder.co.nz>, "John SCOTT" <JLS.staff.MANAGEMENT@mngt.waikato.ac.nz>
cc:

Subject:  ethics application


Kim and John,
I have approved your application for the project called The role of strategic partnerships in VMI to maximise the
efficiency & effectiveness of the NZ food industry supply chain.

I note remaining ambiguity that you should resolve.  Have both companies been given complete information about the
project, including the sort of information that you will collect about them, who will see it and what will happen
to it, and how you will protect confidential information?  Have they agreed to the project under those conditions?
If you have not done so already, make it clear to the companies now.

Best wishes,
Carolyn Costley
ethics person

Dr. Carolyn L. Costley
Senior Lecturer
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Both Goodman Fielder and Progressive were fully aware of the research and the information being collected. Job titles were used throughout the thesis, rather than people's names for confidentiality purposes.

Both organisations gave their approval for their name to be included in the final thesis as shown below.

Progressive ethics approval

Goodman Fielder ethics approval

Appendix 4   Porters five forces industry analysis

This appendix uses Porter's Five Forces Model (1980) to assess the key forces impacting industry profitability. These forces are described in context of the food industry supplemented by examples from other industries as appropriate.

Porter's Five Forces Model (1980) describes five forces that shape competition within an industry. These are:

1. The risk of new entry by potential competitors
2. The degree of rivalry among established companies within an industry
3. The bargaining power of buyers
4. The bargaining power of suppliers
5. The threat of substitute products

Porter argues, that the stronger each of these forces is, the more limited ability established companies have to raise prices.

The risk of new entry by potential competitors is high in food industries around the world. There are low barriers to entry for both manufacturers and retailers. Porter (1980), identified brand loyalty, absolute cost advantages, economies of scale and governmental regulation as potential barriers to entry. The strength of each of these factors varies across different segments of the food industry. Based on the large number of players, both manufacturers and retailers, the barriers to entry can be assessed as low. Local food manufacturers and retailers start up every day throughout the world. These start-up companies range in size and scale, often starting small and growing over time. Examples of common start-up food retailers include corner dairies, lunch bars, bakeries and cafes. Start-up manufacturers cover the full spectrum of food products including fresh, chilled, frozen, dried and canned foods. Some start up food manufacturers, such as small bakeries, require very little capital investment, where as others, such as automated canned food manufacturers, require more significant capital outlay.

Porter's second force relates to the degree of rivalry among established companies within an industry. Porter's research found that if rivalry is strong, significant price competition, including price wars, might result. Price competition limits profitability by reducing the margins that can be earned on sales. Thus, intense rivalry among established companies constitutes a strong threat to profitability. Porter's five forces model identifies three main factors which impact of the extent of rivalry among established companies: (1) the industry's competitive structure, (2) demand conditions, and (3) the height of exit barriers in the industry. These factors vary across food industries globally. Small niche food industry players, such as local bakeries, tend to compete in selected segments of the industry with medium to high demand conditions and low exit barriers. At the other extreme, large multinational food organisations, such as Heinz and Kraft, tend to have well-established brands with strong competitors. They face stronger price competition with demand conditions and exit barriers varying across their product portfolios.

The airline industry in the 1990s provides a good example of price wars that drove down industry profits, forcing many suppliers, such as Pan American out of the industry. Between 1990 and 1992 the industry lost $7.1m billion, more than had been made during its previous fifty years (Hill and Jones, 1998).

The third of Porter's five competitive forces is the bargaining power of buyers. A company's buyers may be the customers who ultimately consume its products (its end users), but may also be the companies that distribute its products to end users, such as retailers and wholesalers. According to Porter (1980), buyers are most powerful in six situations:

1. The supply industry is composed of many small companies and the buyers are few in number and large

2. The buyers purchase in large quantities

3. The supply industry depends on the buyers for a large percentage of its total orders

4. The buyers can switch orders between supply companies at low cost

5. It is economically feasible for buyers to purchase the input from several suppliers at once

6. The buyers can vertically integrate to supply their own needs

The food industry globally is composed of many suppliers and buyers. Typically the buyers, such as supermarkets, tend to be fewer in number and larger than the suppliers. The number and strength of buyers varies across the world. At one extreme, New Zealand has two large supermarkets with 95% share of the retail supermarket industry. At the other extreme, China has many local retailers with low market share. In contrast, while there are some large multinational suppliers, such as Coke and Unilever, the majority of suppliers are small, local manufacturers. Given the diversity of buyer and supplier size and dominance throughout the world, the power of buyers is likely to vary across the food industry globally. Typically, given that buyers tend to be larger than suppliers, buyers are likely to have medium to high power.

Porter's fourth force relates to the bargaining power of suppliers. According to Porter (1980), the bargaining power of suppliers is strongest when the products have few substitutes, it is costly for customers to switch between suppliers, vertical integration is possible for suppliers but difficult for buyers and the industry is not an important customer of theirs. Throughout the food industry generally:

- The bargaining power of suppliers is low with many substitute products available
- There are low costs of switching between suppliers
- It is relatively easy for suppliers to vertically integrate (most suppliers could open a retail outlet at the manufacturing plant to compete against buyers)
- It is relatively difficult for buyers to vertically integrate (most buyers sell a comprehensive range of products which they could not manufacture completely themselves)
- Most suppliers sell the majority of their products within the industry.

Based on these factors the bargaining power of suppliers can be assessed as relatively low for the food industry globally.

Porter's final force is the threat of substitutes. In the food industry the threat of substitute products is real and occurs frequently. Most food products are close substitutes and are often very similar in appearance and taste with branding being the main differentiating factor. As a result, supply chain strategies adopted by food industry players should always reflect the substitutability of food products and therefore this factor considered strong across the whole industry.

Appendix 5 Industry and Competitive Analysis Summary

(Source: Thompson and Strickland, 1997, p.100)

1. Dominant economic characteristics of the industry environment

Includes market size and growth rate, geographic scope, number and size of buyers and sellers, pace of technological change and innovation, scale economies, experience curve effects and capital requirements

2. **Competition analysis**
- Rivalry among competing sellers (a strong, moderate or weak force/weapons of competition)

- Threat of potential entry (a strong, moderate or weak force/assessment of entry barriers)

- Competition from substitutes (a strong, moderate or weak force/why)

- Power of suppliers (a strong, moderate or weak force/why)

- Power of customers (a strong, moderate or weak force/why)

3. **Driving forces**

4. **Competitive position of major companies/strategic groups**
- Favourable positioned/why

- Unfavourably positioned/why

5. Competitor analysis

- Strategic approaches/predicted moves of key competitors

- Whom to watch and why

6. Key success factors

7. Industry prospective and overall attractiveness

- Factors making the industry attractive

- Factors making the industry unattractive

- Special industry issues/problems

- Profit outlook (favourable/unfavourable)

Appendix 6   Temporary product sourcing changes

This appendix describes the steps taken by Goodman Fielder and the Woolworths Buyers to avoid excess stock purchases prior to the South Island DC consolidation, while maintaining a high standard of delivery service to the Woolworths South Island stores.

In December 2002, the researcher and the Senior Woolworths Buyer agreed to temporarily change the source of a number of slow moving Woolworths South Island products lines, from the Woolworths South Island DC to the Woolworths Palmerston North DC. The aim of the temporary change was to reduce the risk of excessive stock purchases prior to the South Island DC consolidation, while maintaining a high service level to South Island stores.

All products that moved less than 8 cartons per week through the Woolworths South Island DC, (13 products in total), were changed to the Palmerston North DC by flagging the products as unavailable from the South Island DC. Several products with high stock on hand were also put 'stop order' in the South Island until the excess stock on hand had cleared. These products included cookies and cake and muffin mixes.

Once the list of 'stop order' and products to temporarily changed to Woolworths Palmerston North had been agreed, the researcher sent the following e-mail to people at Goodman Fielder explaining the implications on South Island demand:

> WW [Woolworths] have put a 'stop order' on the following products in the South Island. Until the DCs have been consolidated in February the WW stores will order product from either the WW Palmerston North or WW Auckland DCs. From a GF [Goodman Fielder] perspective, lower volumes of these products will be dispatched through BB [Bluebird] Christchurch and slightly higher volumes will be ordered from BB Auckland. GF may need to change their replenishment plans for these items. At this stage chips and flour will be continuing as normal (extract from e-mail dated 5 December 2002).

Using the information provided in the e-mail above, Goodman Fielder Demand Management and Production Planning teams were able to temporarily reduce their South Island replenishment levels in order to match supply and demand.

The process of putting products on temporary stop order worked well for the majority of products; however during the last 2 – 3 weeks prior to the DC consolidation a number of other products were also put on temporary stop order for the South Island. A number of these products were high volume products including chips, nutritious snacks and some flour products.

Both Goodman Fielder and Progressive incurred additional freight costs during the final 2 – 3 weeks prior to the DC consolidation, for these high volume products, particularly for those products on promotion. Goodman Fielder had to road-freight the products from Auckland to Palmerston North, rather than deliver them locally within Christchurch. Progressive had to freight the products from the Woolworths Palmerston North DC to each South Island Woolworths store. Inter-Island delivery times to the South Island stores were at least one day longer than deliveries from the Woolworths South Island DC, resulting in out of stocks to consumers in some South Island Woolworths stores.

In addition, Goodman Fielder was not aware of the products put on temporary stop order in the last 2- 3 weeks prior to the DC consolidation. As a result, they were not able to realign their demand patterns, or alter production volumes, to reflect the change in demand from the South Island to the North Island. This resulted in some temporary North Island flour out of stocks to Progressive and Woolworths.

This appendix has explained how Goodman Fielder and Progressive worked together to reduce excess stock levels in the Woolworths South Island DC prior to the DC consolidation. A key success factor in this was open communication between all parties. The process did not go 100% smoothly, mainly due to a number of high volume items being temporarily transferred to the Woolworths Palmerston North DC in the final 2 – 3 weeks prior to the DC consolidation,

resulting in additional freight charges, increased delivery lead times and out of stocks.

Appendix 7   Post-DC consolidation

This appendix describes how Progressive and Goodman Fielder worked together in the week after the DC consolidation to re-establish South Island supply of Goodman Fielder products.

On Friday 7 February 2003, the Woolworths South Island DC received their last deliveries from suppliers. Woolworths South Island stores received their last supply of goods from the Woolworths South Island DC on Saturday 8 February and on Monday 10 February all Woolworths South Island stores started receiving stock from the Progressive South Island DC.

The changeover had been well planned from Progressive's perspective with beer and wine products switching over 2 weeks prior to the other products as a trial. This allowed minor problems in the Woolworths and Progressive IT system interfaces to be fixed and report requirements to be modified to remove Woolworths South Island DC information.

On Monday 10 February 2003, when the Progressive South Island DC starting supplying Woolworths South Island stores no major issues were experienced. The changeover went very well. The physical transfer of stock from the Woolworths DC to the Progressive DC took a few days longer than planned, resulting in some out of stocks of Woolworth's only products, such as housebrand. Apart from this, no other significant problems were experienced. Feedback from the Woolworths South Island stores was excellent with several stores saying, "When are all our products going to be supplied from the Progressive South Island DC?"

In order to minimise the impact of the temporary transfer of Woolworths South Island products to the North Island, immediately following the DC closure, the researcher focused on transferring all Goodman Fielder products back to the South Island. This involved several steps – identifying products transferred to the North Island, creating additional demand in the Progressive South Island purchasing system, making the products available from the South Island in the Woolworths

system and communicating the change to the Goodman Fielder supply chain team. These steps are explained in detail below.

Firstly, the researcher obtained an extract from the Woolworths system showing which products were available by DC and identified the products not available from the South Island DC. In total, 187 products were identified as only being stocked in the Woolworths North Island DCs. Of these, 20 products were identified as pending deletion and therefore did not have to be re-instated in the South Island. Of the remaining 167 products, the Progressive Inventory Manager and the researcher, agreed to transfer the 75 high volume products back to the South Island immediately. These products included chips, flour, nutritious snacks, oil and cookies. For new products, without an average weekly demand history, an estimate was made based on 50% of the Progressive South Island DC volumes. Eleven products were identified as not being ranged in Progressive South Island DC and therefore had to continue being supplied from the Woolworths North Island DCs. This left 64 products to be transferred back to the South Island immediately.

Using the list of 64 products, additional demand was keyed into the Progressive system under the South Island DC for 8 weeks based on the average weekly demand. An 8 week period was selected because, it was judged that, after 8 weeks there should be sufficient history in the Progressive system to enable the computer system to accurately forecast average weekly demand incorporating both the Progressive and Woolworths volumes.

The Woolworths Buyers then made the products available in the South Island where they had previously been available. For products which had never been available from the Woolworths South Island DC, the products were set up to enable them to be supplied from the South Island. All changes were made effective Monday 17 February 2003, one week after the Woolworths DC closed.

The list of 64 products was communicated to the Woolworths Buyers so they could reduce their North Island purchases to reflect the products being supplied from the South Island rather than the North Island. Historically, approximately 3

cases per week had been supplied from Woolworths Auckland DC, 176 cases per week had been supplied from Woolworths Palmerston North and an additional 574 cases per week had been temporarily transferred from the South Island to the North Island during the DC closure count down.

Although 17 February was earlier than expected from a Goodman Fielder perspective, the majority of products were high volume lines with good stock levels in the South Island. The Goodman Fielder Supply Chain Director wanted to have the products supplied from the South Island as soon as possible to minimise distortions in demand.

The key benefits of transferring the products back to the South Island within a week of the Woolworths DC closing were summarised in an e-mail from the researcher to the Goodman Fielder supply chain team (extract from e-mail dated 29 January):

> Key benefits of the early change to Progressive distribution include:
> - Woolworths South Island stores will have access to 7 day deliveries for the first time ever
> - Woolworths South Island stores will have 24 hour delivery lead times compared to 2 - 5 days currently
> - Goodman Fielder will have an advantage in the short-term by having all products available from the Progressive Christchurch DC, providing Woolworths stores with improved customer service levels, significantly reduced lead times and full product ranging
> - Goodman Fielder North Island/South Island demand split will have minimal distortions because Woolworths South Island demand will only be transferred to the North Island for 3 - 4 weeks rather than 2 - 4 months
> - Both Goodman Fielder and Progressive/Woolworths can make a clean change over from Woolworths to Progressive DCs rather than a gradual transfer
> - Goodman Fielder should increase product distribution by increasing the number of Woolworths stores which range some Goodman Fielder products (currently a number of lines are only ranged in Woolworths North Island and are unavailable in the South Island)
>
> Overall, both Goodman Fielder and Woolworths should increase sales as a result of the DC change over and improved service levels to Woolworths South Island stores.

The key benefits to Progressive of transferring the high volume products back to the South Island within one week of the Woolworths South Island DC closing included:

- Reduced freight costs
- Reduced volumes through the Woolworths Palmerston North DC which was at full capacity in January
- Reduced delivery lead times to South Island Woolworths stores
- Daily day deliveries to all South Island Woolworths stores.

The transfer of the 64 products to the South Island was successful with no problems noted. As a result, on 19 February the researcher obtained another data extract from the Woolworths system and identified a further 41 products still being supplied from the Woolworths North Island DC. Of these, only 8 products were also ranged in the Progressive South Island DC. The Progressive Inventory Manager agreed to transfer these 8 products to the South Island as well, therefore switching all Woolworths South Island products to the South Island where possible. The changeover of these products followed the same process as the first 64 products.

This appendix has described how Progressive and Goodman Fielder worked together to supply all Goodman Fielder products from the South Island where possible, within 2 weeks of the Woolworths South Island DC closing. Both parties benefited by working together, communicating regularly and sharing a win/win attitude.

Appendix 8   The DC consolidation – Goodman Fielder's perspective

This appendix outlines the key advantages and disadvantages to Goodman Fielder of temporarily transferring the supply of some products to the North Island during the South Island DC consolidation project. It also describes how Goodman Fielder planned for the DC consolidation in terms of Customer Services workloads, sales forecasting, production planning, and dispatch personnel.

As part of the South Island DC consolidation process, Progressive decided to temporarily transfer the supply of slow moving products to the North Island DCs to reduce excess stock holdings. From a Goodman Fielder perspective, the key benefits of transferring the supply of slow moving lines to the North Island were:

- Continuous supply throughout the transition period
- Reduced freight costs for products manufactured in the North Island

The key disadvantages to Goodman Fielder were:

- Sales demand history was distorted at the North Island/South Island level
- Stock already on hand at the Goodman Fielder South Island DC did not sell as quickly, resulting in aged stock and increased discounting

From a Goodman Fielder perspective, the disadvantages, of temporarily transferring supply to the North Island, were considered manageable in the short-term as long as supply was reinstated to the South Island as soon as possible after the DC consolidation, in order to minimise any long-term distortions in demand. The temporary transfer of products was clearly communicated to the Goodman Fielder supply chain team in order to minimise the impact of the disadvantages.

In addition, as part of planning for the Woolworths South Island DC closure, the researcher met with the Goodman Fielder Customer Services Team Leader in December 2002 and outlined the impacts on the Goodman Fielder Customer Services team of the Woolworths South Island DC closure. The key impact was

to shift workload from the South Island based Customer Services Representative to the Progressive Customer Services Representative in Auckland. Because this impact was communicated to the Customer Services Team Leader in December, they were able to plan for the change and reallocate work responsibilities throughout January. If Goodman Fielder hadn't been involved in the DC consolidation, this change in workload may not have been identified and planned for, resulting in a sudden change in workload at the time the DCs consolidated.

In January 2003, the researcher worked with the Progressive Inventory Manager and the Goodman Fielder supply chain team to identify the increased South Island volumes expected post the DC consolidation. Traditionally, the Woolworths South Island stores had sourced products from the Woolworths Christchurch, Palmerston North and Auckland DCs depending on the volumes sold. The majority of high volume products were supplied from the South Island DC and medium to low volume products were supplied from the North Island. The data extract, Progressive supplied Goodman Fielder, identified the average weekly South Island demand by product that had historically been supplied from the Woolworths Palmerston North and Auckland DCs. This data showed that there were approximately 350 cases per week supplied ex-Palmerston North and 55 cases per week supplied ex-Auckland.

On 10 January 2003, the researcher sent the following e-mail to the Goodman Fielder Supply Chain Integration Manager (extract from e-mail).

> As discussed yesterday PEL [Progressive] are in the process of closing the WW [Woolworths] Christchurch DC. Initially the changes we will see are:
>
> - Ernest Adams cookies going through the DC effective 4 Feb
> - No WW orders being placed (Customer Services will not have any WW South Island orders to key in Bluebird Christchurch)
> - Same number of Bluebird and Meadow Lea SKUs [products] being ordered but higher volumes per order
>
> During April (early April Palmerston North, end of April Auckland) the WW South Island volumes currently serviced from WW Palmerston North and WW Auckland DCs will be transferred to PEL Christchurch (may be brought forward if we ask the Progressive Inventory Manager). This will

increase the volume through Bluebird Christchurch. The attached spreadsheet shows the average weekly movement through WW Auckland (… approx 55 cases per week) and WW Palmerston North (… - approx 350 cases per week), which will ultimately flow through PEL Christchurch and therefore be ordered from Bluebird Christchurch.

We need to plan how we will increase our South Island replenishment levels to meet the increased South Island volumes, while NOT increasing overall Goodman Fielder demand (i.e. we need to reduce North Island demand to offset the South Island increase).

Please note that this spreadsheet shows SKUs [products] and demand as at a point in time. The range may have changed slightly due to new launches/deletions and PEL changes to ranging.

Could you please work with Bluebird Christchurch and the Planning Team on this. If you have any questions or issues please let me know.

Several areas within the Goodman Fielder supply chain team used this e-mail to plan for the change. Demand Management used the information to manually adjust the future demand splits in Manugistics (the Goodman Fielder forecasting system), between the North Island and South Island, by increasing the South Island volumes and reducing the North Island volumes. Volumes ex Palmerston North were adjusted in the forecast from mid March and the volumes ex Auckland were adjusted from the end of March. This information then flowed through to the Production Planning and Replenishment teams.

The Christchurch Bluebird warehouse team also used this information to plan for increased volumes and determine whether additional dispatch personnel were required. No additional personnel were considered necessary to start with because the increased volume was expected to be more full pallet orders, rather than part pallet orders, thereby actually reducing, not increasing the workload.

Upon reflection of this process, the largest problem occurred in the final weeks leading up to the South Island DC consolidation when Progressive temporarily relocated a number of higher volume lines to the Woolworths Palmerston North DC without informing Goodman Fielder. The key problem area was flour which is manufactured in both the North and South Island

For example, the Elfin 1.5kg flour range had an advertised promotion in Foodtown and Woolworths 2 weeks prior to the South Island DC consolidation. Goodman Fielder manufactured the promotion stock in both the North Island and South Island. Because the Elfin 1.5kg range had been temporarily relocated to the Woolworths Palmerston North DC, without notification to Goodman Fielder, there was a mismatch of supply and demand. Goodman Fielder had plenty of stock in the South Island; however only the North Island DCs were ordering stock for the promotion. Goodman Fielder short delivered a couple of orders to Progressive and Woolworths in the North Island. Fortunately the Progressive and Woolworths North Island DCs had sufficient stock for the promotion and did not out of stock the stores, even though Goodman Fielder was unable to supply the DCs.

Cookies were another high volume, promotionally driven range which were temporarily relocated to the Woolworths Palmerston North DC. Goodman Fielder did not have a problem with this because all stock was manufactured in Auckland and freighted to each DC. Goodman Fielder actually benefited from the cookie relocation because they only had to transport the product to Palmerston North, rather than Christchurch, in the few weeks leading up to the South Island DC consolidation.

This appendix has outlined the advantages and disadvantages to Goodman Fielder of temporarily transferring products from the South Island to the North Island. It also described how Goodman Fielder reallocated Customer Service workloads in the lead up to the DC consolidation and how the average weekly demand from the North Island was used to plan for the impact of the DC consolidation on the Goodman Fielder supply chain. Finally, this appendix reflected upon the process and described the key problems encountered.

Appendix 9 The DC consolidation – Progressive's perspective

This appendix describes how Progressive managed the Woolworths South Island stock levels in the lead up to the DC closure.

From mid December, each Monday a sign counting down the number of weeks until the Woolworths South Island DC closed and consolidated with the Progressive South Island DC was put up on notice boards in the Buying room. Woolworths Buyers were instructed not to purchase any stock more than 'x' weeks supply, where 'x' represented the number of weeks until the DC closed. Once the number of weeks dropped to below 8 weeks, the Woolworths Buyers stopped making investment buys (large purchases at discounted prices) in the South Island. Slow moving lines were phased out and supply transferred to either the Woolworths Palmerston North DC or the Woolworths Auckland DC.

The key benefits to Progressive of transferring the supply of slow moving lines to the North Island were:

- Less stock on hand at the time the Woolworths South Island DC was closed which had to be physically relocated to the Progressive South Island DC
- Less risk of excessive stock on hand levels once the Woolworths and Progressive South Island stocks were combined into a single DC
- Continuous supply throughout the transition period

The key disadvantages to Progressive of transferring the supply to the North Island DCs:

- Longer delivery lead times to South Island stores
- Increased freight costs
- Increased volume through the Palmerston North DC during the peak Christmas period

From a Progressive perspective, the benefits of transferring supply to the North Island outweighed the disadvantages, particularly for slow moving lines.

As the Woolworths South Island DC closure moved closer, additional products were switched over to North Island supply. These products included some higher volume Goodman Fielder products such as flour and cookies.

Each day the Senior Woolworths Buyer reviewed the Woolworths South Island DC stock on hand levels and reinforced to the Buyers that all purchases must be kept to a minimum. In the week prior to the Woolworths South Island DC closure stock on hand levels dropped significantly. A number of products were temporarily out of stock as the Buyers chose not to re-order in the final few days. An exception to this was advertised promotional lines which were re-ordered right up until the DC was closed. The out of stock situation was not planned for and resulted in a number of South Island stores running out of a number of products on their shelves in the final week leading up to the DC consolidation. There were a large number of complaints from the South Island Woolworths stores about poor service levels from the DC, and long lead times from the Auckland and Palmerston North DCs. As a result, consumers experienced a number of products, including items on promotion, not available in Woolworths South Island stores in the lead up to the DC consolidation.

In hindsight, the cost of moving the remaining stock on hand in the Woolworths South Island DC to the Progressive Christchurch DC would have been minimal compared to the 'cost' of lost sales to customers. Because the South Island Woolworths stores had longer than normal lead times for product from the North Island DCs, and there were out of stocks from the Woolworths Christchurch DC, customer service levels dropped below 100%. According to the Progressive Inventory Manager, "there were a notable number of products missing from the South Island supermarket shelves. In one Woolworths Christchurch store we visited there were 36 products in an aisle which had tickets but no stock on shelf" (February 2003).

In the 2 weeks prior to the Woolworths South Island DC closure the Progressive South Island Buyers received daily information of product lines in the Woolworths DC which had high stock on hand levels relative to average weekly demand. This information was used by the Buyers to reduce the Progressive South Island DC stock holdings of these products so, that when the Woolworths stock was physically transferred to the Progressive DC, excess stock levels would be minimised.

At the same time, the Progressive South Island DC started building stock levels of high volume products in preparation for the Woolworths DC closure. Stock levels had to be built up because not all stock remaining in the Woolworths South Island DC would be physically transferred to the Progressive DC immediately. The physical relocation of stock took 10 days. The highest priority products relocated were products only ranged in Woolworths stores, such as the No Frills and First Choice housebrand products.

In order to assist the Progressive South Island DC Buyers increase their purchases to reflect the additional Woolworths volumes, the average weekly movements from the data spreadsheet prepared by the Progressive Inventory Manager, were keyed into the Progressive system as additional demand. By doing this, the Progressive Suggested Order Guide (SUGO) system automatically prompted the Buyers to purchase additional stock to cover the forecasted demand.

Upon reflecting on the South Island DC consolidation from a Progressive perspective, a key learning is not to under-estimate the 'cost' of lost sales due to out of stocks on supermarket shelves. Although the cost of relocating the remaining stock on hand in the Woolworths is quantifiable, it is potentially less than the margin on lost sales. This relates to, not just out of stocks in the days and weeks leading up to the DC consolidation, but also out of stocks in the 1 – 2 weeks following the DC consolidation as products were being physically transferred from one location to another.

This appendix has outlined the key advantages and disadvantages to Progressive of temporarily transferring supply to the North Island. It has also explained how

stock on hand was managed during the weeks leading up to the Woolworths South Island DC closure both from the Woolworths perspective and the Progressive perspective. Finally, it has identified key insights from reflecting on the South Island DC consolidation process which should be factored into future DC consolidation plans.

Appendix 10 SSM Stage 3 – DC consolidation CATWOE

A useful tool to assist with stage 3 of SSM in developing a definition of the root system is a CATWOE (Customer, Actors, Transformation process, Weltanschauung, Owner, Environmental constraints) as described in 4.3.3. The following CATWOE is for the DC consolidation process.

Definition of relevant system - A system that purchases and holds stock in a centralised location for distribution to stores.

Root definition – A Progressive DC system that delivers Goodman Fielder stock to stores to meet customer demand.

C: Progressive stores

A: Inventory Manager, Buyers, and Goodman Fielder

T: Purchase stock into DC -> Deliver to stores

W: Rational DC consolidation is desirable and is a possibility; there is a degree of inventory management needed to make rational DC consolidations feasible

O: Progressive

E: Employees, information availability, promotional volatility and supplier inventory levels

Appendix 11   Background to the flour category

This appendix introduces the flour category and describes the situation between Goodman Fielder and Progressive in December 2001. The category dynamics, issues and challenges are discussed.

Goodman Fielder produces the majority of retail flour sold in supermarkets with their main competitor, Western Milling, focusing on commercial flour. Goodman Fielder manufactures flour under the Champion, Elfin, Homelife, Basics, Signature Range and Pams brands. Retail flour is sold in 1.5kg and 5kg pack sizes with standard, highgrade, self-raising and wholemeal variants. All customers sell the Champion, Elfin and Homelife brands. The Basics and Signature Range brands are produced specifically for Progressive and the Pams brand is produced specifically for the Foodstuffs group.

During 2001, Goodman Fielder consolidated their New Zealand flour manufacturing operations from 5 sites down to 2 sites. During the consolidation project there were a number of capacity constraints resulting in short supply issues. Compounding this problem was inaccurate forecasting by Key Accounts Managers and inconsistent buying patterns by supermarkets. These factors combined to reduce customer service levels to under 70% on some products, while at the other extreme, some products, particularly housebrand, had excess stock levels which were close to expiry date. To minimise the impact of these problems, the Key Account Managers had to realign promotional activity to focus on the excess stock products and reduce demand for products with low stock on hand levels.

From a Progressive perspective, Goodman Fielder consistently under supplied housebrand flour (Basics and Signature Range), particularly during promotions and often under supplied Goodman Fielder branded products (Champion, Elfin and Homelife). The situation had deteriorated to the extent that supermarket shelves were often empty during promotions, resulting in lost revenue to both Progressive and Goodman Fielder.

The flour category is highly responsive to promotional activity with low baseline sales relative to promotional volumes. There is a seasonal uplift at Christmas when people do a lot of baking. There is also a small seasonal uplift over winter as more people use flour. This promotional volatility makes forecasting for the category more difficult, particularly from a Goodman Fielder perspective where several supermarkets may have a promotion on at the same time followed by a gap with no promotional activity for several weeks. If promotional activity is not accurately captured in the forecast in the correct week, demand may exceed stock on hand levels resulting in out of stocks. Conversely, if a promotion included in the forecast is cancelled at short notice, stock on hand levels will be very high relative to baseline sales.

In June 2002 (6 months after the start of the VMI Project), retail flour was a $21.0m category with Goodman Fielder branded products comprising 54.2% market share, housebrand products comprising 35.0% market share, Western Milling branded products comprising 5.2% market share and small local brands comprising the remaining 5.6% market share. Of the total retail flour category Progressive accounted for $4.8m (Foodtown $1.5m and Countdown $2.6m). (Source: AC Neilson 15 June 2003). (When the VMI Project role commenced, Woolworths was not part of the Progressive group).

A year later the retail flour category was a $21.5m category (2.3% growth) with Goodman Fielder branded products comprising 51.5% market share, housebrand products comprising 39.6% market share, Western Milling branded products comprising 3.6% market share and small local brands comprising the remaining 5.3% market share. Of the total retail flour category Progressive accounted for $7.3m (Foodtown $1.5m, Countdown $2.7m, Woolworths $2.4m and Big Fresh $0.4m), representing 5.3% growth in the flour category (including Woolworths), 3% above the total category growth of 2.3%. (Source: AC Neilson 15 June 2003).

Appendix 12   SSM Stage 3 - Flour CATWOE

A useful tool to assist with stage 3 of SSM in developing a definition of the root system is a CATWOE (Customer, Actors, Transformation process, Weltanschauung, Owner, Environmental constraints) as described in 4.3.3.   The following CATWOE is for the flour category.

Definition of relevant system - A system that purchases Goodman Fielder flour stock for distribution to Progressive stores.

Root definition – A stock replenishment system that provides flour from Goodman Fielder to Progressive DCs and stores to meet customer demand.

C:	Progressive stores
A:	Category Managers, Buyers and Goodman Fielder
T:	Purchase flour into DC -> Deliver to stores
W:	Rational purchasing is desirable and is a possibility; there is a degree of forecast accuracy needed to make rational purchasing feasible
O:	Progressive
E:	Employees, information availability, promotional volatility and supplier inventory levels