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# Implementation of Lean, Agile or Leagile in Consumer Electronic Retail Companies:

A comparative study between China and New Zealand

A thesis presented in partial fulfilment of the requirement for the degree  
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# ABSTRACT

Since 1960s, a large number of researchers have focused on how organisations have made large investment to streamline their supply chain to improve customer satisfaction and increase their internal productivity, all with the aim of achieving a competitive advantage against competitors on the market. Much research has been conducted on lean management techniques, aiming to reduce the costs of supply chains by minimizing their length and agile management aiming to increasing the robustness and flexibility of supply chains. An emerging field of research combines the two principles indicating that an organisations success lies in the combination of both. This is the case in the consumer electronics industry. The consumer electronics industry generates an array of products and services increasingly used in nearly every human endeavour, now deeply entwined in our social fabric, electronic products and systems now support critical aspects of communication, education, finance, recreation, and government. In the past few years, China in particular have become increasingly important in the consumer electronics as well as other industries. As an importer to New Zealand, a market for consumer electronic goods has been rapidly amplified over the years introducing a market for more relevant companies to be established and the market competition to become more competitive. This research focused on the implementation of lean, agile and leagile strategies in four consumer electronic retail companies from China and New Zealand. It is aim of this research to better understand the inner supply chain management strategies and practices of these four companies, and analyse how these strategies improve their supply chain performance. Finally, the research will find out what New Zealand's companies should learn from China's successful companies by comparing these strategies and identifying the environments these four companies operate in. This research will aim to uncover characteristics associated with the success of Chinese consumer electronics companies, specific to lean, agile and leagile strategies and see whether New Zealand has the infrastructure to gain the same competitive advantage using these strategies.

**Keywords:** supply chain management, lean, agile, leagile, consumer electronic retail industry

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# Chapter 1 Introduction

## 1.1 Introduction

With supply chain management theory being widely applied to helping companies' competitive advantage in the market place, in the 20<sup>th</sup> century, a large number of studies show how heavily organisations have invested in streamlining their supply chain to improve customer satisfaction and increase their internal productivity. However, as Christopher (1998) pointed out that it is not actually individual companies that compete with each other nowadays; rather, the competition is between rival supply chains. These supply chains strive to add the most value for customers with the lowest cost supply chain structure winning the competitive advantage over other supply chains.

In the study of supply chain management strategies, lean and agile methods have been approved to the most popular solution to improve enterprises' supply chain efficiency and responsiveness. Lean philosophy began with Japanese automobile manufacturing in the 1960s to improve working process and eliminate non-value adding activities along the work flow. Its design was to identify waste, find the cause, eliminate cause, make improvements and standardise operation (Ron, 2007). In addition Womack and Jones (1996) said that the lean concept was applicable to the service industry, but there would be difficulty in the retail industry. However, Toru (2015) conducted a study proving that there would be benefits to the retail industry as well with the utilization of lean management characteristics. And Toru (2015) also pointed out that all retail activities, including primary and supporting, are closely linked in the value chain. Value chain is the "nested processes" that are "the concept of a process within a process", connected by linkages that can be used as a source of competitive advantage (Gertner, 2013). Therefore, sales and service to customers at stores at the front end activities affect the next activities toward the back end and supporting activities (Porter M. , 1985).

Compared with lean philosophy, agile supply chain is a more recent academic development,

## Chapter 1 Introduction

having been introduced as a supply chain principle in the 1980s. It has been developed by many companies assist in attaining demand flexibility by seeking to improve their operations. The idea of agility in the context of supply chain management focuses around 'responsiveness'. The agile supply chains are likely to be information-base. The key elements of agile supply chain include time competitive and efficient consumer responsive. And Li (2009) pointed out that agility has the ability to rapidly respond to changes in market and customer demands as the bearer of competitive advantage. Hence, for example, fashion markets which have a shorter life cycle and high demand uncertainty, therefore exposing the supply chain to the risks of both stock out and obsolescence. That is the reason why agile method has become a best solution to solve volatile and unpredictable market. Therefore, there is a growing recognition of the competitive advantage which can be gained through implementing lean and agile methods along the value chain stream.

As a combination form of lean and agile, Leagile paradigms within a complete supply chain strategy by positioning the decoupling point at a particular desired point, so that it will best suit the need for responding to an unpredictable demand of the markets downstream and at the same time making possible to facilitate, level scheduling upstream from the marketplace (Naylor, 1999).

Each year, the consumer electronics industry generates a mushrooming array of products and services increasingly used in nearly every human endeavour. Now deeply entwined in our social fabric, electronics products and systems now support critical aspects of communication, education, finance, recreation, and government (Timothy & Momoko, 2010). In the past few years, China in particular have become increasingly important in consumer electronics as well as other industries, both as production locations and final markets. Growth since 1988, especially on mainland China, has been amazingly high. The recovery was boosted by the government's consumer electronics subsidy programme, as well as a pickup in global demand. Compared to China, New Zealand has smaller population and market scale. However, with a fast growing demand of consumer electronic devices, more relevant companies, such as PB Technologies, JB HiFi, Harvey Norman, have been established and the market competition become fierce. Nevertheless, lower efficiency and customer respond time affect the development of New Zealand companies. How to gain

competitive advantage by implementing outstanding supply chain management strategies in today's business environment has an emerging topic in these two countries. This research focused on the implementation of lean, agile and leagile strategic practices of these four consumer electronic retail companies from China and New Zealand. It is the aim of this research to better understand their supply chain management strategies practices, and analysis how these strategies improve their supply chain performance. Finally, the research will find out what New Zealand's companies should learn from China's successful companies by comparison.

## **1.2 Research Objective**

Many scholars have conducted studies on lean, agile or leagile in manufactory and service industries. In addition, some researchers have focused on those strategies with respect to retail chain or consumer electronic manufacturing respectively only. Although, elucidative, few of these researches focused on the lean, agile and leagile strategic practices implemented by a single consumer electronic retail company to improve their supply chain efficiency and responsiveness or on how these strategies add value along the supply chain.

The two countries chosen were China and NZ because China's and New Zealand's consumer electronic retail industries have different characteristics and levels of maturity. On one hand there is China which became the world's largest consumer electronic devices and relevant components exporter, having a huge market scale, and the export and import value of China-made electronics rising by 11.5% to US\$1.13trn, equivalent to 31% of the country's total foreign trade. On the other hand, New Zealand which is a consumer electronic devices and relevant components importer has a smaller market scale, less than 5% share of the local retail market. It should be noted that the countries have different backgrounds and standings on the global market regarding the consumer electronic retail industry, which is an indication that relevant retail companies have different decoupling points, on which should be improved to adopt lean, agile or leagile strategies.

Based on the research gap in the literature, the importance that improvements have on the

implementation of lean, agile, or leagile and the different features of China's and New Zealand's consumer electronic retail industries, this research project sought to address the following questions

“How do lean, agile or leagile supply chain management strategies improve those companies' supply chain efficiency and responsiveness?”

In order to better understand the implementation effects of lean, agile or leagile supply chain management strategies in the consumer electronic retail industry in China and New Zealand, the following specific objective guided the research:

- I. Review the current situation of consumer electronic retail industry within China and New Zealand.
- II. Describe the implementation of lean, agile or leagile supply chain management strategies in the consumer electronic retail companies of a China-based situation and a New Zealand-based situation.
- III. Analyse and compare the participant companies' lean, agile or leagile implementation strategies of current theory in order to yield insights in the improvement of efficiency and responsiveness in their supply chain

### **1.3 Structure of Thesis**

This thesis is organised into six chapters. The first chapter is to set out the background of the subject to provide a general overview and to offer an outline of the study undertaken.

A comprehensive literature review is in the second chapter. The literature review was constructed under two main sections: 1) Supply chain management and relevant strategies layout; 2) Consumer electronic retail industry in China and New Zealand, and industry value chain.

The third chapter describes that the survey method will be used to conduct the research and

## Chapter 1 Introduction

content analysis and cluster analysis will be implemented to analysis the data used in the study. It describes the research situation and participant, the operational procedures used for this research, the instrument for data collection, the methodology of data analysis, and the methods of questionnaire analysis the research.

The results and finding of this study are presented in the fourth and the fifth chapter. Chapter Four presents the individual case report, which are the outcome of analysis of data collected over the research period. Chapter Five carries a multiple-case study from two countries focusing on how the implementation of lean, agile or leagile strategies to improve the participant companies' efficiency and responsiveness in the supply chain.

The final chapter summarises the results of the study and draws conclusion based on the observed findings. Limitation of the study and suggestions for the future research are then addressed.

# Chapter 2 Literature Review

## 2.1 Introduction

As an important part of the enterprises, supply chain has drawn attention of business operators as well as academic and scholars. Supply chain management and relevant strategies have been a frequently studied area, and a great number of studies and discussions have contributed enormously to the overall development in manufactory, retail and some of the others industry.

Many scholars have explored the field of supply chain management and relevant strategies, such as lean, agile and leagile, in manufactory industry and retail industry. However, it is still difficult to find relevant studies with regards to the consumer electronic retail industry. In this chapter, the researcher will present many of the concepts that are necessary to deeper understand the modifications that have been occurring around the world manufacturing and retail industry.

It is obvious that supply chain management and the leagile strategies are important to the consumer electronic retail companies when they try to enhance their competitive advantage. Hence, in the section 2.2 to 2.5, there is a brief introduction to these strategies. Followed by the investigating situations of China and New Zealand consumer electronic industry in 2.6, where stand two difference consumer electronic market. Then 2.7 and 2.8 describes the value chain and competitive advantage in consumer electronic retail industry. Finally, the evaluation methods to evaluate the strategies implementing result of the research companies.

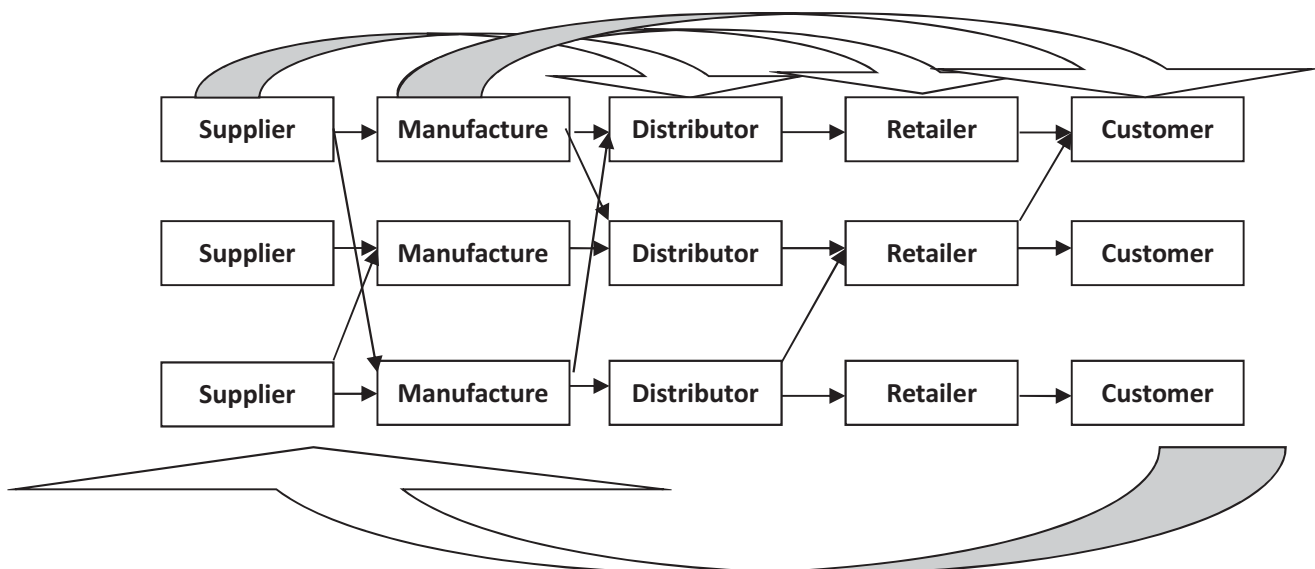
## 2.2 Supply Chain Management

The concept of “supply chain management” arose in the late 1980s and became in widespread use in the 1990s. “Logistics” or “operation management” were often instead used in the individual company before that time. La Londe (1994) described that a supply chain is a set of firms that pass materials forward. Normally, several independent firms are involved in manufacturing a product

and placing it in the hands of the end user in a supply chain—raw material and component producers, product assemblers, wholesalers, retailer merchants and transportation companies are all members of a supply chain (La Londe, 1994). In addition, some researchers also pointed out that a supply chain is an alignment form of firms that brings products or services to market.

In another definition was described by Chopra and Meindl (2007) that a supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain includes not only the manufacture and suppliers, but also transporters, warehouses, retailers, and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service (Chopra & Meindl, 2007). A supply chain is active and includes the flow of information, products and funds, even reversed between different stages. However, a supplier may supply several manufacturers or distributors. Hence, most supply chains are networks, as shown in Figure 2-1.

*Figure 2- 1 Supply Chain Stages and information, products flow*





## Chapter 2 Literature Review

In an organization, the objective of supply chain was strengthened by Chopra and Meindl as “maximizing the supply chain surplus” (Chopra and Meindl, 2010). The supply chain surplus is also known as the overall value generated from the entire supply chain, which is determined as the difference between the perceived value from end consumers and total costs of all the supply chain activities, both directly and indirectly involved in the end-customer order fulfilment. It is worth noting that the surplus is shared by all companies along the entire supply chain. Chopra and Meindl (2010) further pointed out that the success of supply chain should be measured by the entire supply chain profitability rather than the profit of a certain company or at a certain stage.

Hence, supply chain management can be defined as the activities the organisations do that affect the behaviour of the supply chain and get the results they want. However, although industry and academia have investigated the supply chain management concept since 1980s, there is still no consistent definition of the concept. The term of supply chain management has been defined by the Institute for Supply Chain Management (ISM) as “the design and management of seamless, value-added processes across organizational boundaries to meet the real needs of the end customer” (Fawcett, 2007). The real needs of the “end customer” are what pull the entire supply chain moving forward. In general, supply chain consists of many different companies, which are directly or indirectly involved in fulfilling end customer’s requirements, including suppliers, manufacturers, logistics provider, information provider, retailers and so on:

“Differences between supply chain management and classical materials and manufacturing control: “1) the supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas such as manufacturing, purchasing, distribution, and sales. 2) Supply chain management calls for, and in the end depends on, strategic decision making. “Supply” is a shared objective of practically every function in the chain and is of particular strategic significance because of its impact on overall costs and market share. 3) Supply chain management calls for a different perspective on inventories which are used as a balancing mechanism of last, not first, resort. 4) A new approach to systems is required—integration rather than interfacing.” Houlihan (1988)

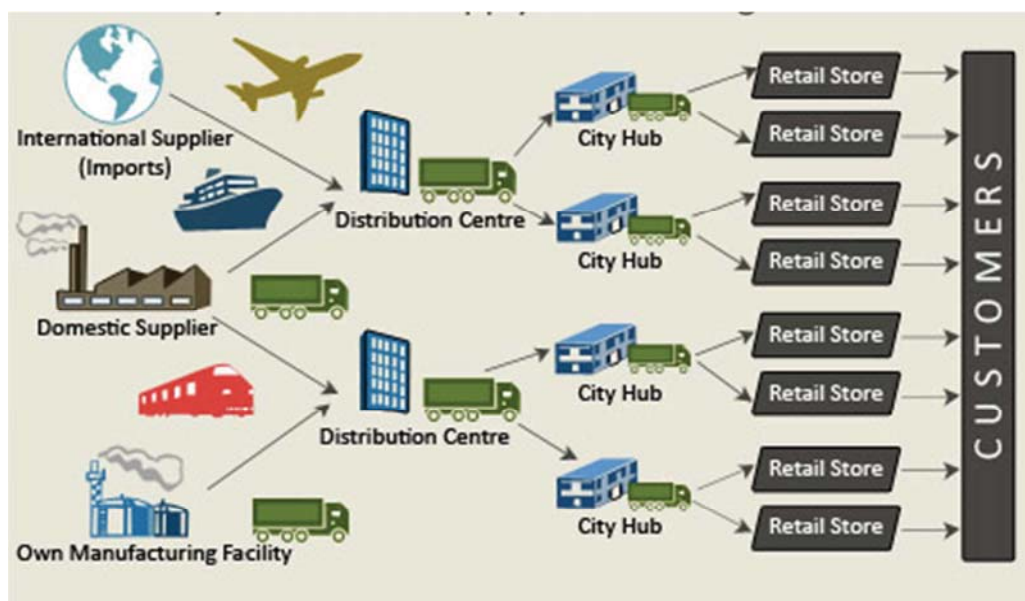
For the purpose of this research, the definition by Mihai and Irina (2013) has been chosen to be a guideline for its inclusion of the integration of a group of firms, organizations and individuals directly involved in the upstream and downstream flows of products, services, finances, and information from initial raw material extraction to the final or end customer, including intermediate processing, transportation, and storage activities and final sale to the end customer. This definition is more suitable for this research because it addresses the components typically found in a supply chain with a short cycle time, especially those in the retail and consumer targeting industries.

## **2.3 Retail Supply Chain**

In this thesis, the term retail can be described as final sales to mostly non-business customers or end-users, called consumer. However, it is significant that most business also purchase at retail stores. Hence, the transactions in the retail shops can be termed business to customer or business to business. Retailing is the set of business activities that adds value to products and services sold to consumers for their personal or family, even organisational use (Levy, Weitz, & Grewal, 2007). Meanwhile, with the development of internet, most of these purchases are made from the comfort of the buyers' home or office using the Internet, which has been the most popular form of buying over the past decade.

As can be seen in the Figure 2-2, retail supply chain include more than stores in their makeup (Ayers & Odegaard, 2008). It is a key component in a supply chain that links manufacturers to consumers (Levy, et al, 2007). Those four companies which were picked into the research are Business to Customer (B2C) companies. They are the bridges between the manufacturers and the final buyers

Figure 2- 2 Retail Supply Chain



Source: <http://sysforeretail.com/sysfore-retail-erp/retail-erp/retail-supply-chain-management.html>

## 2.4 Supply Chain in Consumer Electronic Industry

Consumer electronics industry is characterised by high product variety, short product life cycles and decreasing prices (Fisher, 1997). It is currently among the most dynamic, because the products that did not exist until a decade ago have undergone rapid change, spawning an endless chain of innovations and new products. Nowadays, the demand of consumer electronics devices is increasing significantly, changing the way of people interact, consume entertainment, manage their finances and organize their lives.

Rajesh and Shyam (2011) pointed out that Consumer demand for better and cheaper devices is shrinking product life cycles and leading to rapid obsolescence. New products are quickly finding their way into markets, increasing the velocity of promotional events and marketing activity. According to the analyst from Consumer Electronic Association (CEA), Global retail sales of CE devices are projected to grow 10 percent in 2011 to reach \$964 billion and sales may even approach \$1 trillion in the foreseeable future.

In order to leverage the opportunities presented by the explosion in consumer demand, consumer

electronics manufacturers and retailers need to durable their forecasting, sourcing, distribution and inventory management strategies. Hence, to be succeed in the extremely competitive consumer electronic space retailers must bring a more refined and sophisticated approach to Supply Chain Management. Entirely new capabilities need to be built to understand consumer needs and respond to them even while retaining flexibility in strategies, distribution and logistics (Rajesh & Shyam, 2011).

## **2.5 Supply Chain Strategies in the Consumer Electronic Industry**

A supply chain strategy is defined, relative to its competitors', the set of customer needs that it seeks to satisfy through its products and services (Chopra & Meindl, 2007). However, traditional demand planning and supply chain planning strategies are no more adequate to meet the challenges of consumer electronic industry in the future. Lean thinking had been approved to be successful in the Toyota Production System over last century. And agile management is being widely applied into the fast changing industry, such as the consumer electronic industry.

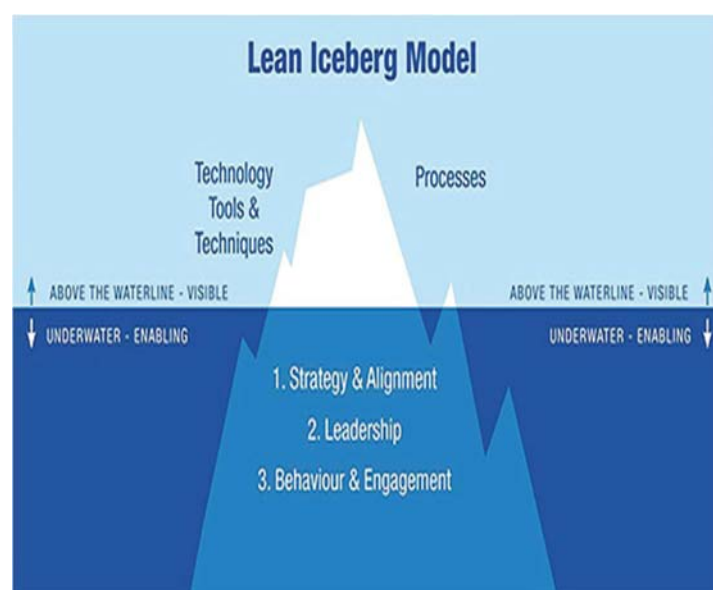
### **2.5.1 Lean Strategy**

Lean is the process of continuous improvement that focuses on waste elimination and customer-oriented value creation during the production process. Even though this method originated from the Toyota Production System (TPS), which predominately focused on mass-production, now it has been identified as a global manufacturing model and widely applied in most industries (Vinodh, S. and Dino, J., 2012; Deflorin, P. and Scherrer-Rathje, M., 2012). A possible explanation for this trend could be associated with the widely accepted belief that successfully implementing lean management could provide the manufacturers with superior business performance as well as competitive advantages. The outstanding performance of Toyota in the automotive industry can be seen as the best example of lean success. For example, Apple, a world famous consumer electronic manufacture, applies lean method to reduce inventory successfully and increase the value of their products on the market.

The floor-level tool set, as known as - lean production is only the operational part of lean methodology, whereas lean thinking is classified as the strategic part. Hines et al (2004) pointed out that organisations missing the strategic aspect of lean are merely using lean as a cost-reduction and quality improvement tool set and cannot gain the sustainability of the lean transformation program and embrace the long-term benefits from lean projects.

Hines and Harrison (2010) presented a “lean iceberg model” (see Figure 2-3.) and stressed that “strategy and alignment” is one of the critical issues for lean sustainability. In the “lean iceberg model”, strategy and alignment is viewed as one of the “underwater enabling”.

*Figure 2- 3 Sustainable lean iceberg model (Adopted from Hines et al, 2010)*



The technical aspects of lean implementation have been widely discussed, while the ability to create a self-sustaining lean culture was relatively neglected in the past. Atkinson (2010) stressed “organisational culture determines the success of lean” and hence suggested organisation should create a “lean culture”, so as to reap full benefit that lean is deemed to offer. It is critical for companies when developing lean strategies to consider both the technical and strategic aspects to ensure that their processes can be sustainable.

Bhasin (2006) explained when an organisation successfully embraces lean as the philosophy, both employers and employees will believe in lean and treat it as a mind-set, so better improvements are feasible which facilitate the lean implementation. Similarly, Husby (2007) claimed that lean was an ideology, because it was strictly based rationality and scientific methodology. Later, Bhasin (2011) examined the performance of those companies treating lean as ideology and identified those companies did perform better. Furthermore, the research showed that those companies treating lean as a philosophy are facing fewer barriers in lean implementation and able to apply lean across the organisation.

Meanwhile, lean principles are a set of beliefs and assumptions that drive operational decisions and actions about products and processes. They address general issues about what a company should do in terms of product and process improvements (Nicholas, 1998). And Womack and Jones (1996) demonstrated five principles of lean.

1. Specify what creates value from the customer's perspective.
2. Identify all steps across the whole value stream.
3. Make those actions that create value flow.
4. Only make what is pulled by the customer just in time.
5. Strive for perfection by continually removing successive layers of waste.

Hence, it is the fact that the consumer electronic industry is also being benefiting in the value creation efforts, as earlier seen with the Apple case and their use of heavy marketing. Similar to the concept of lean manufacturing, the concept of lean retail is known by many names and variations in the literature: lean logistics, lean distribution and lean consumption. Attempt to apply lean concept in retail is recent - it dates from 90s of the last century. In this regard, a number of retailers such as Wall Mart, Tesco and IKEA are well-known (Radojko, 2012). It requires simple workflow, eliminating the loss of effort, time, materials and motifs. Main type of waste that have to be primarily eliminated are: excess inventory, product defects, unnecessary motion, redundant

employees and a waste of time.

Therefore, it is not only necessary to the enterprises apply the combination of lean techniques and strategies to improve the performance, but also importance to apply lean principles as the drive to improvement of the process.

### **2.5.2 Agile Strategy**

The concept of agile supply chains was introduced to transfer and apply the winning strategy of agility to that of supply chains (Harrison A. C., 1999). Christopher (2000) defines agility as achieving a rapid response on a global scale to constantly changing markets. The rapid response needs to cover changes in demand for both volume and variety, such as with the unpredictable market from consumer electronic industry. A third dimension important in analysing rapid response is lead time or how long it takes to replenish the goods in order to satisfy demand. Agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile market place (Naylor, 1999). In lean supply chains the focus is on “waste” elimination, but in agile supply chains the focus is on the ability of comprehension and rapid responding to market changes. Hence, agility in the context of supply chain management focuses on “responsiveness” (Lee, 1999).

Christopher and Towill (2000) pointed out that an important and significant difference is that lean supply is associated with level scheduling, whereas agile supply means reserving capacity to cope with volatile demand. In other words, while lean management typically calls for make-to-stock replenishment driven by short-term forecasts, agile supply chains employ make-to-order provisions, producing only what has already been sold or committed in the market place. To meet this challenge of volatility of demand; the organization needs to focus its efforts upon achieving greater agility such that it can respond in shorter periods both in terms of volume change and in terms of variety change (Amir, 2011). However, current existing literature is difficult to find out a general concept for agile, but only in the manufacturing area.

The key elements of an agile approach are very similar to the elements of the agile supply chain. Agility is all about customer responsiveness, people and information, cooperation within and between firms and fitting a company for change (Marcus, 2010). In order to truly achieve agility, the companies have to process a series of distinguishing factors, such as market sensitivity, process integration, virtual and networking. In fact, response-based supply chains are often characterized as “fast” or “quick”, with few or no intermediaries. Supply should be located nearby, and information sharing among the parties must be open and frequent (Christopher & Towill, 2000). In that respect, the origins of agility as a business concept lie partially in flexible manufacturing systems (FMS). At the beginning, it was thought that the route to manufacturing flexibility was through automation to enable rapid changeovers and thus enable a greater responsiveness to changes in product mix or volume (Harrison & Hoek, 2002).

With the increase in competition and companies seeking the customers’ favour, agile supply chain has emerged as the new mantra. Those who can meet customer demands are more successful (Marcus, 2010). Those phenomenon, such as customer satisfaction, quality improvement, cost minimization, delivery speed, new product introduction, service level improvement, and lead-time reduction, are normally resulted in the implementation of agile strategy. According to an earlier understanding of agile capabilities, Alan, Remko and Heather (2014) defined agility as the capability to read and repond to chaning end-customer demand and indentifies four distinct capabilities that required as shown below:

1. Market sensitive. It is a strong ability that requires the companies be able to read market.
2. Process integration. It requires the organisations can avoid the time, cost and quality penalties associated with ‘stand-alone’ process.
3. Network based. A network of supply chain partners collaborate to meet the end-customer needs and demand by collaboratively planning across the supply chain.
4. Virtual integration. It requires firms share ‘real time’ demand data to improve forecast accuracy.



Similarly to the fashion and garment industry, consumer electronic industry is also characterised by volatile markets, short product life cycles and high levels of competition between retailers. Due to the demand for consumer electronic products is so volatile and short-lived that any attempt to predict the volume of sales for each stock keeping unit or SKU is bound to fail. This business environment drives retailers to explore audacious business strategies and novel marketing channels to increase value for investors and defend market share (Jon, 2012). The agile supply chain literature is idealistic about how collaboration is to be achieved to ensure low inventories (to avoid obsolete stock at the end of the season that will need to be sold at a discount) and frequent replenishment of high turn-over stock in-season.

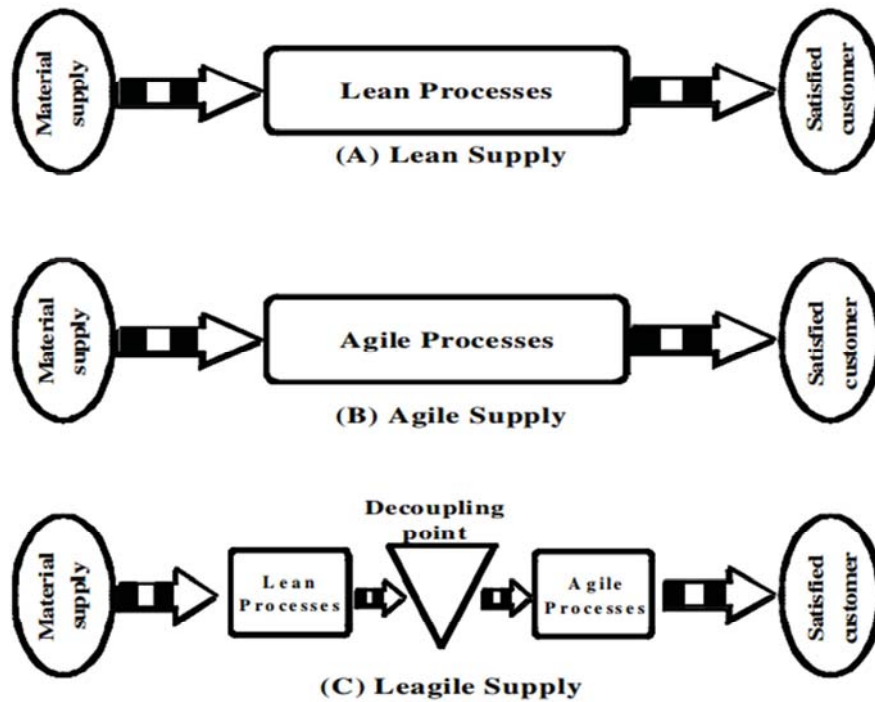
Therefore, in order to enhance the flexibility of the supply chain to meet the overall target for competitive advantage, it requires that the companies should achieve effective co-ordination to all the participants along the value stream.

### **2.5.3 Leagile Strategy**

Leagile is the combination of the lean and agile paradigms within a complete supply chain strategy by positioning the decoupling point at a particular desired point, so that it will best suit the need for responding to an unpredictable demand of the markets downstream and at the same time making possible to facilitate, level scheduling upstream from the marketplace (Naylor, 1999). The decoupling point is the point in the material flow streams to which the customer's order penetrates. It is here where order-driven and the forecast driven activities meet. As a rule, the decoupling point coincides with an important stock point in control terms a main stock point from which the customer has to be supplied (Hoekstra & Romme, 1992).

Figure 2- 4 Block diagrams representing lean, agile, and leagile supply

(Goldshy, GrifTis, & Roath, 2006)



The reason why the business needs a leagile approach is that the agility does not confront but explores the volatility to get a competitive edge, while lean provides customers with good quality products at low prices through the elimination of inventories and losses in processes and the agile manufacturing deals with the strategy to enter in the market niche with customers with specific needs (Maskell, 2001).

The leagile approach refers to hybrids of the lean and agile approaches. Thomas, Stanley and Anthony (2006) illustrated that the first hybrid approach embraces the Pareto (80/20) Rule, recognizing that 80% of a company’s revenue is generated from 20% of products. It is suggested that the fast-moving products that make up the dominant 20% of the product line can be produced in a lean, make-to-stock manner given that demand is relatively stable for these items and that efficient replenishment is the appropriate objective. Meanwhile, the remaining 80% should be produced in an agile, less anticipatory manner, perhaps even employing make-to-order production to generate supply for only those items ordered when they are ordered.

Another lean and agile hybrid explained by Thomas, Stanley and Anthony (2006) is to involve having temporary capacity to meet the needs of peak demand. In the agile component of this hybrid approach, the companies should adopt to increase the inventory level, so as to meeting the over demand situations. A huge number of companies engage in leagile supply, manufacturing, and logistics to support seasonal demands.

The third hybrid approach works best when goods can be developed from common materials in to a near-finished state with final touches to the product providing for a diverse assortment that accommodates distinct customer needs (Goldshy, GrifTis, & Roath, 2006). Mason-Jones, Naylor and Towill (2000) described the premise as lean operations in the production of generic, semi-finished product, and agile accommodation in the customization process. It is on the basis of accommodating diverse needs efficiently that many refer to such an approach as “mass customization” (Feitzinger, Edward, & Lee, 1997).

With the global market becoming fierce, especially in consumer electronic industry, such a rapid change and high profit industry, it is difficult to isolate developing an agile capability or a lean philosophy structure. It is important to recognize that a supply chain can be lean for part of the time, agile for part of the time and both lean and agile (hybrid) for part of the time.

## **2.6 Consumer Electronic Industry**

Consumer electronics (CE) can be described as those daily used electronic equipment in communication, business and entertainment. It includes personal computers, digital cameras, mobile phones, home and office electronic devices, digital devices on cars, disks players, speakers, and so on (Ning & Shao-chuan, 2011). Those consumer electronic devices are playing an important role in daily life currently. China has the largest market on the world and a number of well-developed consumer electronic retail companies comparing with New Zealand whose companies are still developing.

## **2.6.1 China and the Consumer Electronic Industry**

In the past ten years, with fast development in consumer electronics industry, China had played an important role in those products' producing and exported in the global market. According to China Consumer Electronics Report (2013), China's PC market remains robust when considered in a global and regional perspective, with strong fundamentals including low PC penetration, rising incomes and declining device prices driving sales. However, the trend of consumers increasingly adopting lower priced tablets, particularly in the upgrade/replacement market, is limiting market value growth even as unit growth remains strong. This is because consumers are less likely in 2013 to choose Apple's relatively expensive iPad and are instead opting for lower priced Android based tablets, primarily from domestic vendors.

In addition, similar dynamic is at play in the smart phone market, where unit growth is booming, but there have been steep declines in average selling prices. Local vendors including Xiaomi, Lenovo and Huawei are the primary drivers of this trend as they release locally customised Android Smartphone with strong specifications and attractive designs at prices that are available for as little as half the price of flagship products from international vendors. Apple had set to launch a plastic iPhone targeting mass market in emerging economies such as China. The extent to which this strategy will work against local vendors is uncertain now the technological gap has narrowed, making price and branding of key importance.

Furthermore, The AV market has lacked the dynamic edge against the PC and handset markets in recent years but could be set to receive a boost following reports that the government is set to revoke its ban on games consoles. Games consoles had been banned since 2000 as the government feared the impact on children. While the lifting of the ban is unquestionably good news for Sony, Microsoft and Nintendo they will still need approval from the culture ministry to release devices, while games will also be subject to censorship to ensure that they are not too violent or politically sensitive. Furthermore, it was reported that all consoles and associated equipment must be produced domestically, specifically in the Shanghai free trade zone. The

requirement to produce domestically is unlikely to be a major issue, with Nintendo already using Foxconn, Microsoft Flextronics and Sony using a range of local suppliers and assemblers.

*Table 2- 1 Consumer Electronics Overview, 2010-2017, (US\$m)*

	2010	2011	2012	2013	2014f	2015f	2016f	2017f
<b>CE Devices total Demand</b>	159,277	180,970	199,103	215,800	237,234	257,888	277,031	297,091
<b>Computers</b>	62,880	70,894	79,178	85,982	92,994	100,131	106,271	113,955
<b>Audio, Video and Gaming</b>	63,836	70,894	77,491	85,669	95,019	104,451	113,029	120,614
<b>Communications</b>	32,561	39,182	42,434	45,149	49,221	53,306	57,731	62,523

Source: China Consumer Electronics Report Q4 2013.

As can be seen on above table 2-1, China's Consumer Electronics market is mainly consisted by computing devices, mobile handsets and video, audio and gaming products, which was worth US\$215.8 Billion in 2013. With a significant increased from 2010, BMI (Business Monitor International) estimated that the total market demand will be reach a new peak in 2017 (US\$297 Billion). Demand for computers and TV sets in rural areas and tier-three to tier-six cities will be a key driver, along with the increased popularity of high-end items such as flat-screen TV sets, tablets and Smartphone.

## **2.6.2 New Zealand and the Consumer Electronic Industry**

New Zealand has transformed its economy into an industrialized, free market and globally competitive economy (Rushton & Walker, 2007). As figure 2-5 shown, today, New Zealand depends heavily on international trade, especially with Australia, China, the United States, and Japan (New Zealand in Profile 2013, 2013). China as a world-wide manufacturer, exported 7.6 Billion New Zealand Dollars' worth of products to New Zealand. With regards to New Zealand exporting to other countries, its largest partner was Australia at 10.4 Billion New Zealand dollars in 2012. China was the second largest partner to be exported products to from New Zealand at 6.1 Billion. And others main trading partners' profiles can be seen in figure 2-5 as below:

Figure 2- 5 New Zealand Main Trading Partners

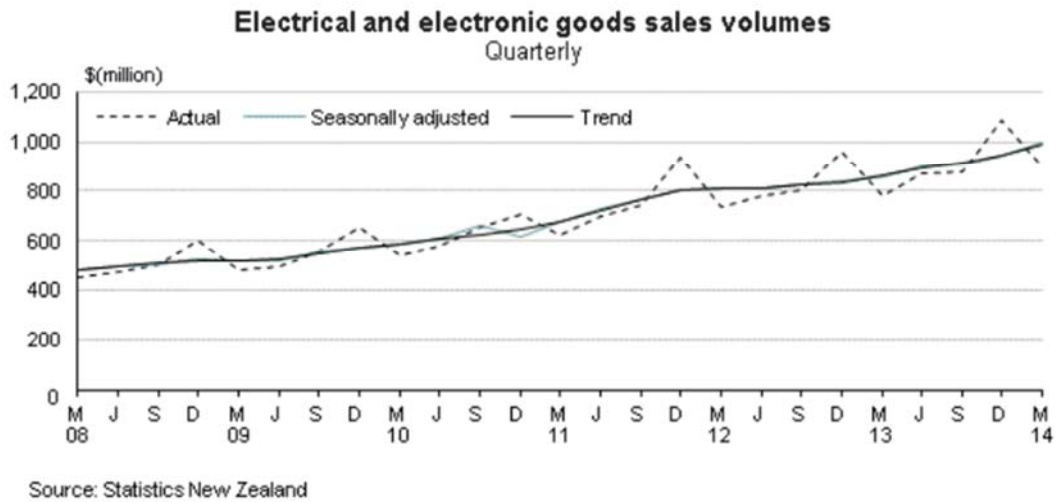


Source: From New Zealand in Profile 2013

In order to compare New Zealand' electronic retail market to China's market, Figure 2-6 illustrates the electrical goods sales volumes in New Zealand from 2008-2014.

In retailing industry, compared with the December 2013 quarter, in March 2014 quarter, the total volume of retail sales rose 0.7 percent. Meanwhile, electrical and electronic goods retailing recorded the largest volume increase, up 5.5 percent. And the total value of retail sales rose 0.7 percent (Retail Trade Survey: March 2014 quarter, 2014).

Figure 2- 6



The volume of electrical and electronic goods sales rose 5.5 percent, the largest industry increase in the March 2014 quarter. As can be seen in Figure 2-6, this follows a 3.7 percent rise in the December 2013 quarter. Electrical and electronic goods prices have been falling since mid-2009. In this latest March quarter, prices (which are not seasonally adjusted) fell 2.0 percent compared with December 2013. The sales value for electrical and electronic goods rose 4.3 percent (\$29 million) in the March 2014 quarter (Retail Trade Survey: March 2014 quarter, 2014).

## 2.7 Value and the Value Chain in the Consumer Electronics Industry

The consumer electronic industry is one of the world's most important goods-producing sectors. Not only does it employ more workers and generate greater revenue than some other sectors, its products also can be apply to enhance productivity in other activities, even stimulate innovation across entire economies. However, there is few value chain researches related to consumer electronic industry. Hence, this research will find out how those companies create or add value along the chain with the implementing lean, agile or leagile methods.

In marketing, the concept of value is a key-element. Marketing managers are encouraged to adopt

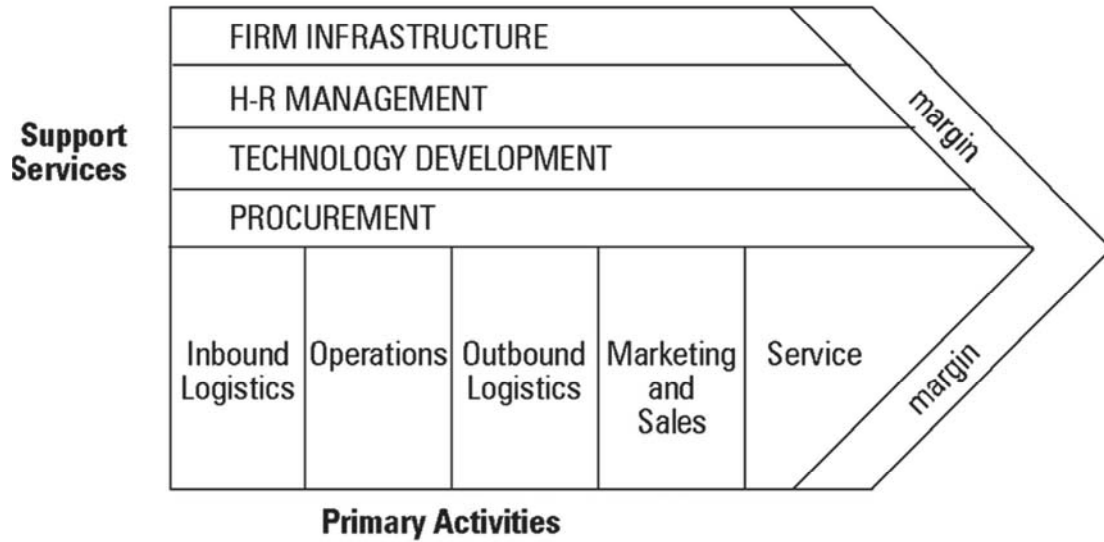
strategies related to the value expected by the consumer, to promote and enhance the long-term success (Hamel, 1994). It is the customers can either appreciate the economic benefits of a purchase process, or can get a better service adapted to his/her own needs. Value is measured by total revenue, a reflection of the price a firm's product commands and the units it can sell. A firm is profitable if the value it commands exceeds the costs involved in creating the product (Porter M., 1985). Porter defined value as the amount buyers are willing to pay for what a firm or organisation provides and linked up the value chains between firms to form what he called a Value System.

The concept of the value chain is the "nested processes" that are "the concept of a process within a process", connected by linkages that can be used as a source of competitive advantage (Gertner, 2013). The value chain displays total value, and consists of value activities and margin (Figure 2-7). Value activities are activities a firm performs that have distinct physically or technologically advanced attributes providing a firm with a competitive edge against competitors with same supply chain needs. And margin is the difference between total value and the collective cost of performing the value activities (Porter M. , 1985).

Value activities can be divided into two parts, primary activities and support activities. As can be seen in Figure 2-7, primary activities are mainly involved in the physical value creation for the product and its sale or transfer to the buyer as well as after sale assistance. And the support activities are to support the primary activities by providing procurement, technology, human resource and firm infrastructure functions.



Figure 2-7 the Generic Value Chain



There are five primary activities involved in competing in any industry, inbound logistics, operations, outbound logistics, marketing and sales and service respectively:

1. Inbound logistics includes those activities with receiving, storing, and disseminating inputs to the product.
2. Operation associated with transforming inputs into the final product form.
3. Outbound logistics is to collect, store and physically distribute the product to buyers.
4. Marketing and sales provide a meaning by which buyers can purchase the product and induce them to do so.
5. Service includes offering service to improve or maintain the value of the products.

(Porter M. , 1985)

Similarly to primary activities, each category of support activities is divisible into a number of distinct value activities that are specific to a specific industry, but they are divided into four generic categories.

1. Procurement activity can normally be associated with a specific value activity or activities to support that a purchasing department serves value activities and purchasing

policies apply firm-wide.

2. Technology development includes a range of activities to group into efforts to improve the product and the process. It is important to competitive advantage in all industries.
3. Human resource management influences competitive advantage in firms by determining the skills and motivation of employees and the cost of hiring and training.
4. Firm infrastructure includes general management, planning, finance, accounting, legal, government affairs, and quality management.

### **2.7.1 The Value of Organisations/Firms**

Firm value, mostly called enterprise value or total enterprise value in financial area, can be described as an economic measure reflecting the market value of a whole business. A firm's potential to generate value for shareholders depends on its market position and its ability to leverage its assets (Richard, 1992). In addition, market share, which can be define as the firms sales revenues relative to total industry sales revenues (Kapil, Bharadwaj, & Kohli, 2010), can be demonstrated that a firm with greater market share is more efficient in transforming its market-based assets into future cash flows (Thomas & Rego, 2005). Therefore, in order to improve the market share, firms should adopt a suitable value proposition strategy.

A value proposition can be described as a reason why customers should consider or purchase your products and service. It also can be defined from the customers' perspective and it plays a key strategic role within a business in developing its competitive positioning.

Value proposition brings together customer intelligence, competitive insight, and product valuation. It delivers a concise, supportable statement of the product's value. It quantifies how that value is realized based on all of the target customers' likely product experiences. The customer value proposition provides a focused approach to understanding the target customers in the context of your product.

Although value proposition is essentially a positioning statement, it is rather brief and clearly with the following aspects:

1. What is being offered?
2. Who is the target customer?
3. Why the customer should purchase your products or service?
4. How different or better your products or service is from the competitors?

A value proposition is a powerful tool that is used to differentiate oneself in the marketplace. A well-craft value proposition for the companies will help them to define or refine the competitive position. Hence, there are three kinds of value propositions approaches which are used or identified by most suppliers or business organizations:

All benefits: this approach requires that the managers should have the least knowledge about customers and competitors and the least amount of work to construct, because they have to list all the benefits that they believe the offering delivering value to target customers. However, managers may claim the advantages for features that actually provide no benefit to target customers (Anderson, Narus, & Rossum, 2006). In addition, another risk of all benefits implementation failure is that many, even most, of the benefits may be points of parity with those of the next best alternative, diluting the effect of the few genuine points of difference. And the managers have to definite clearly in their customer value propositions which elements are points of parity and which are points of difference.

Favourable points of difference: the second approach of value proposition clearly recognizes that the customer will be alternative and all favourable points of difference a market offering has relative to the next best alternative. The managers realize that an element of an offering is a point of difference relative dose not, however, conveys the value of this difference to target customers (Anderson, et al, 2006). Moreover, it is difficult to clarify which points of products or service deliver the greatest value, because a product or service may have several points of difference.

Hence, if there is not a deep understanding of the customers' requirements and preferences, it is hard to the suppliers to identify the right points to deliver the greatest relative value to the target customers.

Resonating focus: the final approach of value proposition acknowledges that the managers who make purchase decisions have major, ever-increasing levels of responsibility and often are pressed for time (Anderson, et al, 2006). In this approach, one or two points of difference whose improvement will deliver the greatest value to the customer for the foreseeable future. In other words, Suppliers can provide such a customer value proposition by making their offerings superior on the few elements that matter most to target customers.

There two significant differences between Resonating focus and favourable points of difference. First of all, although suppliers' offering may include several favourable points of difference, the resonating focus proposition only concentrates on one or two points of difference that deliver and whose improvement will continue to deliver, the greatest value to target customers. The suppliers also can even give up the next alternative the favourable points of difference that customer's value least because of better leverage limited resources, and the suppliers can concentrate its resources on improving the one or two points of difference customers value most. In addition, the suppliers can contain a point of parity if they adopt the resonating focus. It means that either when the point of parity is required for target customers even to consider the supplier's offering or when a supplier wants to counter customers' mistaken perceptions that a particular value element is a point of difference in favour of a competitor's offering (Anderson, et al, 2006).

### **2.7.2 The Value of Customers**

Value in business markets is the worth in monetary terms of the technical, economic, service, and social benefits a customer company receives in exchange for the price it pays for a market offering (Anderson & Narus, 1998). It is the consumer's overall assessment of the utility of a product based on perception of what is received and what is given (Zeithaml, 1998). Kotler and Armstrong (1998)

described that customer value was the difference between the value obtained from a product of customer possession and the cost paid in order to getting the product. And it can also be identified as market perceived quality which customers obtained relative to product price (Gale, 1994). Although there are a wide variety of different definitions of customer value as shown above, those can be summarized that the researchers adopt a customer perspective on value derived from empirical research into how customers think about value. Meanwhile, Sun and Su in 2012 on International Conference of Applied Physics and Industrial Engineering pointed out, "...theoretical principles and research basic points have not any different, that is to say, corporations should take customer's point of view to consider value creation."

Creating and delivering superior customer value to high-value customers will increase the value of an organisation. Albrecht in 1995 illustrated, "Customer value is the basic truth of any business transaction; it is the litmus test of business success." The value is not the products or service itself nor is it feature of the product or service. It is the personal and individual meaning for products or service experience.

## **2.8 Competitive Advantage**

To begin, it may be helpful to take a more in-depth look at what it means to have a competitive advantage: an edge over the competition (Ehmke). Porter (1985) pointed out that the success or failure of firms depends on their core competitive. It can be defined as whatever value a business provides that motivates its customers (or end users) to purchase its products or services rather than those of its competitors and that poses impediments to imitation by actual or potential direct competitors (Christensen, 2010). David (2013) demonstrated that when every part of an organisation discovers what makes it special and builds on the company's overall competitive advantage, it will help each segment of the business grow stronger in defining the role it plays in enhancing its ability to become more competitive.

Porter (1985) pointed out two types of competitive advantage a firm may possess in "Competitive

Strategy with Competitive Advantage”: cost advantage and differentiation advantage.

Cost advantage means that a firm’s cumulative cost of performing all value activities is lower than competitors’ cost (Porter 1985). It can lead to superior performance if the firm provides an acceptable level of value to the customers so that its cost advantage is not nullified by the need to change a lower price than competitors. Porter also pointed out that there are two major ways for a firm to gain a cost advantage, which are controlling cost drivers and reconfiguring the value chain respectfully. Controlling cost drivers mean that a firm can gain an advantage with respect to the cost drivers of value activities, such as controlling scale, controlling learning, controlling the effect of capacity utilization, and linkages, interrelationships, integration, timing, location, procurement and cost advantage, to represent a significant proportion of total costs. Meanwhile, the firm also can adopt a different and more efficient way to design, produce, distribute, or market the product to reconfigure the value chain to gain cost advantage. On one hand, reconfiguration frequently presents the opportunity to fundamentally restructure a firm’s cost, compared to settling for incremental improvements. On the other hand, an alternate value chain can lead to cost advantage is by altering the basis of competition in a way that favours a firm’s strengths.

Another type of competitive advantage a firm may possess is differentiation (Porter 1985). A firm differentiates itself from its competitors if it can be unique at something that is valuable to buyers. It allows the firm to command a premium price, to sell more of its product at a given price, or to gain equivalent benefits such as greater buyer loyalty during cyclical or seasonal downturns. And also, if the price premium achieved exceeds any added costs of being unique, it will lead to superior performance.

## **2.9 Performance Assessment**

Assessment is important, as it affects behaviour that impacts supply chain performance. As such, performance assessment provides the means by which a company or organization can measure whether its supply chain has been improved or degraded. Traditionally, companies have tracked performance based largely on financial accounting principles, which are certainly important in

assessing whether or not operational changes are improving the financial health of an enterprise. However, it is insufficient to measure supply chain performance. On one hand, the measures tend to be historically oriented and not focused on providing a forward-looking perspective. On the other hand, the measurements do not relate to such non-financial important performance and directly tie to operational effectiveness and efficiency.

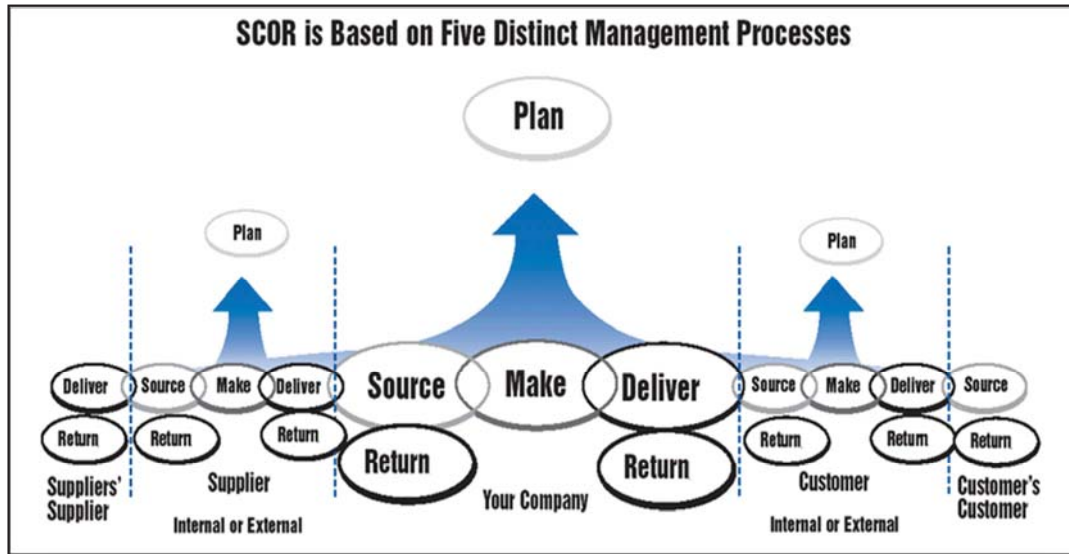
In response to some of these insufficiencies in traditional accounting methods for measuring supply chain performance, a variety of measurement approaches have been developed and shown as below:

1. The Supply Chain Council's SCOR Model
2. The Balanced Scorecard

### **2.9.1 SCOR**

The Supply Chain Operations Reference (SCOR) Model released by Supply Chain Council (SCC) in 1996 has been widely studied and used in research and industry. It was illustrated by Supply Chain Council that "a SCOR model describes the supply chain at multiple levels of detail, identifies best practices and defines associated KPIs for each process. Organizations are beginning to leverage SCOR standards to drive consensus on terminology, processes and expectations among trading partners." The tenet of the SCOR Model is to help organizations to improve their supply chain efficiency and effectiveness (Coyle & Bardi, 2003). It provides standard descriptions of the relevant management processes; a framework of the relationships among the standard processes; standard process performance metrics; and standard alignment to features and functionality. As can be seen in the Figure 2-8, there are five key elements or main processes for supply chain: plan, source, make, deliver and return.

Figure 2- 8 SCOR Model Framework



**Plan:** the plan process includes demand and supply planning and management which require balancing resources with requirements and the establishment and communication of plans for all other processes in the supply chain. It encompasses the processes that balance aggregated demand and supply to develop a course of action which best meets sourcing, production, and delivery requirements (Coyle & Bardi, 2003). Zhou, Schilling, and Milligan(2011) pointed out that the SCOR model suggests that the capability to run “simulated” full stream supply/demand balancing for “what-if” scenarios is important for supply chain planning. And it is also an important ability is to get real-time information and rebalance supply chains using updated information.

**Source:** sourcing practice connects manufacturers with suppliers and is critical for manufacturing firms. It encompasses sourcing stocked, make to order and engineer-to order products or materials. And it also includes scheduling deliveries, receiving, verifying, transferring, and authorizing vendor payments. It covers managing the source business rules, assessing supplier performance, and maintaining appropriate data, as well as managing inventory, capital assets, incoming product, the supplier network, import/export requirements and supplier agreements (Coyle & Bardi, 2003).



**Make:** The Make process includes the practices that efficiently transform raw materials into finished goods to meet supply chain demand in a timely manner. It includes scheduling production activities, issuing product, producing and testing, packaging, staging, and releasing (Coyle & Bardi, 2003).

**Deliver:** recently, evidences show us that delivery has become a critical link in supply chain management review the world class logistics competencies and capabilities. It processes that provide finished goods and services to meet planned or actual demand. It encompasses all order management activities, warehousing activities, invoicing, and managing transportation-related activities necessary to meet planned or actual demand (Coyle & Bardi, 2003).

**Return:** it processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support. This process includes the return of raw materials to vendors and receipt of finished goods from customers. It would encompass authorizing, scheduling, receiving, verifying, and disposing of returns to maximize recapture of revenues for the organization (Coyle & Bardi, 2003).

## **2.9.2 Balanced Scorecard**

The Balanced Scorecard was developed by Robert Kaplan and David Norton in 1990. The BSC (Balanced Scorecard) attempts to move businesses from monitoring to measurement; from measurement to management and from management to direction setting (Nair, 2004). It is a performance measurement system that uses a set of performance targets and results to show an organisation's performance in meeting its objectives relating to its various stakeholders (Ramanan). Its principles provide excellent guidance to follow when doing it. The approach would recommend that a number of balanced supply chain measures be tracked based on four perspectives as Figure 2-9.

Figure 2- 9 Balance Scorecard Strategic Perspectives

(Hopf, Litman, & Pratsch, 2012)



Financial Perspective: it measures relevant to key indicators of the company's financial status (Biazzo & Garengo, 2012). It is an important component of the Balanced Scorecard in the profits, public, and non-profits worlds. Financial performance measures indicate whether the company's strategy, implementation, and execution are contributing to bottom-line improvement (Kaplan & Norton, 1992). It is critical as it forces recognition and definition to the main critical financial goals that the companies must achieve. Nair (2004) also pointed out that money might seem like everything, but the financial perspective provides to the organizations some following reminders:

1. The main goal of business is wealth creation, as measured by a series of financial targets achieved.
2. The purpose of financial targets is to galvanize the operating units to manage performance and gain competencies for future success.
3. It is one of many other perspectives but the one that funds the mission and purpose of the organization.

4. It is a lagging indicator of performance because it records success after the fact.

**Customer Perspective:** it requires that managers translate their general mission statement on customer service into specific measures that reflect the factors that really matter to customers (Kaplan & Norton, 1992). Generally, the customer perspective is viewed as the set of objectives the organization must achieve to gain customers' recognition, acceptance and perpetuation (Nair, 2004). And the customers' concerns tend to fall into time, quality, performance and service. Hence, companies should set clearly goals for those customers' requirements and then translate these goals into specific measures. However, before choosing measures for the customer perspective, the organizations should clarify two critical questions: "Who are our target customers?" and "What is our value proposition in serving them?" Mostly, the companies will state that they do have a group of target customers, but choosing an appropriate value proposition which had been mentioned previously in the thesis poses no less of a challenge to them.

**Internal Processes Perspective:** in this perspective, the key processes at which the organization must excel in order to continue adding value for customers (Niven, 2005). It should stem from the business processes that have the greatest impact on customer satisfaction including the facts that affect cycle time, quality, employee skills, and productivities (Kaplan & Norton, 1992). It reminds us that the background works, driven by objectives and goals, must be in place to ensure that the customers and financial objectives are achieved (Nair, 2004). They should also try to identify and measure their company's core competitive advantage, the critical technologies needed to ensure continued market leadership. Internal processes perspective is to clarify above processes and develop the best possible measures which to track the organization's progress. And service development and delivery, partnering with the community, and reporting may be represented in this perspective.

**Learning and Growth Perspective:** it is the foundation or essential of the other three perspectives in the Balanced Scorecard. With the target keeping changing for success and intense global competition requirement, the companies should make continual improvements to their existing

products and process and have the ability to introduce entirely new products with expanded capabilities. Meanwhile, they will be certain of discovering some gaps between their current organizational infrastructure of employee skills, information systems, and capital and the level necessary to achieve the results the company's desire (Niven, 2005). This perspective is designed to help the organizations to close those gaps and ensure sustainable performance in the future. And it is aligned to key deliverables in the other perspectives.

## **2.10 Summary**

This chapter shows a brief introduction on consumer electronics and focus on supply chain management and its strategy development.

Consumer electronics (CE) can be described as those daily used electronic equipment in communication, business and entertainment. It includes personal computers, digital cameras, mobile phones, home and office electronic devices, digital devices on cars, disks players, speakers, and so on (Ning & Shao-chuan, 2011).

Supply chain management (SCM) can be defined as the integration of a group of firms, organizations and individuals directly involved in the upstream and downstream flows of product, services, finances, and information from initial raw material extraction to the final or end customer, including intermediate processing, transportation, and storage activities and final sale to the end customer.

The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use (Kaplinsky & Morris, 2000). Five primary activities involved in competing in any industry, inbound logistics, operations, outbound logistics, marketing and sales and service. And four support activities to specific industry: Procurement, Technology development, Human

resource management and Firm infrastructure.

Lean is the process of continuous improvement that focuses on waste elimination and customer-oriented value creation during the production process. Even though this method originated from the Toyota Production System (TPS), which predominately focused on mass-production, now it has been identified as a global manufacturing model and widely applied in most industries (Vinodh, S. and Dino, J., 2012; Deflorin, P. and Scherrer-Rathje, M., 2012). Womack and Jones (2003) demonstrated five principles of lean: Specify what creates value from the customer's perspective; identify all steps across the whole value stream; make those actions that create value flow; only make what is pulled by the customer just in time; strive for perfection by continually removing successive layers of waste.

Christopher (2000) defines agility as achieving a rapid response on a global scale to constantly changing markets. The rapid response needs to cover changes in demand for both volume and variety. A third dimension is lead times and how long it takes to replenish the goods in order to satisfy demand. Agility is achieved by flexibility and in order to achieve flexibility standard platforms are postponed and components and modules are final assembled when the demand for volume and variety are known.

Leagile is the combination of the lean and agile paradigms within a complete supply chain strategy by positioning the decoupling point at a particular desired point, so that it will best suit the need for responding to an unpredictable demand of the markets downstream and at the same time making possible to facilitate, level scheduling upstream from the marketplace (Naylor, 1999).

# Chapter 3 Methodology

## 3.1 Introduction

The selection of the most suitable method for answering the research question is a critical aspect of any research (Billones, 1999). According to Holbert and Speece (1993), the research method and research design aims to extract information the researcher considers necessary in order to answer their thesis question. The choice of research method therefore depends on the type of research question needing to be answered and the degree of control the researcher has over the subject to be investigated (Yin, 2009).

This chapter illustrates that the survey method will be used to conduct the research and a content analysis and cluster analysis will be implemented to analyse the data used in the study. The following part of this chapter, the section 3.2 indicates the research method adopted in this study. Section 3.3 discuss the overall research methodology, in which case study method is describe as the main research strategy of this study. Multi-case study is chosen as the final research method. Data collection method is discussed in section 3.4. With the principle of multi-case studies, questionnaire was adopted as the instrument for data collection. In section 3.5, content analysis and cluster analysis are the main method for qualitative data analysis throughout the process of data analysis. Some research ethics and how to avoid will be explain in sector 3.6.

## 3.2 Research Method

The objective of the research project is to better understand implementation of lean, agile and leagile strategies in consumer electronic retail companies in China and New Zealand, thereby the investigating how the strategies improve the companies' supply chain performance. Lean, agile and leagile studies in the consumer electronic retail industry mostly relate from practical to strategy level. However, this study focuses only on the tactical level of those companies.

Due to the research focus on the strategies implementation status and the results of those

companies, the comparison between China and New Zealand companies, a qualitative research approach was deemed appropriate.

Qualitative Research is research that addresses business objectives through techniques that allow the researchers to provide elaborate interpretations of market phenomena without depending on numerical measurement (Zikmund, Babin, Carr, & Griffin, 2013). It focuses on discovering true inner meanings and new insights. Cooper and Schindler (2007) illustrated that Qualitative Research includes an “array of interpretive techniques which seek to describe, decode, translate, and otherwise come to terms with the meaning, not the frequency, of certain more or less naturally occurring phenomena in the social world.” Bryman and Bell (2007) pointed out qualitative research can be construed as a research strategy that usually emphasizes words rather than quantification in the collection and analysis of data and that:

1. Predominantly emphasizes an inductive approach to the relationship between theory and research, in which the emphasis is placed on the generation of theories;
2. Has rejected the practices and norms of the natural scientific model and of positivism in particular in preference for an emphasis on the ways in which individuals interpret social world;
3. Embodies a view of social reality as a constantly shifting emergent property of individuals’ creation.

Qualitative Research is widely applied in practice, because it is less structured than most quantitative approach. Instead of relying on self-response questionnaires containing structured response formats, it is more researcher-dependent in that the researcher must extract meaning from unstructured responses (Zikmund, Babin, Carr, & Griffin, 2013).

Because of the rapid development of supply chain management as a field of research has so far not been matched by related developments in research methodologies. Relatively, a full range of research methodologies can be applied in supply chain management, and the use of case study research is an interesting and efficient option (Seuring, 2008). Case studies are an appropriate

research methodology to map the field of supply chain management, as they allow identification and description of critical variables (Stuart, Mc Cutcheon, Handfield, Mclachlin, & Samson, 2002).

Yin (2009) states that a case study is an empirical enquiry that investigates a contemporary phenomenon with its real life context, especially when the boundaries between phenomenon and context are not clearly evident. The advantage of the case study approach is its ability to address “why” and “how” question in the research process (Yin, 2009), as is the case in the main research question of this study. Hence, for the purpose of this research was concluded that a qualitative research using multiple case studies was the most suitable method.

### **3.3 Research Design**

Business research is the application of the scientific method in searching for the truth about business phenomena (Zikmund, Babin, Carr, & Griffin, 2013). These activities include defining business opportunities and problems, generating and evaluating alternative courses of action, and monitoring employee and organizational performance. The process includes idea and theory development, problem definition, searching for and collecting information, analysing data, and communicating the findings and their implications. Zikmund (2013) also pointed out business research information is not intuitive or haphazardly gathered. It connotes patient study and scientific investigation wherein the researcher takes another, more careful look at data to discover further in-depth findings from the same set of information.

This study included four consumer electronic retail companies, two located in China and another two based in New Zealand. These four cases have great reputation in their countries' consumer electronic retail industry. Nevertheless, they also have dissimilarities. Those companies which will be discussed in future detail are from different countries, have different market scale, and have different amount of revenue.



### 3.3.1 Case Study Design

Case study simply refers to documented history of a particular person, organization, or event (Zikmund, Babin, Carr, & Griffin, 2013). It is a powerful research methodology that combines individual and (sometimes) group interviews with record analysis and observation (Cooper & Schindler, Business Research Methods, 2007). Yin(2009) defined case study in two parts. First part beginning with the scope of a case study is an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. Secondly, technical definition of the case study must inquiry that it copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulation fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis.

In case study, researchers gain information from company brochures, annual reports, sales receipts and newspaper or magazine articles, along with direct observation and combine it with interview data from participants. Its object is to obtain multiple perspectives of a single organization, situation, event or process at a point in time or over a period of time (Cooper & Schindler, Business Research Methods, 2007). It is certainly true that exponents of the case study design often favour qualitative methods, such as participant observation and unstructured interviewing, because these methods are viewed as particularly helpful in the generation of an intensive, detailed examination of a case (Bryman & Bell, 2007).

The main advantage of the case study is that an entire organization or entity can be investigated in depth with meticulous attention to detail. Zikmund (2013) also pointed out that it highly paid attention to enable the researcher to carefully study the order of events as they occur or to concentrate on identifying the relationships among function, individuals, or entities. Overall, the case study approach was chosen because of the following factors: firstly, lean, agile and leagile

supply chain strategies are prevalent event in today's manufacturing industry. In addition, implementing these strategies successfully within the retailing consumer electronics market is still in its starting stage and will face more challenges compared with implementation in the manufacturing sector. Moreover, leagile strategy implementation is emerging and unsaturated concept to retail consumer electronics industry, even in retailing. Although there are thousands of research cases or articles on leagile manufacture, it is difficult to identify or select a suitable sample for study. From the point of view of this thesis, it is hard to apply the study with a single source of evidence. Finally, the case study requires only a small size of sample.

Case study includes both single and multiple case studies. Most, researchers would like to choose multiple subjects, rather than a single subject to study, because of the opportunity for crosscase analysis. Cooper and Schindler (2007) pointed out that multiple subject study results in a deeper understanding of the subject. The evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more powerful. Meanwhile, the principle of single case cannot usually be satisfied by multiple cases. Moreover, the conduct of a multiple-case study can require extensive resources and time beyond the means of independent research investigator. Due to the participant companies of this research being from China and New Zealand, in order to ensure the quality of the study, researcher has to spend more time on travelling between these two countries to working for these companies. In addition, only supply chain or relevant manager from those companies will be invited to answer the questionnaires, and some of the answer may have to be re-clarified clearly after the first answering when necessary.

### **3.3.2 Ensuring Quality of Case Study Research**

One of the main concerns in case studies is related to lack of rigour during the research design (Donoso, 2003). The quality of the research design is ensured by aiming for validity or weather the evidence is valid), and reliability or is the stated evidence correct (Seuring, 2008). For case study research, Yin (2009) outlines how validity and reliability of the research can be ensured. He suggests three types of validity: construct validity, internal validity and external validity. These

three types of validity are applied during different stages of the research process. Reliability and validity are ensured by a clearly structured research method. As proposed by Yin (2009) the following case study tactics were used in order to ensure the quality of the research.

1. Use multiple sources of evidence-Interviews were conducted with different people from company personnel. Likewise, secondary data was collected from different sources, such as company reports, websites, conference proceedings, academic case studies and general reports on the consumer electronic industry.
2. Have key informants review draft case study report-draft reports were sent to key informants (two on each case).
3. Use replication logic in multiple case studies-both cases selected are from the same industry, are producer organisations of the co-operative type, and basically engaged in similar activities.
4. Use case study protocol –study protocol was developed as previously described in Section 3.3.
5. Develop case study database –A database was created and data was classified according to the following categories: 1) Information retrieved from company websites; 2) Company annual reports and publications; 3) Conference proceedings; 4) company reports by research groups; 5) Company news; 6) Academic case studies; 7) General reports on the consumer electronic industry.

According to Coco (2003) validity relates to aspects of the entire research-internal and external validity –and to aspects of individual components of the research –construct validity. On the other hand, reliability basically relates to whether a study is replicable by a different researcher at another point in time producing equivalent results. The main goal of reliability is to minimise the errors and bias in a study (Gary, 2001).

### **3.3.3 Selection of Case Studies**

Similar to quantitative studies, the objective of sampling in case studies is to determine the minimum size that will enable a satisfactory level of confidence in the results (Angot & Milano, 2001). Yin (2009) alleges that the replication logic in qualitative research is comparable to that of multiple experiments, with each case corresponding to one experiment.

As previously mentioned, this study is a multiple case study in which four companies from two countries will be analysed. All the companies are considered as leaders of the industry within their country respectively and have a great reputation in the consumer electronic retail industry.

Of the four selected case studies two, COMPANY A1 and COMPANY A2 are situated in China and the others, COMPANY B1 and COMPANY B2 are located in New Zealand. For the purpose of protecting the identities of these companies they have been classified with codes. The selection of the case studies was based on their reasonable similarity in terms of the products, the major importance to their country's consumer electronic retail industry. Therefore a more in depth analysis over the successes and failures of these two countries in the consumer electronic industries, respectively, in agile, lean and leagile strategies can be obtained by gaining a broader range of information.

## **3.4 Data Collection**

For each case study, data was collected from primary and secondary sources. Primary data was obtained from questionnaires with the representatives of the co-operatives, such as management staff.

### **3.4.1 Survey Research**

Survey method is a very popular form of data collection, especially when gathering information from large groups, where standardization is important. Generally, surveys attempt to describe what is happening or to learn the reasons for a particular business activity (Zikmund, Babin, Carr, &

Griffin, 2013).

Fowler (2014) summarized three characteristics of survey method as followed:

1. The purpose of the survey is to produce statistics, that is, quantitative or numerical descriptions about some aspects of the study population.
2. The main way of collecting information is by asking people questions; their answers constitute the data to be analysed.
3. Generally, information is collected about only a fraction of the population, that is, a sample, rather than from every member of the population.

Fowler (2014) illustrated that there are two of main goals of survey methodology which are to minimize error in data collected by surveys and to measure the error that necessarily is part of any survey. Surveys provide a quick, low cost, efficient, and accurate means of evaluating information on a population. It is a good tool for obtaining information on a wide range of topics when indepth probing of responses is not necessary, and it is useful for both formative and summative purposes. Table 3-2 shows the advantages and disadvantages of surveys.

*Table 3 - 1 Advantages and Disadvantages of Surveys*

Advantages	Disadvantages
Good for gathering descriptive data	Self-report may lead to biased reporting
Can cover a wide range of topics	Data may provide a general picture but lack depth
Are relatively inexpensive to use	May not provide adequate information on context
Can be analyzed using a variety of existing software	

Source: From Business Research Methods (Zikmund, Babin, Carr, & Griffin, 2013)

Zikmund (2013) pointed out that errors are common to all forms of surveys (personal interview, telephone, mail, Internet and so on). He seperated the errors into two major sources: random sampling error and systematic error. Random sampling error is a statistical fluctuation that occurs

because of chance variation in the elements selected for a sample (Zikmund, Babin, Carr, & Griffin, 2013). The other major source of survey error is systematic error. It can be described as the error resulting on some imperfect aspect of the research design causes respondent error or from a mistake in the execution of the research. Table 3-3 will illustrate the errors belong to systematic error.

*Table 3 - 2 Systematic Errors*

Nonresponse Error	The statistical differences between a survey that includes only those who responded and a perfect survey that would also include those who failed to respond.
Response Bias	A bias that occurs when respondent either consciously or unconsciously tend to answer questions with a certain slant that misrepresents the truth. And the tendency for respondents to agree with all or most questions asked of them in a survey. A response bias that occurs because the presence of the interviewer influences respondents' answers. Bias in responses caused by respondents' desire, either conscious or unconscious, to gain prestige or appear in a different social role. Mistakes made by interviewers failing to record survey response correctly.
Administrative Error	An error caused by the improper administration or execution of the research task. An administrative error caused by improper sample design or sampling procedure execution.
Data-Processing Error	A category of administrative error that occurs because of incorrect data entry, incorrect computer programming, or other procedural errors during data analysis.

Source: From Business Research Methods (Zikmund, Babin, Carr, & Griffin, 2013)

However, those errors or bias can be reduced or handled actually. For example, a good questionnaire design can reduce the response bias.

### 3.4.2 Questionnaire Design

The survey questionnaire is guided by the research questions and is the data collection tool (Punch, 2003). A good questionnaire design is reliable -- providing consistent measures in comparable situations) and valid -- answers correspond to what they are intended to measure (Fowler, 2014). The research questions take the generalised statement of objectives and make them more specific and concrete (Punch, 2003). Zikmund (2013) also pointed out that the research questionnaire development stage is critically important as the information provided is only as good as the questions asked.

Generally, certain decisions made during the early stages of the research process will influence the questionnaire design and when a researcher decides what should be asked, the criterion of accuracy becomes the primary concern (Zikmund, Babin, Carr, & Griffin, 2013). The Questionnaire Relevancy, in other words, Relationship to research questions, Zukmund (2013) suggested that the researchers should be specific about data needs and have a rationale for each item requesting information. Questionnaire Accuracy means that the respond information is reliable and valid. In order to achieve more cooperation and a higher probability of obtaining unbiased answers, the questions design should not be too long, difficult to answer, to ego threatening. Zukmund (2013) also pointed out that question wording and sequence also substantially influence accuracy, which can be particularly challenging when designing a survey for technical audiences.

Punch (2003) illustrated nine general steps when the researchers are developing the questionnaire:

1. Go through each specific research question and decide what information is necessary to answer it, and use this to make a list of the variables involved.
2. Provide conceptual definitions for the variables, as appropriate.
3. For each variable, decide whether the information required is factual, cognitive, affective or behavioural.

### Chapter 3 Methodology

4. Decide whether each variable is categorical or continuous, in the way that it is to be measured.
5. For each variable, decide whether the data will be in the form of a single indicator, or of multiple items making up a scale.
6. Draw up a table summarising the last three points above.
7. Formulate the items, to give a draft form of the questionnaire. For those items and questions being developed specifically for the survey, the researchers need to keep in mind that there are many different ways to phrase items or ask questions, and that this issue has been written about extensively by measurement theorists.
8. Pilot test the draft form of the questionnaire.
9. Use pilot test results to finalise the questionnaire.

In this research, questionnaire were unstructured with open-ended questions. The main objective of the questionnaire was to get a better understanding the implementation of lean, agile and leagile in the participant companies. Also, through the questionnaire the researcher tried to gain an understanding of how these strategies could improve the companies' supply chain efficiency and responsiveness. Unstructured questionnaire guidelines were used during the data collection process, because of differences in companies' participant background and strategies applying in the organisation. The questionnaire were mainly focus upon seven specific issues which are illustrated as below:

1. The cognizance of lean, agile and leagile strategies
2. The opportunity to apply specific methods in lean, agile and leagile
3. The reason for lean, agile and leagile implementation
4. The reason for not implementing lean, agile and leagile
5. The use of lean, agile and leagile in firm's supply chain
6. Critical success factors of selecting and evaluating lean, agile and leagile strategies
7. Impacts of lean, agile and leagile implementation

Before sending the questionnaire, permitted had to be confirmed by the participant companies.

The length of the questionnaire was approximately 25 to 35 minutes to be completed. All the



questionnaires would be sent back by e-mail. In addition, in order to avoid the bias in the questionnaire, some of the confused answers would be sent back to the participants to make it clear. A total of six people were taken part in the questionnaires from these four companies. In China, two managers come from COMPANY A1 and COMPANY A2 respectively. In New Zealand, because of the lack of secondary data collection which will be mentioned in the coming paragraph, senior supervisors also took part in answering the questionnaires.

Secondary data collected for this study included: 1) Information retrieved from company's website and publication; 2) Company's news; 3) Company's report written by research institutions; 4) Academic literature; 5) General reports on the consumer electronic industry. During the secondary data collection, there are few relative company's report written by research institutions and academic literature of New Zealand companies. That is reason why there were four participants from two New Zealand companies respectively.

### **3.4 Data Analysis**

With the rapid development of science, statistical data analysis has played an important role in scientific research over the last century. Data analysis is a process that the researchers inspect, clean, transform and model the collected data with the purpose to highlight useful information, suggest conclusion and support decision making. In the process, according to the different types of collected data and resources, the researchers divide data analysis into different types, such as content analysis in qualitative research, or exploratory data analysis in quantitative research. This research is qualitative in nature and therefore will utilise a content analysis methodology.

Content analysis is defined as a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Stemler, 2005). Its breadth makes it a flexible and wide-ranging tool that may be used as a stand-alone methodology or as a problem-specific technique (Cooper, Business Research Methods, 2006).

As the most common notion in qualitative research, content analysis can be a powerful tool to analyze written, audio, or video data from experiments, observations, surveys, and secondary data studies. The data to be analyzed include transcripts of focus groups, transcripts of interviews, and open-ended survey responses. In addition, the researchers also use content analysis on advertisements, promotional brochures, press releases, speeches, Web pages, historical documents, and conference proceedings, as well as magazine and newspaper articles (Cooper, Business Research Methods, 2006). Content analysis also plays an important role in the research of competitive intelligence and the marketing of political candidates.

The advantages of content analysis include:

1. Content analysis avoids bias in the result caused by the interaction between analysis and their subjects which leads to the subjects to react to situation rather than in their more “natural” manner (Gao, 1989).
2. Content analysis is flexible enough to cope with large volumes of written materials.
3. Those researchers who involve to content analysis need not to master an advance mathematical skill.
4. Content analysis is systematic in nature, and its task of devising reliable and useful categories is rigorous (Gao, 1989).
5. Those research reports or results can be presented in tables which are easily read and understood.

However, every coin has two sides. The disadvantages of content analysis include:

1. Content analysis can be relatively costly and the researchers have to spend a huge time on content analysis research.
2. Content analysis can lead to reliability and validity problems.

In present study, questionnaires had all been sent back from the participant by e-mail. All raw data

from questionnaires and added data to the confused answering were saved in independent files. Once the within-case analysis was elaborated based on the primary and secondary data collected, a content analysis and cross-case comparison were performed, comparing similarities and differences found between these four cases study.

### **3.6 Research Ethics**

Ethics or moral questions are important for all human activities, such as business research. The purpose of business research is to provide the valuable customer or market information to business owners through research. Hence, in order to achieve the result to be valuable, research must be ethically conducted, trustworthy, and socially responsible. In other words, whole process of a research, from research design to submission of the results for review, has to be upstanding in order to be considered ethical. Once a part of the process is questionable or conducted ethically, the integrity of the entire research is called into question. Meanwhile, Cooper and Schindler (2007) claimed that the goal of ethics in research is to ensure that no one is harmed or suffers adverse consequences from research activities.

Therefore, ethical concerns will emerge as you plan your research, seek access to organizations and to individuals, collect, analyse and report your data. Cooper and Schindler (2008) defined ethics as the 'norms or standards of behaviour that guide moral choices about our behaviour and our relationships with others'. Lewis and Thornhill (2012) described research ethics as "it relates to questions about how we formulate and clarify our research topic, design our research and gain access, collect data, process and store our data, analyze data and write up our research findings in a moral and responsible way." Mostly, ethics in research can be achieved. However, Cooper and Schindler (2007) pointed out that unethical activities are pervasive and include violating nondisclosure agreements, breaking participant confidentiality, misrepresenting results, deceiving people, using invoicing irregularities, avoiding legal liability, and more.

In order to ensure the research is both methodologically sound and morally defensible, the researchers should plan their research to be guided by the relevant code of ethics or ethical

guidelines. A code of ethics is set for principles that underlie the professional responsibilities and conduct of the organizations' membership and enforced ethical standards that apply to members in the roles of the organizations and to those participating in research activities. Also, as pointed out by Saunders and Lewis (2012) "This will be helpful and, where followed, should ensure that you do not transgress the behavioural norms established by your university or professional association.

In addition, the researchers may be required to submit the research proposal to a research ethics committee which "would include constructing an ethical code and disseminating advice about the ethical implications of design aspects of research and adopt a reactive role in relation to the consideration of research proposals and calls for advice arising from dilemmas that confront researchers", summarized by Saunders and Lewis (2012).

Meanwhile, the researchers must consider the issues of ethics which affect the research generally at specific stages in the research process.

In this research, the ethics problems that the researcher may have to face to are the participant companies' name and the people who took part in the research. The research had placed the companies by COMPANY A1, A2 standing for China's companies and COMPANY B1, B2 for New Zealand's. Those people were placed by the word "respondent" or "participant".

### **3.7 Research Process**

The research process was demonstrated in a sequential stepped scheme as indicated in the following components, which are shown as below:

- Reviewing industry and relevant literature and theoretical studies

Most of previous relevant both experimental and the theoretical studies in lean, agile and leagile are reviewed, and the statistic of consumer electronic market research in China

and New Zealand at the same period are also reviewed.

- The specification of the research questions

After reviewing previous literature and theoretical studies regarding above supply chain strategies and consumer electronic industry, the theoretical framework served as the basic on the development of questions

- Development of questionnaire

The issue under questionnaire were developed with the great assistance and guidance from Alan Win for the first draft questionnaire. It was handed to Alan for the first review. The revision to the questionnaire was mainly about the order of questions, and wording.

- Data collection

For the China's companies, the revision version of questionnaire was send to the e-mail address of the logistics management or operation manager. And all the companies were asked to send back the questionnaire no later than 23<sup>rd</sup> August. For the New Zealand's companies, the researcher adopted interview method to gain data.

- Data analysis

Collected information and data was analysis under content analysis methods.

- Conclusion

The research findings were summarized and conclusions were drawn from those findings. Some of the implications of the findings were given. Limitation of the study and recommendation for further research in this field are considered.

# Chapter 4 Survey Results

## 4.1 Introduction

The results of the questionnaires had all been returned from the participants by e-mail. All the raw data from questionnaires and additional data collected where needed were collated and saved in independent files. Once the within-case analysis was elaborated based on the primary and secondary data collected, a content analysis and cross-case comparison were performed, comparing similarities and differences found between these four cases study.

The purpose of this study is to understand the current environment for implementing Lean, Agile and Leagile strategies in China and New Zealand's consumer electronics industry using companies successful in maintaining their competitive edge. It aims to compare the similarities and differences between the environments that Chinese and New Zealand companies operate in and identify where New Zealand, the more openly considered weaker environment, faces challenges to implementing the same strategies as China. In addition it also aims to analyse whether there are any opportunities within New Zealand that China doesn't have to create another niche of competitive advantage. Moreover, it will approve the effects of the Iceberg model which had been mentioned in literature review to those participant companies.

The findings of this research are presented in the following chapter as well as chapter 5. Information about the four companies who participated in the questionnaire are listed below, taking care to keep their identities hidden. The blank questionnaire is attached as Appendix 1. For both spatial and ethical reasons the completed questionnaires have not been attached but the collected findings are summarised in the following sections.

## 4.2 China Region

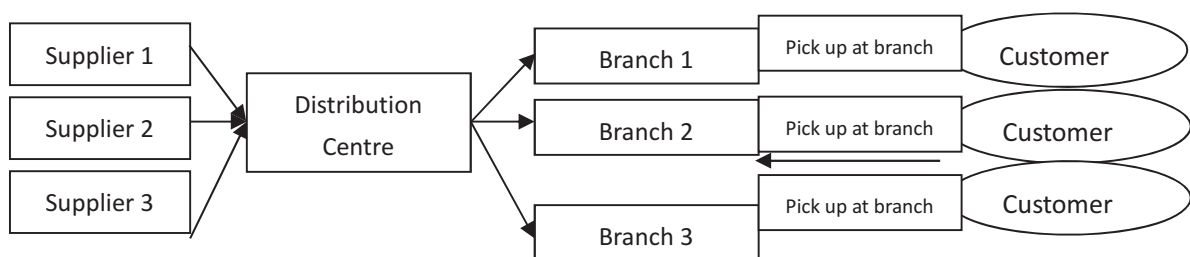
### 4.2.1 COMPANY A1

- Introduction

COMPANY A1 is one of the largest privately owned electrical and consumer electronic appliance retailers in Mainland China. The first COMPANY A1's electrical retail outlet was opened in Beijing at the 20<sup>th</sup> century. Later on, it had expanded to 8 branches in Beijing since a new marketing strategy adopted. Recently, more than 150 branches had been set up in mainland China. Over 2000 staffs work for COMPANY A1 and they produce RMB 200 billion (equal to NZD 50 Billion) turnover in 2013. Consumer electronic products occupy 41%-60% in those selling products of COMPANY A1. China, Japan and Korea are the top three countries where COMPANY A1's suppliers are located in.

At the beginning of COMPANY A1, due to the limitation of business scale(only in Beijing), they adopted the logistics model named "deliver to store in branch", which means that each branch had their own storage room to keep the inventory from distribution centre and only allowed customer to pick orders up in the storage area. The process is shown as figure 4-1:

*Figure 4- 1 COMPANY A1's Old Distribution Model*



In this process, customers have to arrange their own delivery transportation when they are going to purchase the products. On one hand, it is clear that satisfaction and loyalty of the customers would be reduced because the customer service cannot really match their expectation. On the other hand, in such a distribution network, the cost of transportation will be increased by inefficient vehicles used, while the resources in this network will be wasted.

- **Supply Chain Strategic Improvement**

Based on previous mentioned information, COMPANY A1 has to make an alteration on its supply chain network to improve efficiency and cost reduction. In the questionnaire, the company was asked about their understanding of Lean, Agile and Leagile and whether they implemented this into their supply chain. Findings of COMPANY A1 revealed that the company had adopted those strategies in the supply chain with the aim of improving the accuracy of procurement, the time management of delivery and to reduce the inventory level. As the primary strategy, agile had been implemented for the improvement of company's procurement and marketing stage. Lean was adopted as a supporting was to achieve lean distribution network and improve the company's customer service level.

- **Lean Improvement**

*ERP System*

In order to achieve internal information flow balance, COMPANY A1 built up their Enterprise Resource Planning (ERP) system. ERP (enterprise resource planning) systems are operational information technology systems which plan and monitor resources of supply chain resources as well as the other internal resources (material, orders, schedules, inventory information itself). It can stress to optimise operational performance and process flows while, providing effective enterprise management. In the ERP systems, the software is involved to different functions in the company, such as finance, logistics, manufacturing, human resources and others in the company.

In addition, its ERP system of COMPANY A1 was not only used to internal information interaction, but also extended to the upstream and downstream of the supply chain to increase the participation of suppliers and gain the real feedback from clients.

Moreover, POS (Point of Sale System), WMS (Warehouse Management System), EOS (Electronic Ordering System), Continuous Replenishment System, Distribution Tracking System and Store Information System were combined as a network by COMPANY A1 as an internal information



sharing platform of supply chain management.

Interactive customers' information centre which was occupied by B2B (Business to Business) and B2C (Business to Customers) website had become the external sharing platform of COMPANY A1's supply chain management to ensure that the strategies implemented in COMPANY A1's supply chain can help the company to gain competitive advantages.

### *JMI (Jointly Managed Inventory)*

As a transformation of VMI (Vendor Managed Inventory), JMI (Jointly Managed Inventory) means that the retailer and supplier share responsibility for keeping the right product levels on the shelves. The key to this collaborative approach is the sharing of insights from the retailers' POS data with suppliers so that both parties are making data driven decisions. With the implementation of JMI strategy in the fast growing of COMPANY A1's marketing network, the relationship between COMPANY A1 and the suppliers had been improved. Meanwhile, the reduction of inventory and cost, increase of turnover rate and quick respond to the customers had been achieved by the implementation of Jointly Managed Inventory.

### *Distribution Network*

COMPANY A1 set up its logistics department and logistics centres, which will be operated and managed by head office only, in different market districts to achieve a more efficient distribution model. In the new model, most of bulk products and customer orders will be dealt with and arranged delivery by the logistics centres. There was only one logistics centre which was set up in different market district. And the logistics centre will be shared to those districts around the centre's location.

In addition, COMPANY A1 also used advanced technology operating systems in their logistics centres. In order to achieve automatically controlling in the centres, AIDC (Automatic Identification and Data Capture) and EDI (Electronic Data Interchange) have been used in tracking the product status which include the tracking of storage location and delivery status. Inventory level and

products' delivery information will be synchronized to each staff in the company when the logistics centres' operators key the relevant information into the database of the system.

Automatic Identification and Data Capture (AIDC) is an industry term that describes the identification and/or direct collection of data into a computer system, programmable logic controller (PLC), or other microprocessor-controlled device without using a keyboard (Mobileinfo). AIDC technologies provide a reliable means not only to identify but also to track items. It is possible to encode a wide range of information, from basic item or person identification to comprehensive details about the item (Mobileinfo). The advantages of this programme include:

1. Reduce data entry costs
2. Eliminate errors associated with identification and/or data collection
3. Accelerate the basic process
4. For moving assets, be able to collect tracking data and determine its exact location (Mobileinfo).

Another technology operation system used in the logistics centre is EDI. EDI (Electronic Data Interchange) is one of the important technologies used in information sharing between businesses to business. EDI is an electronic transmission information of documents, such as bill of lading, purchase or order information between different systems from different firms base on a standard, structure, machine retrievable format.

The advantages of EDI are the improvements of cost reduction in administration and transaction, information quality, operations management, and so on. It achieves information interchange with little or no need for human intervention. With the normal information flow automated through electronic data, the companies can focus on more value-added job responsibilities. Meanwhile, EDI platform can not only avoid time-consuming on paper works but also eliminate the errors from duplicate manual data key in. Hence the greater accuracy leads to faster information processing and non-paper operation reduces the office operation cost.

Moreover, the old warehouse in different market districts had been being refurbished to a multifunctional distribution centre including warehousing, distribution, information centre and products' processing. The efficiency of distribution network and the quick respond of the company had been improved by the implementation of information system in each stage of the logistics network.

Furthermore, COMPANY A1 outsourced its logistics business (outbound logistics and inbound logistics) to the third party logistics companies, because the company is not establish their transport system. Lieb and Randall (1996) discribed the third part logistics as a company which suppliers or coordinates logisitics functions across multiple links in the logistics supply chain as a "third-party" facilititor between the seller and the buyer. At the same time, COMPANY A1 will choose the most efficient and fastest express companies as their logistics partners to achieve fast response to customers' requirement.

- **Agile Improvement**

### *Procurement*

The competitive advantages of COMPANY A1 are procurement cost controlling and short turnover rate of inventory. Hence, in order to maintain the advantages, it is important to the company to balance their information flow sharing system. In order to balance the external suppliers' information: COMPANY A1 adopted Centralized Procurement that the company will purchase a bulk amount of materials or product from suppliers to gain cost benefit. And COMPANY A1 also take part in the products design and production planning of suppliers through the information platform to gain cost benefits as well.

According to the results of questionnaires, COMPANY A1 have adopted above strategies for five years to improve the customer's experience. For example, with the improvement of the logistics network, lead time of order processing and delivery had been improved significantly. Depending on the size of bulk and the customer's location, customers will receive their orders within 3-5days (compared to previous 10-15 days' lead time).

- **Waste Elimination**

Due to the mostly direct relation to company's profits and business performance, COMPANY A1 concerned that the inventory waste is more than others wastes in the supply chain. Hence, as the priority strategy, the combination promotion through the company's on-line sales and physical stores would be implemented to achieve inventory level reduction.

- **Reduce Customer Response Time**

According to the respondent, in order to reduce customer respond time, the COMPANY B1 considered that the improvement of delivery lead time and customer service should be the best method to achieve the target.

- **Strategies Evaluation**

Being based on the result of the questionnaire, the company focuses on the customer experience feedback to evaluate the strategic performance. Customer experience is that the internal and subjective response customers have to any direct or indirect contact with a company (Meyer & Schwager, 2007). The direct contact can be explained to the activities which is usually initiated by customers, such as purchase, use and service. And the indirect contact is that mostly presented through multi-medias, such as advertisement, recommendations, news report and reviews on the products or service. Hence, according to market or customer experience feedback, COMPANY A1 will decide to alter the strategy or not.

- **SWOT Analysis**

In order to gain a whole image of the competitive situation of the company, a SWOT analysis was used to identify competitive strength, weakness, opportunities, and threats of the company. This information was collected from the questionnaire replies. The relevant research results have been summarized and illustrated in Table 4.1. From the participant's viewpoint, the main strength of the

company includes price, reputation, and customer service and logistics network. However, there are three weakness points identified by the respondent: business model, relationship with suppliers and capital investment. The opportunities that the participant believes the company has included but not limited to: market potential in most small cities, government police. Finally, the threats COMPANY A1 is facing are more domestic competitors (especially COMPANY A2), a late beginning E-Business network and the competitors from overseas.

*Table 4- 1 SWOT analysis of COMPANY A1*

Strength	Weakness	Opportunities	Threats
1. Price 2. Reputation 3. Customer Service 4. Logistics network	1. Business model 2. Relationship with suppliers 3. Capital investment	1. Market potential in small cities (50% population of China) 2. Government Police	1. Main domestic competitors (COMPANY A2) 2. E-Business network 3. Competitors from overseas

### 4.2.2 COMPANY A2

- Introduction

As the mainly opponent of COMPANY A1, COMPANY A2 is also one of the largest privately owned electrical and consumer electronic appliance retailers in Mainland China. It is the leading company in the industry of 3C (consumer appliances, computers, communication products) and home appliance retail chain in China, which is one of the top 15 conglomerates emphatically supported by the Ministry of Commerce. In the 1990s, COMPANY A2 was established in Nanjing, China. It is the China’s commercial leader. Among China’s top 3 privately-run retail enterprises. As the largest commercial retail enterprise in China, COMPANY A2 ranks first among top 500 Chinese private enterprises with the brand value of 95.686 billion RMB. It has over 1600 chain stores in more than 600 cities in mainland China (Figure 4-2). In 2009, by overseas merger and acquisition, COMPANY A2 entered the markets of Hong Kong, and Japan and launching its global business. 120 Billion RMB (NZ\$24 Billion) worth of products was sold by a huge group of staff (13 thousand). Similarly to COMPANY A1, consumer electronic products occupy 41%-60% in those selling products of the company. Currently, the COMPANY A2 offers 8 major categories including air conditioners,

refrigerators, washing machines, colour TVs, Audio-video products, small home appliances, communication products, computers, and digital products covering more than 200,000 specifications of nearly 1,000 brands. Local suppliers are the primary supplier to COMPANY A2, followed by Japan and Korea suppliers.

*Figure 4 - 1 Network of COMPANY A2*



COMPANY A2 has focused on its supply chain building since the company established. According to the questionnaire feedback, the company has adopted agile strategy as the majority strategy in the supply chain since 2000. The implementation purpose of this strategy is to gain improvement of the efficiency and competitive advantages in the massive market.

- **Supply Chain Strategic Improvement**

During the company's scale fast growing period, COMPANY A2 realized that the company must have to achieve supply chain strategy transformation. Besides the improvement of inventory management and customer relationship management implemented the lean strategy, agile strategy has been adopted in customer service, distribution network and other parts of the supply chain.

- **Lean Improvement**

*Information technology system*

Information technology system is considered as the nervous system of an enterprise by COMPANY A2. Hence, in order to support the company's development, COMPANY A2 has cooperated with IBM, Microsoft, SAP and CISCO on constructing its information system. By relying on the SAP/ERP system, COMPANY A2 has carried out more than 10 types of information-application module development covering SCS (COMPANY A2 Supply Chain System), B2C, BI, WMS (Warehouse Management System), TMS (Transportation Management System), CRM (Customer Relationship Management), Call-Centre, OA, SOA, and HR with the total number of items being over 120. It has realized centralized information management integrating "high efficient operation of procurement and sales, lean customer service and professional shared management" during the whole process.

SAP/ERP consists of several modules, including utilities for marketing and sales, field service, product design and development, production and inventory control, human resources, finance and accounting. SAP/ERP collects and combines data from the separate modules to provide the company or organization with enterprise resource planning.

With 8 years implementation of SAP/ERP, the inventory holding of COMPANY A2 had been successfully reduced to nearly 50%, improving the turnover rate of the goods to 60%. At the same time, accelerate the turnover rate of the goods as well as the turnover of the cash. This behaviour obviously saves the transaction costs and makes the customers get the preferential prices of the products.

*ECR (Efficient Customer Response)*

Efficient Consumer Response (ECR) is a modern supply chain management mode, which aims at reducing and eliminating the cost during the manufacturing and distributing processes in the supply chain, to bring the biggest profit for the customers based on the close cooperation among the manufacturers, suppliers, and the retailers. The goal of the ECR is to build up a customers'

based system which can have quick response capacity in order to make the players in the chain as partners. The goal is to improve the efficiency of the whole chain to make the end customers satisfied, which will lead to the decrease of the cost on the operation, the inventory holding, and the increase of the service level. The implementation of the ECR plays critical role in the effective space management, effective replenishment, effective promotion, and effective introduction of new products.

### *Customer Relationship Management*

CRM (Customer Relationship Management) as a part of the business strategy is designed to ensure profitability, revenue and customer satisfaction. It is a management approach to create, develop and enhance relationship with targeted customers. Hence, in order to gain, even maintain more competitive advantages, COMPANY A2 which was the first company that implemented a Customer Relationship Management System in the industry. It is devoted to exploring the customers' consumption and service needs, putting forward a series of targeted value-added services, telephone sales and online customer service to provide customers with more friendly choices. With an objective of "improving the satisfaction of the clients" and taking care of the clients as their primary concern, COMPANY A2 has fulfilled the promise of providing consumers with all-year-round self-help and proficient services through telephones, internet, text messages, and videos. The company uses the largest calling support centre in the industry to provide customers with 24-hour consultation, preservation, complaints and customer feedback records.

- **Agile Improvement**

### *Logistics network system*

As one of COMPANY A2's competitive advantages, the company has established a three levels logistics network system including regional distribution centres, city distribution centre and transferring point. Relying on the nationwide logistics network characterized by mechanized operations and information-based management, the company has realized an operation integrating long-distance distribution, short-distance allocation and transfer, as well as retail home



## Chapter 4 Survey Results

delivery so as to reduce the customers' waiting time to the largest extent (Consulting, 2012). The average distribution radius is 200 kilometres and the maximum daily distribution capacity is more than 800,000 units. COMPANY A2 also takes the lead to carry out punctual goods delivery service. Those advantages achieved were based on the advance information system, such as WMS (Warehouse Management System), TMS (Transportation Management System), and GPS (Global Position System).

In order to achieve the objective of "network integration, operation mechanization and informational management", COMPANY A2 has energetically founded the third generation logistics base feature by mechanized operation and informational management. The third generation logistics base integrates the logistics and distribution centre, call centre, training centre, and the logistics centre to support retail delivery services within a radius of 80-150 kilometres and a circular flow volume of 5 to 20 billion RMB of commodities per year (Consulting, 2012). With the standard of the third generation technology, the present distribution centres are advanced at the efficiency of the in and out storage of the goods, the speed of the handling and the transportation of the goods, the on time and in time products delivered, the response speed, the satisfaction level of the customers, and the reduction of the loss rate and the failure rate of the goods. All of these advantages are due to the proper adoption of modern equipment and a WMS inventory management system which has an auto management of the input and output of the company's products.

Moreover, the SAP/ERP system has become a fast developing booster and long-term competitive advantage of COMPANY A2. It achieved the fast response speeding up to the customers while the satisfaction of customers had been improved. For example, before the system adoption, it took five minutes to finish a transaction through the whole process, but now, it is just less than one minutes.

### *SCS (COMPANY A2 Supply Chain System)*

Centred on making quick reactions and providing quick service to the clients, COMPANY A2 has

established fine cooperative partnerships with tens of thousands of well-known Chinese and foreign home appliance suppliers with the help of the platform of COMPANY A2 Supply Chain System, thus having created a highly efficient supply chain through the coordination of commodities, supply chains, markets, talented people and communicative mechanisms.

- **Waste Elimination**

According to results from the respondent, they considered that the over stock is one of the priority issues for the company. Meanwhile, with internet widely being applied at the downstream of the supply chain, especially at the point of sales, physical stores performance are under threaten. A number of physical stores with low performance would be closed down because of business strategies alterative.

- **Reduce Customer Response Time**

In order to achieve customer response time reduction, the company has built up a multiple distribution network. Beside COMPANY A2's existent physical stores, E-Buy, P2P and mobile app have been developed to adapt the customers' 24-7 consuming trend. On the other hand, rapid logistics system was consisted by a group of regional distribution centres and city distribution centres. According to the marketing data analysis, products will be delivered to the RDC (Regional Distribution Centre) to achieve overnight delivery or same day delivery.

- **Strategies Evaluation**

According to the respondent, the company provided a fact that some of the competitors in China were trying to adopt the above strategies to gain advantages as well. However, as the company taking the lead in those strategies, COMPANY A2 successfully avoid to fall behind to their competitors. Meanwhile, due to the company had adopted the strategies longer than the others companies, it could discover the problems of those strategies and improve it to meet the target. In other words, suppliers can be same but supply chain may not be same to different companies.

Copying succeed supply chain model cannot promise that the others companies could copy it successfully because of different company having different supply chain model.

- SWOT Analysis

The SWOT analysis of COMPANY A2 is summarized based on the questionnaire feedback and it is demonstrated in Table 4-2, showing the competitive strength, weakness, opportunities, and threats of the company. According to the questionnaire feedback, the main strengths of the COMPANY A2 can be summarized as: distribution network, information technology support, reputation, cost, relationship with suppliers, and customer service. The weaknesses identified by the respondent includes but is not limited to: the competition between the on-line shop and their stores and late-beginning of E-Business. The opportunities the company has including: government support, fast growing of B2C business model, products variability, and overseas market expansion. Finally, the threats concluded by the respondent are more domestics and foreign competitors, operation cost increased by land value.

*Table 4- 2 SWOT Analysis of COMPANY A2 Limited*

Strengths	Weaknesses	Opportunities	Threats
1. Distribution network 2. IT support 3. Reputation 4. Cost 5. Relationship with suppliers 6. Customer Service	1. The competition between the on-line shop and their stores 2. Late-beginning of E-business	1. Government support 2. Fast growing of B2C business model 3. Products variability 4. Overseas market expansion	1. Domestics and foreign competitors 2. Operation cost increased by land value

## 4.3 New Zealand Region

### 4.3.1 COMPANY B1

- Introduction

COMPANY B1 which was founded in 1990s is one of New Zealand's leading companies, providing technology nationwide, including both in the retail and wholesale sectors in Auckland, Hamilton, Wellington and Christchurch. It not only supplies internationally-renowned brands products such as Philips, HP, Acer, IBM, Toshiba, Asus, but also supplies 'COMPANY B1 brand' of machines to suit the individual needs of clients. After 20 years development, the company has over 350 staffs and the percentage of the consumer electronic products being sold in the company is more than 80%. Most of the consumer electronic products suppliers are located in New Zealand, China and Taiwan area.

Being different to above two leading companies in China, COMPANY technologies is relatively new to the consumer electronic industry, having only constructed its supply chains in 2005. As such, COMPANY B1 has focused its supply chain strategies solely on customer service and finance. In addition, most of warehouse and distribution operations are still based on paper work. Operational costs have increased by stock losing and customer lost resulted in the reduction of market shares and profit. With the business development, the company realized that supply chain development is important to gain competitive advantage in such a fierce competition market.

- Supply Chain Strategic Improvement

According to the questionnaire feedback, the respondent understood what are Lean, Agile and Leagile, but the company had not adopted any of those strategies in the improvement of their supply chain. Hence, the researcher will try to understand what kind of strategies the company implemented to achieve waste elimination and the reduction of customer response time.

- **Waste Elimination**

Based on the respondent's description, the strategies they adopted in the improvement of supply chain waste elimination are included: improvement of system processes, work flow design, procedures, and the increase of productivities.

*Improve process*

As an important support platform in supply chain management, system process influences all supply chain operations significantly. Hence, COMPANY B1 introduced ABM (Advance Business Management) from an Australia IT company when they realized the importance of information system to the supply chain in their development. To some extent, Advance Business Management System played an important role for the company's supply chain management at the beginning stage. The system integrated internal finance, sales, warehouse and distribution information to the company. It achieved internal information synchronization for the supply chain.

However, with the business expanding and growing, the company needed to cooperate with third party logistics partners to extend their distribution network. Despite having their own trucks, COMPANY B1 is unable to handle the increased needs of the supply chain without the support of these partners. COMPANY B1 also faces challenges from their management systems. Their Advanced Business Management System cannot really communicate with the systems of their partners. For example, after the picker finishing order picking, the courier team had to take 2 minutes on average to finish the process through keeping switching between the ABM system and the courier system. In the peak season, nearly 30% of the orders had been delay, which led to the reduction of customers' satisfaction. In order to improve the situation, the COMPANY B1 decided to focus on improving their system: CB1ABM (COMPANY B1 Advance Business Management). It is still an internal information system (similar to Enterprise Resource Plan System), but it can connect to the cooperation logistics company to achieve data exchange. Meanwhile, improvement of system process and elimination of useless process reduced the operation lead time.

### *Improve workflow design and procedure review*

In order to eliminate waste during the process, as another two main strategies, workflow design and procedure review were adopted by COMPANY B1 to the supply chain improvement. Workflow design improvement is to remove redundancy of duplicate operations and avoid the stock on hand difference. Meanwhile, procedural reviews focus on the best operation details to avoid errors. For example, the Bin Management Procedure which is reviewed every half year is to ensure that the products are on the right single location to improve pickers' picking efficiency.

### *Increase productivity*

Productivity improvement is another strategy mentioned by the respondent implemented by the company to improve the efficiency and decrease the waste. First of all, transportation efficiency was improved by two separate warehouses combined to a functional distribution centre. With the elimination of inventory transfer frequency between the warehouses, all of the vehicles can be involved into the distribution network to serve a boarder market demand. Moreover, mechanization operation in the new logistics centre improved the productivity of products' internal transportation, upload and offload from trucks or containers. Furthermore, under the standard of the guidance of operation procedures, the KPIs (Key Performance Indicators) of bin management and order picking had been improved significantly.

- **Reduce Customer Response Time**

According to the questionnaire results, the strategies they adopted in the improvement of supply chain customer response time are included: review product line, market research to determine right trend, improve stock holding and working close with suppliers.

### *Review product line and improve stock holding*

In order to achieve quick response to customer demand, the COMPANY B1 decided to review product line and improve stock holding. The respondent also explained that product line means the product range. Over 8,000 kinds of consumer electronic products and relevant accessories are

sold by COMPANY B1. At the same time, improve stock holding help the company to support whole sale orders and peak season orders. It decreases the potential risk of customers lost by inventory shortage. Currently, COMPANY B1 provides the most variable of consumer electronic products in New Zealand.

### *Market research to determine right trend*

As stated in the earlier chapters, the main characteristic of consumer electronic products is shorter life cycles than typical supply chain. In other words, those companies who can pre-empt the market with the right products will gain the advantage. Hence, one of the strategies to achieving a competitive advantage is being able to respond rapidly to customer. Meanwhile, marketing research plays an importance role in the improvement of the supply chain flexibility of COMPANY B1, even explored the new market demand. In 2013, the company firstly imported water-cooling system to develop the advance computer hardware assembling, and most of youth generation was attracted by the system to update their personal computer.

### *Working closely with suppliers*

Finally, vendor relation management is another strategy of COMPANY B1 to ensure fast response to customer. As mentioned above, communicating with their partners provides a great deal of benefits. The same benefits are visible when communicating with vendors effectively. Theses benefits are that the supply chain can be agile enough to face the changeable customer demand. In order to achieve strategy alliance, COMPANY B1 invites their suppliers to take part in their market development meeting regularly.

- **Strategies Evaluation**

In order to ensure that the strategies implemented in COMPANY B1's supply chain can help the company to achieve or gain competitive advantages, the respondent pointed out that constantly business review, vendor management, and customer feedback were the main method to evaluate their implementation of strategies.

In order to maintain the company’s competitiveness and increase the market shares, COMPANY B1 have implemented those strategies for more than 5 year. Customers’ satisfaction, company scale and market shares had also been improved significantly by those strategies changed. And they will also continue to perfect their supply chain by adopting advance strategies, such as the implementation of new technologies, CRM (Customer Relationship Management), supply chain integration, and so on.

- **SWOT Analysis**

Competitive strengths, weaknesses, opportunities, threats of the company were summarized mostly based on the questionnaire feedback. The SWOT analysis is illustrated in Table 4-3. From the respondent’s viewpoint, the strengths of COMPANY B1 cover price, variability of products, customer service and logistics service. However, business scale and supply chain integration are the weaknesses identified by the respondent. In the questionnaires, the opportunities of the COMPANY B1 are sustainable supply chain strategy implementation, the increase of stock rang holding and low cost business model. The main threats which the respondent concluded of the COMPANY A1re included fast changing products, shorter product life cycles, price transparency and domestics’ competitors.

*Table 4 - 3 SWOT analysis of COMPANY B1 LTD*

Strengths	Weaknesses	Opportunities	Threats
1. Price 2. Product variability 3. Customer service 4. Logistics service	1. Business scale 2. Supply chain integration	1. Sustainable supply chain strategy implementation 2. The increase of stock rang holding 3. Low cost business model	1. Fast changing products 2. Shorter product life cycles 3. Price transparency 4. Domestics’ competitors



### **4.3.2 COMPANY B2**

- **Introduction**

COMPANY B2 is one of New Zealand's leading consumer electronics and appliances retailers and the flagship retail brand for COMPANY B2. Proud to offer customers superior services and solutions with the widest possible range of branded technology and appliances. Since their first store opening in Christchurch, the company have gone the extra mile to help customers with their technology and appliance purchases. More than 30 branches, and excellent service is still at the centre of everything they do. Inspiring stores and more than 350 highly trained staffs are just the beginning. After being acquired by New Zealand's largest non-food retail company in 2012, the percentage of the consumer electronic products being sold in the store is only 21%-40%. And most of products are imported from China, Thailand and Australia.

The Group's retail heritage extends over 100 years. During that period a solid foundation has been laid from which to grow business in to new and complementary areas. Due to the consumer products and technology are always evolving, the company needs to know well the market trend, inform and deliver solutions to customers through robust supply chain management.

- **Supply Chain Strategy Improvement**

According to the results from the respondent, they understood that what is lean and agile, but they did not suppose that the strategies they applied to improve the supply chain management are lean, agile or leagile strategies. Hence, the researcher will try to understand what kind of strategies the company implemented to achieve waste elimination and the reduction of customer response time.

- **Waste Elimination**

Based on the respondent's description, the strategies they adopted in the improvement of supply

chain waste elimination are included: qualify and measure resource usage, EDI solutions.

### *Qualify and measure resource usage*

According to the respondent's illustration, in their supply chain, human and facilities resource are the mainly resource that they have to measure. They use KPIs to measure capacity utilisation and process waste. KPIs (Key Performance Indicate) are the vital navigation instruments used by managers to understand whether their business is on a successful voyage or whether it is veering off the prosperous path (Marr, 2012). Capacity utilisation means that a COMPANY A1ctually uses its installed or bought productive capacity.

### *Implement EDI solutions*

Before EDI solutions being implemented in the whole supply chain, the Warehouse Ltd. had two ordering systems along their chain, EDI and paper which had limited their supply chain efficiencies and cost saving. For example, data transfer mistakes may be coursed by data entry problems, or price issues were caused by a lost invoice. With the EDI solutions implemented, the supply chain of the company has become electronically data transferring. The suppliers and the company share the same supplier portal to receive the orders or send back the invoice. The time to process orders and overall orders lead time has been reduced since the system improved. With the system improved, on one hand, it is a very cost effective means for suitable suppliers to trade electronically with the company; on the other hand, for the suppliers, the improvement offers the advantage of receiving order electronically which needs up order processing and accuracy.

- **Reduce Customer Response Time**

Marketing demand is changeable. In order to achieve marketing competitive advantage by fast response to the customer, the company encourage the sales staffs pay more care when visiting or calling the customers. Regularly, COMPANY B2 will send some surveys to customers who are registered on-line to get more feedback on the customer service, products quality or customer recommendations. That helps customer response time be reduced.

- **Strategies Evaluation**

According to the respondent, continuously monitoring company-wide performance and maintaining successful relationship with customer are the mainly measurements to evaluate the results of their supply chain strategies.

The strategies described above have been adopted by the company since 2005. As one of the large scale electronic companies in New Zealand, those strategies play an important role in the improvement of customer satisfaction, ROI (Return of Investment) and wastage reduction.

- **SWOT Analysis**

The SWOT analysis of COMPANY B2 is summarized based on the questionnaire feedback and it is demonstrated in Table 4-4, showing the competitive strength, weakness, opportunities, and threats of the company. According to the respondent's feedback, the strengths of the COMPANY B1 can be summarized as the company's reputation and its leading brand in the New Zealand market. The weaknesses identified by the respondent include that the product price is higher than the competitors. The opportunities the company has including: multiple business model with online and in stores full customer service on the products. Finally, the threats would be a trend that shopping on-line will be more popular than window shopping, which will affect the stores' performance.

*Table 4 - 4 SWOT Analysis of COMPANY B2*

Strengths	Weaknesses	Opportunities	Threats
1. Reputation of the COMPANY A1 and product quality 2. The most famous and leading brand in NZ market.	1. Higher price than the competitors.	1. Multiple business model with selling and customer service.	1. Rapid on-line shopping environment 2. Lower price from domestic competitors.

## **Chapter 5 Case Study and Discussion**

### **5.1 Introduction**

The findings of previous cases analysis are presented and discussed in this chapter, which are based on the findings described in the case study in Chapter Four. The purpose of this study is aimed to understand the implementation of lean, agile and leagile strategies in China's and New Zealand's consumer electronics retail companies. The research has provided an understanding of the lessons behind these companies chosen strategies and the environments that they operate in with regards to the individual consumer electronics companies. Through analysing the case study findings, this chapter concludes and presents the common similarities and differences between the companies studied. Moreover, through comparing, interpreting, and discussing the case findings, the chapter reveals what has found across those retail companies' strategy studies.

There is a back ground comparison between these four companies in the following section 5.2. In 5.3, the researcher will have a detail analysis the strategies difference respectively to those companies. From 5.4 to 5.6, a cross-case analysis will be discussed to compare the difference between the companies and countries. However, although virtual integration was observed and assumed as significant, the results of the questionnaire revealed that the vertical integration was not as significant to company success partnership management. Therefore this was not analysed in any further detail.

### **5.2 Company Overview**

Two participating consumer electronics retail companies come from the big city in China, Beijing and Nanjing, while another two companies are from the biggest city in New Zealand, Auckland. Among the four cases study companies, both of the companies are private companies. And all of the four companies are famous consumer electronics retail companies in their country.

According to the case study report, two forth consumer electronics retail companies were established in 1990s, and another two were founded in 1980s. The four participating companies originated from different service area. Two of those companies focused on consumer electronics products originally; one started as a specializing in air conditioner store; and another began as a computer company. In regarding to the development of consumer electronics industry, it can be back to 1947, when Bell Laboratories invented modern consumer electronics device. From the late of 1980s, with an increase of consumer electronics manufactories and products sold on the market, a number of companies from another area, like electronics components, information technologies, daily shops had begun the involvement in consumer electronics retail industry. Based on the case study, 41-60% of the products being sold are consumer electronics products in China's two companies, while one of the New Zealand's companies is more than 80% and another is just 21%-40% (after acquired by The Warehouse Limited). Interestingly, three of the four companies' priority suppliers are local, but one of those is mainly from China. In other words, local suppliers are the first chose of the most companies in the questionnaire.

To some extent, the histories of the four companies uncover the development of China's and New Zealand's consumer electronics retail companies. Being relevant to its origin, it is similar to the development of consumer electronics retail industry in other countries.

### **5.3 Strategies Implementation Comparison**

According to the case study reports, all of the four consumer electronics retail companies understand what are lean, agile and leagile strategies, but only half of the researched companies confirmed that they had adopted those strategies to achieve the improvement of their supply chain. And another company responded that they did not adopt lean, agile or leagile strategies, but they had implemented others strategies to achieve waste elimination and rapid response to the market demand. However, most of those strategies are driven by the main principles or capabilities of lean or agile.

## Chapter 5 Case Study and Discussion

The principles of lean strategy are:

1. Specify what creates value from the customer's perspective.
2. Identify all steps across the whole value stream.
3. Make those actions that create value flow.
4. Only make what is pulled by the customer just in time.
5. Strive for perfection by continually removing successive layers of waste.

And the capabilities of agile described by Alan (2014) are:

1. Market sensitive. It is a strong ability that requires the companies can 'read' market.
2. Process integration. It requires the organisations can avoid the time, cost and quality penalties associated with 'stand-alone' process.
3. Network based. A network of supply chain partners collaborate to meet the end-customer needs and demand by collaboratively planning across the supply chain.
4. Virtual integration. It requires firms share 'real time' demand data to improve forecast accuracy.

According to the discription of those principles of Lean and Agile, Tabel 5-1 illustrates the comparison of the strategies or taticles implemented by the respondent companies:

Table 5- 1 The Comparison of lean and agile implementation

	COMPANY A1	COMPANY A2	COMPANY B1	COMPANY B2
<b>Lean Principles</b>				
Specify Value Creation	Details as below	Details as below	Details as below	Details as below
Value Flow	AIDC, EDI, WMS, EOS,	SAP/ERP	PBABM, re-procedure, Productivity Improvement	EDI Solutions,
<b>Agile Capabilities</b>				
Market sensitive	JMI Multifunctional DC Centralized Procurement	SAP/ERP, CRM, Logistics Network Improvement	VRM, Marketing research, Increase Stock holding	Marketing research,
Process integration	IT Support Platform	SAP/ERP	PBABM	EDI
Network based	JMI	SCS	VRM	B2B Web Portal
Virtual integration				

### 5.3.1 Lean Improvement

- Specify Value Creation

Specify what creates value from the customer's perspective. Value is always added along the supply chain as raw material from manufacture into finished products consumed by the end-customers. Porter (1985) illustrated that value activities can be divided into two parts, primary

activities and support activities. The primary activities are mainly involved in the physical value creation for the product and its sale or transfer to the buyer as well as after sale assistance. And the support activities are to support the primary activities by providing procurement, technology, human resource and firm infrastructure functions.

#### COMPANY A1

##### Primary Activities:

1. Inbound Logistics: WMS (Warehouse Management System) and AIDC (Automatic Identification and Data Capture) are used in inventory and products' location management.
2. Operations: ERP (enterprise resource planning) system optimises the operational performance and process flows while, providing effective enterprise management. POS (Point of Sale System) and EOS (Electronic Ordering System) are used in customer data collection and order process improvement respectively.
3. Outbound Logistics: the COMPANY B1 choose the most efficient and fastest express companies as their logistics partners to achieve fast response to customers' requirement.

##### Support Activities:

1. Procurement: COMPANY A1 adopted Centralized Procurement that the company will purchase a bulk amount of materials or product from suppliers to gain cost benefit.

#### COMPANY A2

##### Primary Activities:

1. Inbound Logistics: as one of the integration functions in the company's SAP/ERP system, the WMS (Warehouse Management System) achieved the target that the inventory



holding of COMPANY A2 had been successfully reduced nearly 50%.

2. Operations: SAP/ERP consists of several modules, including utilities for marketing and sales, field service, product design and development, production and inventory control, human resources, finance and accounting. It collects and combines data from the separate modules to provide the company or organization with enterprise resource planning.
3. Outbound Logistics: TMS (Transportation Management System) and GPS (Global Position System) are used in the improvement of punctual goods delivery service.
4. Service: SCS (COMPANY A2 Supply Chain System) creates an information platform to achieve quick service and on-line solution to the clients.

Support Activities:

1. Technology development: multi-functional system SAP/ERP was applied to combine difference information applications along the company's supply chain. And it also collects and combines data from the separate modules to provide the company or organization with enterprise resource planning, which minimises the data transfer lead time and improves the process efficiency.

COMPANY B1

Primary Activities:

1. Inbound Logistics: WMS (Warehouse Management System) which is integrated in PBABM (PB Advance Business Management) was implemented to manage inventory and improve the warehouse operation efficiency.
2. Operations: PBABM (PB Advance Business Management) also integrated internal finance, sales, warehouse and distribution information to the company. It achieved internal information synchronization for the supply chain.
3. Outbound Logistics: The cooperation with 3PL companies optimises its distribution

network and reduces PB's fixed cost. For national wide delivery, PB builds up a long-term cooperation with local express company to deliver ordered products to clients within two days. Moreover, the COMPANY A1 also arranges its own truck to deliver some big patches orders to clients or local branches.

Support Activities:

1. Procurement: COMPANY B1 has close links with major off shore suppliers which ensures they can continuously offer their customers with the best quality products at competitive prices. It uses a variety of advanced technology to maintain and optimise the relationship with the supply base.

COMPANY B2

Primary Activities:

1. Operation: KPIs monitoring and controlling reduces resources and process waste, which increases the facilities or resources utilisation rate and improve the supply chain operation efficiency.

Support Activities:

1. Procurement: EDI solution reduces respond lead time between COMPANY A1 and the suppliers. Information transferring accuracy decreases supply order processing.

- **Make Value Flow**

Make those actions that create value flow. In this stage, it means that the seven wastes were mentioned above should be eliminated. The wastes include transportation, inventory, motion, waiting, over-processing, overproduced and defects. However, in retail industry, over-produced

may not exist. Hence, in summarised, there are six wastes in retail industry.

#### COMPANY A1

1. Transportation: in order to avoid the reduce delivery lead time, most of bulk products and customer orders will be dealt with and arranged delivery by the logistics centres.
2. Inventory: promotion as one of the important marketing strategies is used to reduce over stock by the company. Meanwhile, with the increase of promotion frequency, inventory waste will be decreased to the safety level in a short term.
3. Waiting: AIDC (Automatic Identification and Data Capture), EDI (Electronic Data Interchange), WMS (Warehouse Management System), EOS (Electronic Ordering System) reduce information exchange waiting time to achieve data transfer synchrony.

#### COMPANY A2

1. Inventory: a multifunctional information system ---- SAP/ERP system has been successfully used to manage inventory. Meanwhile, effective replenishment and inventory holding decrease were achieved effectively by ECR (Efficient Customer Response), which is a customers' based system.
2. Waiting: SAP/ERP system reduce information delivery lead time, because it is a company-wide data combination system and include utilities for marketing and sales, field service, product design and development, production and inventory control, human resources, finance and accounting.
3. Over-processing: CRM (Customer Relationship Management) strategy adopted requires the company to provide a directly channel to solve problems between customers and technicians.

#### COMPANY B1

1. Transportation: in order to achieve orders overnight delivery New Zealand-wide, the COMPANY B1 cooperate with NZ Courier which is one of the fastest express company in New Zealand to achieve the target.

2. Motion: procedure review focuses on the most correct operation details to avoid errors.
3. Waiting: an internal information system---PBAMB (PB Advance Business Management) was develop to achieve information synchronization to decrease the process operation lead time.
4. Over-processing: the company will re-design the workflow to reduce the duplicate operation during the process and avoid the stock on hand difference.

#### COMPANY B2

1. Motion: KPIs monitoring and management maintain that the facilities and man power can be fully utilised during working.
2. Waiting: supply chain information electronically and processing accuracy was benefit to the EDI solutions implementation.
3. Over-processing: EDI solution integrated two ordering systems along the supply chain to improve the process efficiency and cost saving.

### 5.3.2 Agile Improvement

- Market sensitive

Market sensitive: it is a strong ability that requires the companies can 'read' market.

#### COMPANY A1

JMI (Joint Managed Inventory) share the insights from the retailers' POS data with suppliers so that both parties are making data driven decisions through the market demands.

#### COMPANY A2

Efficient Consumer Response (ECR) have quick response capacity to make the players in the chain as partners. It makes the end customers be satisfied. Meanwhile, the three levels of the logistics network system increase the response speed. Moreover, SAP/ERP as a fast developing booster to speed up the customer response.

#### COMPANY B1

In order to avoid the risk of customer lost by inventory shortage and improve the market respond, the company expand the stock holding quantity and variability to meet the target. Moreover, the supply chain flexibility and market respondent are improved by marketing research regularly. Furthermore, VRM (Vendor Relationship Management) plays an important role in the customer changeable market.

#### COMPANY B2

To be closed to the one of the respondent in New Zealand, the COMPANY A1 also adopts marketing strategies to “read” the market in store-wide conversations or through e-mail.

- **Process Integration**

Process integration: it requires the organisations can avoid the time, cost and quality penalties associated with ‘stand-alone’ process.

#### COMPANY A1

The company’s ERP (Enterprise Resource Planning) not only used to internal information interaction, but also extended to the upstream and downstream of the supply chain to increase the participation of suppliers and gain the real feedback from clients. In the system, there is an Interactive customers’ information centre which was occupied by B2B (Business to Business) and B2C (Business to Customers) website had become the external sharing platform of COMPANY A1’s supply chain management.

#### COMPANY A2

A multifunctional information system---SAP/ERP was cooperation developed by IBM, Microsoft, SAP and CISCO. The centralized information management integrating “high efficient operation of procurement and sales, lean customer service and professional shared management” during the whole process. Meanwhile, the foundation of the RDC (Reginal Distribution Centre) reduce the

physical products delivery lead time.

#### COMPANY B1

As an internal information system, PBABM (PB Advance Business Management) can also connect to the cooperation logistics company to achieve synchronically data exchange to achieve the improvement of process lead time reduction.

#### COMPANY B2

In order to help those non-EDI suppliers to achieve the improvement of information respond lead time, the website which was named B2Be's Web Porta, the same as the EDI system, was developed to help those suppliers to get what the COMPANY B2 needs.

- **Network based**

Network based: a network of supply chain partners collaborate to meet the end-customer needs and demand by collaboratively planning across the supply chain.

#### COMPANY A1

JMI (Jointly Managed Inventory) requires that the retailer and supplier share responsibility for keeping the right product levels on the shelves. And the key of this strategy is to the sharing of insights from the retailers' POS data with suppliers so that both parties are making data driven decisions to achieve quick respond to the customers.

#### COMPANY A2

In the SCS (COMPANY A2 Supply Chain System), the company cooperates with tens of thousands of well-known Chinese and foreign home appliance suppliers to create a high efficient supply chain through coordination of commodities, supply chains, markets, talented people and communicative mechanisms.

#### COMPANY B1

Vendor relation management enhances the cooperation between the company and the suppliers. With the improvement relationship, the company shares the estimated market demand information to those doing continuing replenishment suppliers.

#### COMPANY B2

According to the market demand, COMPANY B2 normally has three kinds of orders (direct to store orders, direct to distribution centre orders and cross-docking orders) that have to be solved. The Web Portal distinguishes between these types of orders and provides the functionality needed to support the three different Order types.

### **5.3.3 Evaluation**

#### COMPANY A1

The evaluation of COMPANY A1 is based on the customer experience. According to the market respond or customers experience, the company may change the strategies to ensure that the company will still maintain the competitive advantages on the market.

#### COMPANY A2

As one of leading companies in China, COMPANY A2's strategies are also taking the lead in the retail consumer electronic industry. However, more competitors were intend to imitate its successful strategies that makes great threaten to the company. Hence, in evaluation, the company mostly focuses on the decisions of strategies improvement or new strategies applied.

#### COMPANY B1

Constantly business review, vendor management and customer feedback are the mostly priority principles for the company to evaluate the strategies performance. In constantly business review, financial perspective as one of the key indicators of the company is forced definition to the main goal that the company have to achieve. Vendor management exams the cooperation strategies

between the company and the suppliers. Finally, customer feedback evaluates the strategies are being recognition, acceptance and perpetuation.

#### COMPANY B2

KPIs (Key Performance Indicators) is not only used to plan or control the company's resources utilisation, but also evaluation the efficiency in each part of the supply chain. Moreover, as one of the perspectives in Balanced Scorecard, customer feedback exams the strategies that it meets the customers' requirements or not. And it is also the boost power for the company to continue improve the strategies.

### **5.3.4 COMPANY A1 versus COMPANY A2**

Both COMPANY A1 and COMPANY A2 are the leading appliance groups in mainland China. They were established at the period before home electronic appliance becoming popular in China. As can be seen from the results, the companies not only adopted lean strategies to improve the efficiency and eliminated waste, but also implemented agile strategies to achieve quick respond to the market. Moreover, information technologies are applied to improve their supplier chain as an important support function by both companies. However, only COMPANY A2 has developed a multi-functional system to connect difference applications along the supply chain.

In the implementation of lean strategies, COMPANY A1 focused on the improvement of the resource planning system and the distribution network, while COMPANY A2 adopted Efficient Customer Respond, Customer Relationship Management and the integration of information system to achieve lean improvement.

In agile area, Jointly Managed Inventory, Centralized Procurement and reducing delivery lead time played an important role on the agile improvement of COMPANY A1. COMPANY A2 mostly focused on the end of sales area. It involved the agile theory to improve the distribution network and build up a quick reaction to the customers.



### **5.3.5 COMPANY B1 versus COMPANY B2**

COMPANY B1 and COMPANY B2 are the most famous consumer electronic product retail companies in New Zealand. COMPANY B1 was founded later than COMPANY B2, but the company scale is becoming larger and larger. COMPANY B2 was combined to another New Zealand enterprise few years ago, and it is still running a good market in consumer electronic retail market with being share the head enterprise's strategies. According to the respondents, they did not think the strategies that the companies adopted to achieve waste elimination and quick respond to the market belongs to lean or agile improvement. And, one of the participants pointed out that according to the company's current business scale, lean or agile may not be the most suitable methods to achieve the target, because it requires the company to invest more and change the structure when necessary.

However, in order to eliminate useless processes or resources, some of the solutions adopted by COMPANY B1 and COMPANY B2 are just a part of lean or agile strategies. For example, on one hand, system process improvement and re-designing the work flow to improve the process efficiency in COMPANY B1 are similar to one of the wastes elimination of lean theory: Non-Value-Added-Processing. On the other hand, both these companies implemented information system to integrated their internal supply chain resources and part of the external decoupling points.

In order to achieve the reduction of customer response time, COMPANY B1 increased the variability of product stock and kept being closed to the end consumer through marketing research. Working closely with suppliers is also important that the company's supply chain would become agility to meet the customer requires. Being similar to COMPANY B1, COMPANY B2 also adopted marketing strategies to achieve the optimization of customer response time reduction.

### **5.3.6 Comparison between China and New Zealand companies**

According to the research results, both participant companies had applied lean, agile or leagile strategies to achieve supply chain optimisation. However, due to the external environment difference, such as population, competitors' quantities and economic scale, China's companies implemented more variable applications to support their information platform than New Zealand's companies. Moreover, China's companies had highly integrated most of the applications or resources along their supply chain, including the internal and external decoupling points rather than New Zealand's companies did. Furthermore, transport network in China is better developed than New Zealand. Hence, the delivery lead time from supplier to consumers in China is much shorter than New Zealand on average. However, New Zealand COMPANY B1 is the only NZ's company which can achieve overnight order delivery by closed cooperation with the third party logistics.

### **5.3.7 The Lean Iceberg Model**

As previously mentioned in the literature review, the iceberg model was related to the critical issues for lean sustainability. According to the results, COMPANY A1 and COMPANY A2 have significant alignment with the strategies and the techniques. For example, as a strategy, VMI (Vendor Managed Inventory) was adopted by COMPANY A2 to reduce the higher level inventory control costs. Meanwhile, one of functions of SAP/ERP system was applied to achieve the reduction of the inventory holding for the company. Hence, the alignment of VMI (Vendor Managed Inventory) and SAP/ERP had founded a solid support framework to manage Company A2's inventory control. However, results of this research made it difficult to uncover examples of the same nature in the New Zealand companies B1 and B2. As such, this could be one of primary reasons why Chinese companies have a better competitive advantage than New Zealand companies.

## 5.4 Summary

Chapter 5 is a cross case discussion of four consumer electronic companies between China and New Zealand how to apply lean, agile or leagile strategies to improve their supply chain performance.

China's fast growing economic tendency require the companies in the market have to grow faster and stronger. There were a number of consumer electronic retail companies being founded at the same period as COMPANY A1 and A2. However, most of those have since collapsed not surviving the initial growth period. In contrast, Company A1 and A2 have excelled and become the most successful consumer electronic retail companies in China today. Their success is due to the skilled implementation of supply chain management strategies. Company A1 and A2 primarily found their competitive advantage through the use of leagile strategies, thereby implementing processes that assisted flexibility and robustness and minimising cost for the company. This in turn allowed the companies to charge competitive pricing for the customers and helped them establish a unique image on the marketplace.

New Zealand has a slower economic development than China, but the market is also full of competition. In the past few years, some of the large scale consumer electronic companies closed down because of poor business performance. As the leading consumer electronic retail companies in New Zealand, COMPANY B1 and B2 kept increasing their performance levels instead. This is also due with effective leagile systems. However, benchmarking performance indicators suggest that these New Zealand companies should be in better position than they are in currently.

According to the discussion, compared with China's companies, one of the primary reasons for these New Zealand companies to not be as rapidly growing as with the companies in China is an incorrect alignment of supply chain technologies and strategies. In addition, although both the participant companies adopted lean, agile or leagile methods, to be different in relative environments between two countries, those strategies can be implemented wider and in more detail by Chinese companies than New Zealand companies. However, the findings also pointed out

## Chapter 5 Case Study and Discussion

that in some decoupling points, New Zealand companies have the potential capability to improve and achieve a competitive advantage like in China's.

## Chapter 6 Conclusion

### 6.1 Research Conclusion

The primary motivation of this research was the desire to investigate how lean, agile and leagile strategies improve the efficiency and responsiveness of consumer electronic retail companies. It also aimed to develop a better understanding of the consumer electronic retail industries in China and New Zealand.

With the consumer electronic devices and relevant components or accessories being widely used in our daily life, the industry is becoming importance to China's and New Zealand's economies. China became the world's largest consumer electronic devices and relevant components exporter, having a huge market scale, and the export and import value of China-made electronics rose by 11.5% to US\$1.13trn, equivalent to 31% of the country's total foreign trade. Although market scale is not large as China, the retail market share of consumer electronic kept increasing in New Zealand year by year.

In analysing the consumer electronic retail industry in both countries one opening conclusion can be drawn: Chinese and New Zealand consumer electronic retail industries have different characteristics and levels of maturity. On one hand, China in particular have become increasingly important in consumer electronics as well as other industries, both as production locations and final markets. Growth since 1988, especially on mainland China, has been extraordinarily high. The recovery was boosted by the government's consumer electronics subsidy programme, as well as a pickup in global demand. On the other hand, New Zealand has smaller population and market scale. However, with a fast growing demand of consumer electronic devices, more relevant companies have been established and the market competition become increasingly more competitive.

Despite the importance of better understanding the consumer electronic retail industry in China

and New Zealand, the main purpose of this research was to answer the following research question:

How do lean, agile or leagile supply chain management strategies improve those companies' supply chain efficiency and responsiveness?

In this research endeavour, four case studies were analysed: COMPANY A1 and COMPANY A2 from China, COMPANY B1 and COMPANY B2 from New Zealand. Based on the information gathered in the case discussion and a comprehensive literature review of the topic, the following findings have emerged regarding the implementation of lean, agile or leagile supply chain management strategies.

- **Lean improvement in consumer electronic retail companies**

The core of lean retail is primarily a commitment to eliminating waste. Similar to lean philosophy in manufactory, the main types of waste in retail also include: excess inventory, product defects, unnecessary motion, redundant employees and a waste of time. The companies in retail can apply similar techniques and principles to identify all kinds of waste in their company and improve the operational efficiency. During the research, bellows lean techniques are implemented to the participants companies to improve the efficiency:

- I. Simplifying the design of work. The individual work process of the companies have to review and design to provide a high degree of feasibility and possible control, so as clear to be started and finished.
- II. Use of pull to create a sustainable replenishment system. In order to keep inventory level low and free space, product supplied or fuelled should be based on the actual demand of customers to forecast or anticipated.
- III. Removing the bottleneck through the supply chain. Working closed to the third party logistics suppliers and re-designing the local and national-wide distribution network

eliminate inefficiency to achieve shorter delivery time, lower transport costs and defects, and improving the flow of goods and operational performance.

- IV. Elimination of waste of effort, time, materials and movement. By identifying the core competitiveness of the company, information technologies are widely applied the elimination of excess information movement, time, and materials and labour utilisation in the process.

The effective implementation of lean approach in retail makes greater cost efficiency, increased worker productivity and less waste of time and effort. This in return significantly affects the improvement of customer satisfaction and enterprise profitability.

- **Agile Improvement in consumer electronic retail companies**

The core concept of the agile in retail chain is flexibility or responsiveness. To be similarly to fashion industry, the characteristics of consumer electronic industry is short life cycle and rapid change, spawning an endless chain of innovations and new products. As fast change and buyers differ, there are strong requirement in constantly create new tactics for marketing, selling engagements and matching them to the right targets. Hence, the companies agile and sales should be improved by keeping variables of potential products, service to either help them get the right solution or meet the clients' need.

During the research, bellows agile tactics are implemented to the participants companies to improve the responsiveness:

- I. The companies and their suppliers share the use of information technology data. It is very effective to create a virtual supply chain due to virtual supply chains are information based and not inventory based.
- II. Conventional logistics systems are created being based on a paradigm that seeks for the optimal quantities and the spatial location of inventory. Meanwhile, Electronic Data

## Chapter 6 Conclusion

Interchange (EDI) and the Internet have helped partners in the supply chain to act upon the same data i.e. real demand, rather than be distorted information when orders are transferred from one step to another in an extended chain.

- III. Between supply chain partners, shared information can only be fully leveraged through process integration. As a kind of network, the companies wish to gain competitive advantages in the market need to be able to better structure, co-ordinate and manage the relationships with their partners in a network, and it needs to be committed to better, closer and more agile relationships with their final customers.

The effective implementation of agile approach in retail makes increased the responsiveness of the companies and less waste of time and effort. This in return significantly affects the improvement of customer satisfaction and company profitability.

Two overall conclusions have emerged from above findings. First, lean, agile or leagile implementation have a significant effect on the improvement of consumer electronic retail companies. Those strategies influenced the competitive advantage gained by the companies from difference decoupling point improvement.

The second conclusion that can be drawn is that although there are differences between the China and New Zealand companies and part of the participants had not pointed out what kind of strategies were adopted clearly, the both seek to implement the combination of lean and agile (leagile) techniques to achieve the efficiency and responsiveness improvement. The different characteristics of the consumer electronic retail industry in each country requires different models from the strategies, however, those strategies are critically important to each enterprise's supply chain improvement.



## **6.2 Limitations of This Study**

With the present study, there are a number of caveats that need to be noted. First of all, this research has investigated only four consumer electronic retail companies, two from China and two from New Zealand, hence the results may not represent the total environment of the daily industry in these countries.

Moreover, the questionnaire survey in this study were conducted only with the supply chain manager or the warehouse manager from each companies, and this might have influenced the study results by merely taking account of the participants' personal interests, subjective viewpoint and experience.

Finally, the utilisations of the secondary data from the websites of case study countries and relevant companies may result in bias. For example, data collection about the consumer electronic industry in New Zealand is difficult to find, and the researcher only can utilise the electronic industry to place it.

## **6.3 Directions for Future Research**

It is hard to gain full understanding the situation of lean, agile or leagile implemented in consumer electronic retail companies through only a questionnaire and some information form company website. Therefore, it is worthwhile considering some general directions for future research:

- I. As this study sampled a small number of consumer electronic retail companies, further research surveying a larger number of the companies should be undertake for evaluating the improvement of supply chain efficiency and responsiveness that are caused by those strategies implementation companies.

## Chapter 6 Conclusion

- II. Further research should be focused on how consumer electronic retail companies can enhance their agile sustainability practices by keeping improving the level of flexible supply chain. The research should have three links the consumer electronic supply chain: manufactory, retail and consumer.
  
- III. Further research should be conducted to investigate the opportunities and constraints for New Zealand's consumer electronic industry to play an important role in the South Pacific market by following the successful experience from China's relevant companies.

# APPENDIX 1

## Questionnaire

### Lean, Agile and Leagile Implementation Survey

Introduction: Consumer electronics (CE) can be described as those daily used electronic equipments in communication, business and entertainment. It includes personal computers, digital cameras, mobile phones, home and office electronic devices, digital devices on cars, disks players, speakers, and so on.

1. How long has your company been operating?  
A. Less than 5 years    B. 5-10 years    C. 11-20 years    D. 21-30 years  
E. More than 30 years
  
2. The approximate number employees of your company (in New Zealand):  
A. Less than 100    B. 100-150    C. 150-200    D. 201-250    E. 251-300    F. 301-350  
G. More than 350
  
3. Annual turnover in 2013 (NZ\$ Million) of your company:  
A. Less than 100    B. 101-200    C. 201-300    D. 301-400    E. 401-500  
F. More than 500
  
4. The number of retail stores in New Zealand:  
A. Less than 5    B. 5-10    C. 11-15    D. 16-20    E. 21-25  
F. More than 25
  
5. What is the percentage of the consumer electronic products being sold in your company?  
A. Less than 20%    B. 21%-40%    C. 41%- 60%    D. 61%-80%    E. More than 80%
  
6. Where are your consumer electronic product suppliers mostly located? Please list the top 3 countries.  
  
\_\_\_\_\_  
  
\_\_\_\_\_  
  
\_\_\_\_\_
  
7. Do you understand what Lean, Agile and Leagile strategies are?  
A. Yes.    B. No. (Please go to Q11 )

8. Has your company adopted Lean, Agile and Leagile strategies to improve your company's supply chain?  
A. Yes.                      B. No. Please explain the reasons. (Please turn to Q 11).
9. Which strategies does your company adopt (ie Lean, Agile or Leagile)?
10. What part of the supply chain in your company is implementing Lean, Agile or Leagile strategies?
11. In your company, what does your company do when it needs to reduce resources waste? (Such as transport, inventory, motion, waiting, over-process and defects)
12. In the past few years, what did your company do when it needed to reduce customer response time? (Such as market sensitive, process integration, network based and virtual integration)
13. For how many years has your company adopted these strategies?
14. What are reasons your company chose to implement these strategies in the supply chain?
15. What improvement has your company benefited from implementing such after strategies?
16. How can your company ensure that the strategies implemented in your supply chain can help your company to achieve or gain competitive advantages?
17. What do you think the strength, weakness, challenges and opportunities for your company's supply chain in the consumer electronic market?

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