



**UNIVERSITY OF CAPE TOWN**

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**The Adoption of Lean Techniques to optimise  
the on-shelf availability of products and drive  
business performance in the Food Industry:  
*A South African Manufacturing and Retail Case Study***

\* \* \* \* \*

By

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## ***DECLARATION***

*This note is intended to declare that this Dissertation is the sole product of my own work, in the context of the contents, analysis, development, consolidation, academic and professional research, production and field execution.*

*Furthermore, this work has not been submitted in the past, or being, or is to be submitted, in whole, or in part thereof, for any degree at this University or at any other Institution.*

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*Signature..... Date ...../...../.....*

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## ABSTRACTS

The degree of sustaining business performance, while maintaining competitive costs, satisfied consumers and customers has become more difficult and harder to achieve. To date, both retailers and manufacturers are economically challenged as they enter into a new age and era that is characterised by a restructuring of the supply and demand known today, the one in which the consumer demand chain will both lead and direct all organisational processes. The greatest challenge in manufacturing and retail supply chains today continue to be the inconsistency of product availability. Both retailers and their manufacturers frequently find themselves in positions where they either have too much stock of specific stock-keeping units (SKUs) or insufficient stock levels of a particular SKU, Steve (2010). Retailers and their suppliers both seek to avoid the costly out-of-stock (OOS) situations, which result in lost revenue opportunity for both parties. OOS can also damage shopper loyalty as frustrated consumers might seek out alternative retailers for the same merchandise, while on the other hand suppliers' brand loyalty can be impacted if a competitor's product is substituted instead.

It remains true that the two pillars of business, namely demand and supply, still rule. Traditionally, putting supply before demand, with its implied precedence, was the correct approach to apply, but in today's business environment, there is a major shift taking place, predominantly driven by the cycles in globalisation that would be faster than in the traditional way, oversupply in the fast-moving consumer goods industry, a parallel loss of pricing power, consumers with a twenty-four hours access to precise pricing information, which terminates the power of information scarcity, and shorter product life cycles. The global economic crash that represented a global economic storm led many organisations to rethink the manner in which organisations are led. A consensus exists among many authors and commentators that the emerging economic order has imposed changes to the very way companies are doing business.

Juttner & Peck (1998: 227) pointed out, as a result of fieldwork conducted, that the degree of integration of the retail organisation and the supplier organisation is strongly influenced by the way in which an organisation participates in the business relationship and the individual responsibilities of each partner. Furthermore, a key point to note according to Walter (1997: 214) is that the manufacturer and retailer have a shared relationship with the consumer, and therefore a mutual market responsibility. The importance of a partnership and the relevance of selecting appropriate channel members have been widely recognised by academics and practitioners such as Arthur & Co. (cited in Siguaw et al., 1998: 99); Frazier & Antia (cited in Siguaw et al., 1998); Buzzell & Ortmeyer (1995); Cespedes (1995: 244-245); Kumar et al. (1995); Weitz et al. (1995: 34-49 & 382-511); and Christopher & Juttner (2000: 117). This is because retail organisations can achieve vertical marketing integration and as a consequence both the retailer and manufacturer are able to achieve competitive advantages. As a result of this, retail

organisations can increase the level of service and product availability, can distinguish themselves from the competitors by providing a high level of customer service and this can improve profitability, Baker et al. (1999: 50).

Fisher et al. (1994) argued that by using accurate responsive mechanisms, the companies could actually lower prices instead of making the consumers pay for their inaccurate forecasts. The reason why this is not widely done is twofold. First, the dramatic increase in demand uncertainty is a recent phenomenon and most retailers still plan their production and sourcing as if forecasts were reliable. Second, it is difficult to run multiple demand scenarios and incorporate them into the planning process simultaneously. Lean has the potential to address the above issues, identify business and process gaps and challenges, and drive the creation of a robust infrastructure through the optimisation of the information flow, ensures end-to-end improvement on the product flow, resulting in the elimination of wastage throughout the value streams. OOS on shelves in the context Lean is classified as waste in retailing and manufacturing.

In terms of customer satisfaction, Lean plays a key role in simplified and accelerated store shelf restocking processes to give customers a good shopping experience free from disruption; building the capability to determine the root causes of unnecessary fluctuations in replenishment, and responding to demand variation with high flexibility to reduce OOS or overstock. Well-stocked shelves, minimal inventories, low transport costs, and steady workload in distribution centres and in stores' backrooms are some of the key benefits of Lean, delivered through continuous elimination of waste, inflexibility and variability. Such superior performance may be balanced between high product availability, lower working capitals and low costs as non-irreconcilable trade-offs.

This research aimed at analysing, investigating and describing the manner in which Lean methodologies can be applied to support consistent availability of products on shelf at retail stores [therefore minimising OOS on any SKU], and assist managers to improve the business performance. The investigation was pertinent to the South African manufacturing and retailing sector. The extent of interconnectivity and interdependence between the two chosen companies, led the researcher to consolidate them as one inter-organisational cluster, considered as interchangeable in the research process. A case study method was seen as appropriate to collect data on the inter-organisational determinants of the Lean value stream. Given the researcher's active involvement with the inter-organisational set up, the use of action research methodology, formed an integral part of the chosen case study framework in collecting information and observing trends. Finally, the use of the institutional theoretical framework provided an explanatory framework that was useful in investigating, evaluating and gaining greater insights into the formulation of the desired strategic response to the organisational challenges, which involved organisational change, in response to the inconsistencies of product availability.

## **CHAPTER 1: INTRODUCTION**

### **1.1 Introduction**

This chapter presents the key problems and associated challenges faced by organisations operating within the manufacturing and retailing industries. It also attempts to demonstrate the manner in which competition has become vigorous in general, along with the ever-changing consumer behaviours. It also highlights the major trends of the economic revolution, with particular reference to the manner in which leaders deal with both supply- and demand-based economies for products and services in this century.

### **1.2 Background**

In today's extremely competitive economies, with ever-changing consumer demands, organisations are expected to re-invent themselves consistently. The international deregulation in most industries has created many opportunities for the entry of new competitors, while the globally diversified cultures have led organisations to standardise most of their business processes. Given the extent of these changes, the South African (SA) manufacturing and retail environments have experienced extremely high levels of out-of-stock (OOS) products over the past five years.

Furthermore, greater innovation and renovation on products, competitiveness and risk will make markets far more volatile in the future, according to McKinsey's Dominic (2010). While the SA organisations have been able to survive the economic crisis of two years and remained relatively unscathed, many global companies are gearing up to do business in a world that is significantly changed after the event. The business environment after the economic crisis will be more volatile, riskier and increasingly focused on Africa, and SA is not exempted from this ambition aspiration.

It is also worth noting that consumers, governments and general stakeholders will be looking for greater intrinsic value in products and will be more discerning about value for money. Competition for market share from existing and new players within Africa, including SA, will be more intensive as Africa is now regarded as a consumer market of enormous potential for the next decade, and as a source of significant expansion for new growth. SA will be caught up in all these sweeping market trends and developments.

Consequently, it has become evident that in the past few years, organisations have moved from being vertically organised structures to horizontal organisations. In other words, a single company no longer controls its products from the farm to the store shelf. Instead, today's organisations only control selected elements of the supply chain while other institutions and divisions generally located in different areas or regions control the remaining processes. Although this enables companies to concentrate on their core competencies, it results in longer and complex supply chains from farmers, to manufacturing, up to the shelf level.

The research aimed at analysing and investigating the manner in which Lean techniques could be applied to improve the consistency of products' availability on the shelf at retail for consumers and shoppers. Typically, the retail success can be defined as achieving high gross margins and customer service levels in the context of stock availability. Forecast accuracy, process lead times, different procurement and sourcing models and replenishment strategies can have a significant impact on the profitability of retailers or manufacturer, irrespectively.

Generally, forecasting errors often lead to significant inventories or lack of sufficient stock, and the latter results in loss of sales. A typical retailer's performance measures key performance areas such as customer service levels, product availability, lost sales, product substitute percentage, gross margins, gross margin return on inventory, sell-through percentage, but the mark-down rate masks the source of the problem – namely poor stock availability.

Given these developments, this investigation was pertinent to the South African (SA) manufacturing and retailing sectors. More specifically, this research investigated the adoption of Lean techniques throughout the value stream to drive better customer service levels, in terms of the presence of products in retail stores. . In particular, this research addressed the following question:

- *How can Lean techniques stimulate business performance in an integrated supply chain environment?*

(1) *Business performance is hereby viewed as delivering (a) value to consumers & shoppers and (b) growth to shareholders.*

(2) *Integrated supply chain environment is understood as the arena that involves coordinating the flow of physical goods, information and intelligence, from the farm-to-fork or from the manufacturer to the point of consumption, supported by a seamless connection between various stakeholders.*

*(Source: Author, Action Research 2011).*

### **1.3 Research objectives**

Today the greatest challenge in manufacturing and retail supply chains continues to be the inconsistency of product availability. Both retailers and their manufacturers frequently find themselves in positions where they either have too much stock of a specific stock-keeping unit (SKU) or insufficient stock levels of a particular SKU, Steve (2010). Generally, the fast-moving consumer goods (FMCG) segment is typically challenged with OOS for popular SKUs, and this is compounded by greater fluctuations due to manufacturer-and-retailer-driven trade promotions.

The management of a customer-facing supply chain, demand-facing and supply-facing processes have predominantly focused on value creation, but with limited alignment of business priorities. This poor reconciliation of inter-organisational and cross-functional conflicts has resulted in deteriorated consumer dissatisfaction due to the inconsistency on the availability of various product categories and ranges at retail stores.

To date, both retailers and their manufacturing counterparts, seek to avoid the costly OOS situations, which result in lost revenue opportunities. OOS can also dampen shoppers' loyalty as frustrated consumers and shoppers seek the same or alternative products from different retailers. Furthermore, the manufacturer's brand loyalty can be impacted if a competitor's product is instead substituted. The Foods Marketing Institute study, Steve (2010), found that for all SKUs on OOS during customers' shopping, up to 30% of OOS items were purchased from another store; and in certain instances, they were not purchased at all and were replaced by a substitute product, thereby resulting in a lost opportunity for both manufacturer and retailer.

A number of European retailers share point-of-sale information, including sales, stock levels with its key suppliers; tracking sales on a daily basis in order to enable the suppliers to differentiate fast- from slow-moving product categories and respond to replenishment and to assess whether certain categories should be discontinued from the retail stores. Such visibility and coordination present significant opportunities to increase product availability on the shelf at retail stores; it assists in greater customer service levels including the satisfaction of shoppers and consumers, and the reduction of inventories in finished goods and packaging materials.

Extensive research studies have been conducted by various educational institutions and industries, documenting the enormous benefits of Lean. The findings and best practices will not be repeated in this study; as such, this study's main objectives are as follow:

- To examine the use of Lean tools in today's manufacturing-retail supply chains in an integrated fashion,
- To investigate the potential benefits and contributions made by these Lean techniques, with specific emphasis to the reduction of OOS and driving better on-shelf presence and availability of products and merchandises at the retailer's store shelf for shoppers,
- To understand Lean's capabilities to support business performance and growth; and,
- To explore the manner in which the joint adoption of Lean techniques could lead into a collaborative partnership for a manufacturer-retailer relationship.

While many researchers and commentators have addressed the concept, implementation and the role played by the Lean method, most of their proposals result in attempts and recommendations to address the challenges associated to pure production within the manufacturing environment. To date, improved stock levels and product availability on shelf for consumers and shoppers have not been evident, this is mostly due to the fact that extremely high stock levels are generally held within the distribution centres and warehouses belonging to both the manufacturer and retailer, as opposed to ensuring more stock pressures at the retail stores or outlets, readily available for customers. Also, very little empirical research, if any, has been done with an intention to understand the extent to which Lean can be applied beyond the manufacturing operations, with particular emphasis to the impact that Lean techniques have in driving better stock availability, visibility and pressure at store shelf, readily accessible for consumers, customers and shoppers.

As such, this research sought to demonstrate the manner in which Lean tools can be adopted, integrating both the manufacturer and the retailer's supply chain environments, with specific focus to the delivery of improved on-shelf availability of products at retail stores.

#### **1.4 The South African food retail environment**

The SA food retail environment is characterised by diverse dynamics that intensifies the level of competition within the market place, literally fighting for the same consumer and shopper. Figure 1.2 (shown at the end of this chapter) points out the largest SA retailers, namely Pick n Pay, Shoprite, Spar, Massmart [which has recently been acquired by the American Retailer, namely Walmart], and Woolworths, among others; the size of the population representing the consumer landscape is also highlighted. It is also clear that there is reasonable understanding of the enormity of opportunity presented by the market, which does not seem to be explored due to capacity and capability constraints from both the manufacturers and retailers. While the intention of this research is not necessarily to examine the positions of these retailers, it is appropriate to present a brief summary of the top three food retailers, in no priority order as described below. *(Source: Researcher & Author's strategy office, Manufacturer, 2011).*

Shoprite Retail has been in an aggressive growth mode, with an addition of approximately 60 new stores in the last six month. It is actively preparing for Walmart's entry into SA, examining its supply chain systems and improving its readiness to pressurise its suppliers. It has consistently performed well in the last few years, growing sales by 9.4%, and edging its trading margin up to 5.1%, far better than its peers. It is also becoming a great dividend payer for its shareholders, increasing the interim payment to 10%, putting itself on a yield of 2.3%. Shoprite has been growing headline earnings at a compounded annual rate of 25% over the past five years, well ahead of its competitors. Despite the challenges on OOS, this retailer is expected to continue with such performance.

Spar Retail has similarly been good to its shareholders. The share price has grown fivefold and has had a dividend yield of 3.9%. It has a well-developed distribution network and has been acquiring some of its franchise stores and turning them into corporate and solely owned stores. It also performed well in the last year or so, growing at a rate of 9%, although the attributable earnings were relatively lower than expected. The operating margins were under pressure, resulting in 3.7%. This retailer's growth experience is not as convincing as others.

Pick n Pay Retail on the other hand has had a challenging period in the last two years or so. Its last financials showed the strain of 6% growth in turnover depleted through high operating costs and internal operating challenges, leaving attributable income down to 34%, and headline

earnings down to 18.3%. Although industrial actions with labour federations contributed significantly, operating costs have increased severely. One of the most striking outcomes was that the business had a swing from a net cash position in the previous years to a net debt of just about \$170m just a year ago. However, the investments in distribution and information systems are positive and their contribution is expected to yield greater benefits in the medium term.

Figure 1.1 (on the last page of this chapter) highlights the key quantitative findings derived from a recent field work conducted by a manufacturer within the SA Retail environment. It is clearly evident that both retailer and manufacturers are accountable for the growing OOS, and as shown in Figure 1.1, there are a number of primary departmental root causes that drive such OOS, along and the associated missed opportunities, which appear to be enormously alarming. It is evident from the field study analysis and findings that the flow of both information and physical products, irrespective of whether they are raw materials, packaging materials or finished goods, throughout the value chain was based on the traditional push mechanism.

Some of the key observations and experienced phenomena from this investigation included the following business issues and process gaps:

- Misalignment of performance measures between the retailer and manufacturer, consequently disabling dialogue thereby weakening the commercial relationship.
- Disintegrated discussions between the supply chains and commercial negotiations for both companies.
- Stagnant case-fill rates and poor availability of products and merchandises, leading to drastic consumer dissatisfaction and brand disloyalty.
- Alarming growth in terms of number of back orders, claims, refusals and returns, thereby resulting in the compounded generation of wastages.
- Poor promotional planning and execution, warehouse and logistical inefficiencies, volatile order cycle times, increased order complexity with undefined replenishment rules.
- Inadequate visibility of historical sell-through data, as well the inventory levels within the right timeframe.
- Lack of common views on consumer demands, poorly coordinated actions plans and activities between the retailer and manufacturer.

Based on the above issues and challenges, the motivating factors to hold more stock or inventories at manufacturers' and retailers' distribution centres and factory warehouses were driven by the need to: (i) cover fluctuations in the manufacturer product supply networks, including the time between deliveries and forecasted consumer purchases from the shelf; (ii) gain goods discounts from the manufacturer to retailers for efficient unit load, such as full pallets and full trucks where the total delivered cost decreases, thus driving scaled economies; (iii) build more stock for promotions prior to price increases and new product launches; and (iv) cater for discontinued, damaged and obsolete products that would not be sold.

### **1.5 Practical implications**

Given the existing fiercely competitive retail and manufacturing economy, most organisations face the challenges of ever-increasing supply chain complexity. Historically, a typical company offered a limited number of products through a single supply chain channel, using one logistical and shipping method. To date, organisations are faced with an explosion in number of SKUs while the limited and constrained shelf space at stores, compounded by the increasing complexity of the distribution networks and logistical channels, wider range of suppliers and delivery options, supplemented by more sophisticated and demanding consumers and customers, along with changing governmental regulatory environments.

Thus, the degree of improving business performance, while maintaining competitive costs, satisfied consumers and customers has become more difficult and harder to achieve, more specifically because the supply and demand variables are consistently changing, even more rapidly than ever before, as argued by George (2003). With these challenges, there are very few organisations; namely, the automotive manufacturing companies, for example, that have been successful, and have consistently produced acceptable revenues and profit growth, whose supply chain excellence has become legendary. The key success factors for such market leaders are exhibited through the deployment of advanced techniques, such as Lean, advocated by John (2000). This gives them an exceptional nimbleness and unparalleled ability to respond efficiently, effectively, smoothly, rapidly and appropriately to the changing market conditions, with the least amount of waste generation throughout the value chains.

Lean, has the potential to address the above issues, identify business and process gaps and challenges, and drive the creation of a robust infrastructure, Christopherson (2007), through: (i)

the optimisation of the *Information Flow*, (ii) ensuring end-to-end improvement on the *Products Flow*, and (iii) resulting in the *Elimination of Wastage* throughout the value streams.

In other words, well-stocked shelves, minimal inventories, low transport costs, and steady workload in distribution centres and in store backrooms can all form part of the key benefits of Lean, and these should presumably be delivered through continuous elimination of waste, inflexibility and variability. However, in order to deliver such superior performance, there must be a balance between high product availability, lower working capitals and low costs as non-irreconcilable trade-offs. As such, organisational improvement is most effective when approached in a holistic manner addressing improvement in all parts of the organisation, using holistic improvement methodology such as Lean. These improvements address the flow of information and materials through processes as well the enhancement of value-adding process steps that create and deliver the product for the customer, said Bruce and Daly (2004).

Practically, Lean as a concept involves the constitution of a standard problem-solving toolkit, also categorised as Lean's building blocks. In particular, the utilisation and application of these well-structured tools and problem-solving techniques, selectively dependent on the type of business gaps, include the following: **(1) DMAIC** [Define-Measure-Analyse-Improve-Control: a structured tool with five key steps]; **(2) Kanban** [electronic signals in the form of data sent electronically from the point of sales to replenish inventory in a pull mechanism]; **(3) GSTD** [Go-See-Think-Do, which also incorporates the "**5Ws**" [meaning: Why, Why, Why, Why & Why?] - a methodology that leads people to go to the place where things or actions are happening]; **(4) DFSS** [Design For Six Sigma: which is a structured approach, efficiently commercialising technology that results in new products or services]; **(5) PVAFI** [Process Value Analysis and Focused Improvement: a tool for process-mapping, redesign and optimisation as well as identifying, analysing and eliminating losses]; **(6) AM** [Autonomous Maintenance: a tool that develops and empowers people to manage their production and manufacturing lines and processes in an autonomous manner]; **(7) PM** [Planned Maintenance: a manufacturing tool focused on achieving zero breakdown and extending equipment lifecycle]; **(8) TQM** [Total Quality Management: a tool that is designed to support the initiatives to deliver zero defect products]; Bruce and Daily (2004), John (2000), Womack and Jones (2005a & 2005b).

For example, through the use of DMAIC and Electronic Kanban systems, both the retailer and manufacturer can achieve customer-demand-driven replenishment, by adjusting shelf

availability rates, adjusting stock delivery intervals and automate product replenishment. The counterpart to Lean manufacturing's stable production processes in Lean retailers is the achievement of a demand-driven replenishment. Thus, when store replenishment is motivated and triggered by consumer demands, both the retailer and manufacturer can avoid order fluctuations, volatility as well as reduce both under-stocking and over-stocking. The goal of replenishment management is to ensure a consistently high level of merchandise availability, while keeping the store inventory as low as possible. The merchandise availability and store inventory levels are determined by a complex interplay of demand forecasts, sales, reorder points, delivery slots or intervals, and logistics processes at the store level. If this interplay is suboptimal, the results would be a mixture of OOS or overstocks. Thus Lean processes ensure that work is kept simple and transparent and that all activities create value for the customers and shoppers.

OOS or overstocks on shelves in the context of Lean is classified as waste in retailing. Therefore, Lean retailing is oriented to the customer and shoppers and prevents waste. In terms of customer satisfaction, Lean plays a key role in (i) simplified and accelerated store processes, for example, restocking of shelves in order to give customers a good shopping experience free from disruption; (ii) building the capability to determine the root causes of unnecessary fluctuations in replenishment, such as incorrect orders and unsuitable supply intervals and, therefore, initiating the appropriate corrective actions; and (iii) responding to demand variation with high flexibility to reduce OOS or overstock, for instance, the retailer is able to fill his/her shelves within bandwidths set by the product category management, but also with the mandate to change them quickly in order to prevent any overstock or OOS.

On the other hand, the application of the GSTD and PVAFI toolkits, have the potential to generate Lean processes as well as effective labour force planning; resulting in simplified process steps, concentrating on value-adding activities, matching service staff levels to customer traffic in retail stores, thereby responding flexibly to demand variations with the introduction of effective staffing and scheduling. With Lean, there is no unproductive movement of products or people, and no unnecessary products. All activities are precisely coordinated to ensure efficient product replenishments, in a smooth flow from dispatch at the manufacturer to the shelves.

Lean value stream, profitability and rigorous organisational performance are three attributes, seen by Harry (1998), that tend to optimise operational excellence and stakeholder value creation. The fundamental view of Lean manufacturing is therefore to operate at minimum cost and offer exactly the services and products that customers or consumers want and are willing to pay for. As such, if less is produced, the customer is dissatisfied; if more is produced unnecessary costs are incurred without being offset by the corresponding revenues. It's presumable that the associated cost and benefit, with an optimised customer value proposition is a systematic prevention of waste by means of Lean; more specifically in the context of eliminating all activities that do not add value, with business processes that are largely standardised and consistently produce the desired results, and that these processes can be altered quickly and nearly effortlessly when the organisation intends to respond to changes in the market place.

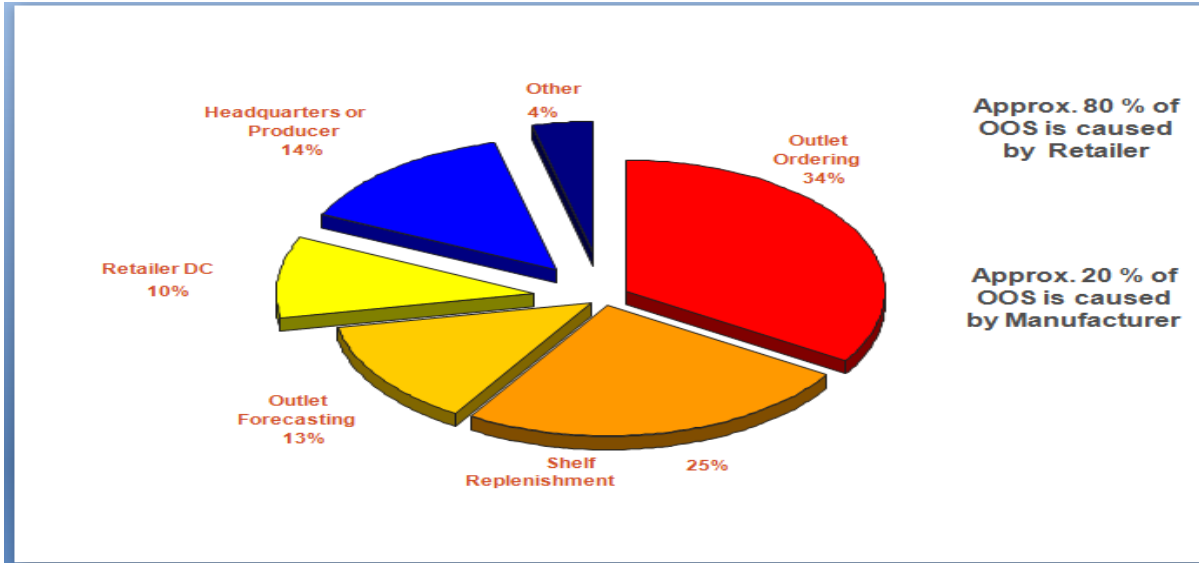
### **1.6 Organisation of the research study**

This dissertation is structured in five chapters. Chapter one deals with the general introduction of the dissertation, identifies challenges within the manufacturing and retail environment, highlights the problems with brand management along with the challenges associated with consumer satisfaction, and highlights the purpose of the entire research study.

Chapter two emphasises the literature review, and this entails five different sections, ranging from the Lean value chain, which explains its evolution and also deals with Lean methodologies as well as differences between Lean supply chain and Lean manufacturing. This is then followed by a section that focuses on the demand-driven supply chain strategies, its associated processes, as well as the demand and supply planning and forecasting methodologies. The next section is about the competitive operating environment, its competitive intensity, and the various techniques and strategies to protect, develop, grow and position organisational brands. The following section capitalises on the integration of retailers and manufacturers through the customer-facing supply chain and the need for cross-functional alignment and integration and the extent of collaborative engagement along with the development of sustainable partnerships between manufacturers and retailers. Chapter two is then concluded with the section on institutional theory, including the development of a theoretical framework. Chapter three deals with the research methodology applicable to the empirical collection of information for this research study. Chapter four presents the key results from the case study as well as the

analysis on findings gathered from the research. Finally, Chapter five places emphasis on the summary of the study and main conclusions.

Figure 1.1 Root causes of out-of-stocks (OOS) at retail outlets



Source: Nestle supply chain strategy office, South Africa, 2011

Figure 1.2 Landscape of the South African retailer and consumer population and potential opportunity



Source: Nestle supply chain strategy office, South Africa, 2011

## **CHAPTER 2: LITERATURE REVIEW**

### **Section 2.1 Lean value stream**

#### **2.1 Introduction**

This chapter deals with both the traditional and modern transformation of the economic environment, and associated techniques of dealing with business process development and improvement. It attempts to highlight some of the key statistical methodologies historically deployed to drive quality management, in the context of product, service and process over the past decades. The evolution and migration from the traditional methods to the Lean as a modern technique, and the manner in which Lean drives business transformation will also be dealt with in this section.

#### **2.1.1 Economic transformation**

##### **2.1.1.1 The transition to economic order**

The relatively stable, growing economy that the developed world has enjoyed for almost an uninterrupted period since the end of World War 2 is transitioning into a new economic order. The signs of change have been visible within the financial, political and business environments. The global economic crash that began in the year 2007 provided a great indication that drastic change was taking place, and such change would generate implications for business as well as the manner in which the entire economic environment would function (Kash & Calhoun, 2010 and McKinsey's Dominic, 2010).

Historical developments have proven that great economic, ecological and social revolutions manifest themselves gradually, almost invisibly, growing ever-larger beneath the calm surface of the status quo until such time that they burst into the open during a crisis that would have been precipitated. As such, the global economic environment has reached a turning point, whereby most rules have been rewritten and the business world now operates very different to the traditional way. From a vast and complex business perspective, this turning point has been reached at an alarming speed since the twenty-first century, and this seems to portend an equally transformative impact on various industries, along with the respective customers and consumers.

History shows that most of the transformation in the various industries, including the first and second industrial revolution, were sparked by a transformation in labour from craft guilds to assembly lines, leading to a rise of the management and professional classes; a jump in productivity due to both the transformation in labour and the invention of new technologies; a sudden expansion in markets; a change in the location and the manner in which the work was done, such as the migration of people from farms and villages to city centres; and finally, the burst in the entrepreneurial sector, (Kash & Calhoun, 2010). Therefore, considering such economic transformation, the survival of the current and the next economy requires greater thinking on the transformational rules, and move from a supply-based economy to a demand-driven economy. This is further explained in the following two sections.

#### **2.1.1.2 Supply-based economy**

After the Second World War, in which prosperity was relatively quick to return to a number of geographic regions of the world, notably Eastern Europe, South Asia, and the USA, an extended period of continuous yet manageable growth in demand was created (Kash & Calhoun, 2010). There was a great emphasis on manufacturing quality products, with some low cost elements attached to the products in the early 1950s, which subsequently led to the development of new management techniques, such as the ultimate supply chain management (SCM) in the late 1980s. SCM, which is the tool to systematise and tune the entire business process of getting components to manufacturers at the right volume, cost and quantity, is one of the revolutionary business inventions of the twentieth century. As such, the world has essentially assimilated the philosophy, processes and tools of the SCM, and world leaders barely notice the operation of the SCM within a modern organisation. This has consequently led to a state of market disequilibrium, in terms of supply and demand, particularly from the 1950s to 1990s, in the natural state of economy.

The reality was that the relative global equilibrium between supply and demand was itself a mere transition between one era and another. A number of global economic forces shaping the supply base included the increasing in aging population particularly in the developed world, poverty, rapid globalisation following the cold war, as well as the sudden burst of productivity, which was made possible by the rate of technological development and internet. With an economic boom in the 1990s, consumer spending continued to increase substantially and organisations responded with ramped-up operations and technological infrastructure. By 2000, the oversupply of products and services reached a drastically alarming level, with insufficient

demand to support the level of new businesses being created, resulting in a surplus of products and services, particularly in the automobile, residential real estate, airline and mineral resources industries.

To date, it remains true that the two pillars of business, namely demand and supply, still rule. The most successful people, the best strategies, and the winning organisations are still those that clearly understand the facts of demand and supply and its implications. Traditionally, putting supply before demand, with its implied precedence, was the correct approach to apply, but in today's business environment, there is a major shift taking place, predominantly driven by: (i) the cycles in the globalisation that would be faster than in the traditional way, (ii) oversupply in almost all major industries, and the FMCG is not exempted, (iii) a parallel loss of pricing power, (iv) consumers with a twenty-four hour access to precise pricing information, thus ending the power of information scarcity, (v) shorter product life cycles. The global economic crash that represented a global economic storm led many organisations to rethink the manner in which organisations are led. One of the consequential damages included the insolvency with catastrophic results in unemployment, which drove a further decrease in demand, given the extended conservativeness of consumers, shoppers and customers.

### **2.1.1.3 Demand-based economy**

According to a number of analysts and commentators, McKinsey's Dominic (2010), Kash and Calhoun (2010), King (2001), Kash (2002), and the existing position of demand contraction and flattening would not last forever. The business cycle will eventually restore confidence and prosperity to consumers, which will ameliorate some of the reduced demands. At the same time, some organisations had begun to cut their production while others have become victims of the crash, which in turn has begun to reduce supply, depending on the industry. It must be noted that these interventions will not address the underlying problems of the imbalance or disequilibrium of consumer demand and organisational capability to supply. In fact, it was stated at the 2011 World Economic Forum that this could become worse as two globally powerful economies, given the ramp up of manufacturing and production to support fragile prosperity, which increases the oversupply, in both India and China.

Although there is no evidence that the global economic arena will return to the position of a highly significant continued growth that was experienced in the last two decades or so, there seems to be a growing – and yet extremely volatile – future demand across most categories. As

demand grows more steadily, its gains would be challenged by continual increases in productivity and greater access to low-cost labour, electricity, and water. The consequence is that increasing pressure in costs, prices and profitability; and the organic growth which has always been difficult to achieve, becomes even more elusive.

In the next few years, organisations will face a period of hyper-competition, driven by cost-effective and innovative consumer demands. Thus, organisations that have competitively advantaged understanding of sustainable profitable demand would most likely be the winning organisations. In this transitional period, organisations are economically challenged as they enter into a new age and era that is characterised by a restructuring of the supply and demand known today, the one in which demand will both lead and direct all the processes associated to planning, finance, supply, manufacturing, logistics, sales and marketing.

As such, it is no longer enough to focus solely on growing one's market share, success would go to those organisations that focus intensively on understanding how to compete and win in an environment where the changing nature of demand is now dominant. Given the entrance into a long-term demand dominance position, it is now critical to have deep understanding of current, latent, and emerging demand. Finally, while the implications of this global economic inflection are already enormous, they are likely to be even greater in the immediate future. Thus Lean organisational thinking through the developmental transformation into a Lean enterprise becomes an unavoidable pre-requisite and business lifestyle.

## **2.1.2 Lean concept**

### **2.1.2.1 Background**

Quality management and business process improvement have always been integral parts of virtually all products and services. However, the awareness of its importance from a business perspective and the introduction of formal methods for quality control and business process improvement have been an evolutionary development.

At the beginning of the 20<sup>th</sup> century, science and most of business and industry were based on determination, that is, a widespread belief that physical laws and economic models of the real-world phenomenon were actually the true reality and that all that was needed to be able to perfectly predict future events was enough data so that physical constants in these models could be estimated precisely, Montgomery (2007). With sufficient data and the appropriate

equations, one could estimate future events with certainty. Some big successes in the 19<sup>th</sup> century drove this feeling. For instance, in the 1840s, Newton's methods were used to predict the existence of Neptune. This did much to enhance the belief in determinism. Science, business and industry dealt with things that were held constant, but one simply needed statistical data to be able to describe the exact phenomena.

In the academic world, courses on statistical mechanics began to emerge in physics and engineering curricula. The development of interchangeable parts as a manufacturing technique led to the origins of mass production in the late 1890s. Frederick W Taylor introduced some of the principles of scientific management as these mass production industries began to develop. Taylor pioneered dividing work into tasks so that a product could be manufactured and assembled more easily. His work led to substantial improvements in productivity. Also, due to standardised production and assembly methods, the quality of manufactured goods was positively impacted as well. However, along with the standardisation of work methods came the concept of work standards. Work standard may be viewed as the standard time to complete the work, or a specific number of units that must be produced per work design. As such, the product of this was the motion time measurement system used to set work standards. Much of this had a positive impact on productivity, but it often de-emphasised the quality aspect of work. Furthermore, if carried to extremes, work standards can potentially halt innovation, renovation and continuous improvements, which are a critical aspect of all work activities.

World War II saw an emergence of expanded use and acceptance of statistical quality control concepts in manufacturing industries. Wartime experience made it apparent that statistical techniques were necessary to control and improve product quality. The American Society for Quality Control was formed in 1946, but the 1950s to the 1960s saw the emergence of reliability of engineering, the introduction of several important textbooks on statistical quality control, and the viewpoint that quality is a way of managing a business, Montgomery and Woodall (2008). In the 1950s, designed experiments for products and process improvements were first introduced in the European continent and the USA. Despite the fact these designed experiments were predominantly developed and utilised to improve the efficiencies and effectiveness of agricultural environments, the method was later adopted in many other fields and industries.

### 2.1.2.2 Advanced Lean business improvement techniques

Since the 1980s, there has been extensive growth in the use of statistical methods for product and process quality improvements. This was motivated in the USA and Europe by widespread loss of business profitability and market shares by many organisations that began during the 1970s.

Given the loss of such business opportunities and market shares, various management techniques and systems have emerged as frameworks in which to implement quality improvement for products and services from the 1980s. Some of these techniques, classified as the foundational building blocks and toolkits for Lean, according to George et al (2005), George (2003), Montgomery & Woodall (2008), Perry & Bacon (2007), Welch & Welch (2005), Bruce and Daily (2004), John (2000), Womack & Jones (2005, 2005a & 2005b), include the following:

- Total Quality Management (TQM): designed to support the initiatives to deliver zero defect products.
- Define-Measure-Analyse-Improve and Control (DMAIC): which is a structured five-steps problem solving methodology (see Figure 2.4, in the list of Addendums).
- Kanban: which is an electronic signal managed in the form of data sent electronically from the point of sale to replenish inventory in a pull mechanism.
- Go-See-Think-Do (GSTD), which also incorporates the “5Ws toolkit” [meaning: Why, Why, Why, Why & Why?] is a methodology that leads people to go to the place where things or actions are happening.
- Design For Six Sigma (DFSS): being another structured approach efficiently commercialising technology that results in new products or services.
- Process Value Analysis and Focused Improvement (PVAFI): as a tool for process-mapping, redesign and optimisation as well as the identification, analysis and elimination of losses (see Figure 2.8).
- Autonomous Maintenance (AM): which also incorporate the 5S’s toolkit (Set {also means: organise}, Shine {also means: Cleaning}, Standardise, Sort {also mean: Clear}, Sustain {also means: discipline}, as highlighted in Figure 2.5). This is a tool that develops and empowers people to independently manage their production and manufacturing lines, as well as business processes in an autonomous manner (see Figure 2.6).
- Planned Maintenance (PM): being the manufacturing tool that is focused on achieving zero breakdowns and extending the equipment lifecycle (see Figure 2.7).

TQM has largely disappeared as a framework for quality improvement, while Six Sigma has flourished, and this is largely due to the emphasis that Six Sigma places on delivering bottom-line business results in addition to quality improvements. Institutions deploying Six Sigma employ specially trained individuals called black belts, green belts, and master black belts; and adopt a project-based approach, namely DMAIC, according to Montgomery & Woodall (2008) and Womack & Jones (2005). DFSS, on the other hand, is an extension of operational Six Sigma that takes the variability reduction and process improvements philosophy upstream from manufacturing into the product design process.

DFSS is a structured approach efficiently commercialising technology that results in new products or services. Customer inputs are obtained to determine their requirements, in order to understand if the business has the correct capabilities to meet those customer needs at a competitive price that will enable it to make profit.

Traditionally, DMAIC is used to achieve operational excellence, while DFSS is focused on improving business results by increasing the sales revenue generated from new products and services, and finding new application opportunities for the existing ones. In many cases, an important gain from DFSS is the reduction of development lead times or cycle times to commercialise new technologies and get the resulting new products to markets. DFSS is directly focused on increasing value in the organisation.

Overall business improvement cannot be achieved by focusing on reducing variability in manufacturing alone, and DFSS is required to focus on customer requirement while simultaneously keeping process capability in mind. Perry & Bacon (2007) stated that matching the production capability system and the requirements at each stage or level of the design process is essential. When mismatches between process capabilities and design requirements are discovered, either design changes or different production alternatives are considered to resolve the conflict.

Organisational improvement is most effective when approached in a holistic manner addressing improvement in all parts of the organisation, using holistic improvement methodology such as Lean. These improvements must address the flow of information and materials through processes as well the enhancement of value-adding process steps that create the product for the customer.

As indicated by many researchers and commentators, the foundations of Lean are in the Toyota Production Systems, created by Toyota founder Sakichi Toyoda, along with his son and engineer, namely Taiichi Ohno, many decades ago. The primary intention of introducing Lean was to drive the production of products with fewer resources, while simultaneously improving both the product quality and quantity.

### **2.1.2.3 Lean and business performance**

Businesses always seek for better ways to improve their bottom lines, and this has never been more critical than in difficult financial times. Approaches to a business improvement come and go but improving profitability or the bottom-line never disappears. Lean is the latest generation of driving institutional improvement and accelerating business performance.

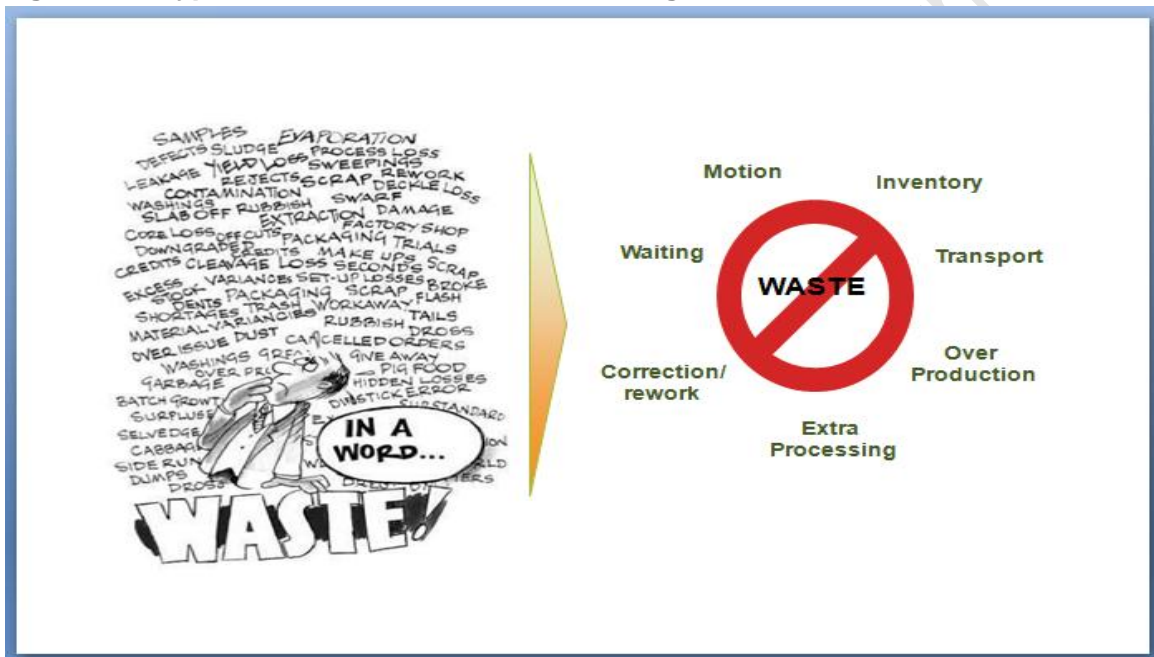
The commonly encountered improvement needs that are generally delivered through the adoption of Lean include the following: streamlining process flows to reduce complexities, decreasing downtime, shortening cycle time, reducing waste, improving product quality, achieving consistent product delivery, reduction in process and product costs, reduction in process variance such as on defective products, improved process control to maintain stability, and achievement of process and product robustness.

Many commentators argue that the state of process excellence is the ultimate objective of Lean. While Lean manufacturing from Toyota manufacturing systems has been around for decades, it did not get integrated with Six Sigma until the late 1990s and early 2000s according to George (2003). Lean manufacturing systems are designed to eliminate waste. Waste may be categorised as any business aspect that consumers are not willing to pay for. As demonstrated in Figure 2.1, these include unnecessary long cycle times, waiting time between value-adding and non-value-adding activities, correction or reworking, inventory, scrap, overproduction, motion, including the unused intellectual, one would also argue that transport is waste, Womack & Jones (2006), Beischel (1990), Womack & Jones (2005).

From the Retail perspective, the types of waste are also highlighted in Figure 2.3. Some types of waste, such as major stock-outs, are obvious, but others, such as non-availability of service staff for customer contact, may sometimes be less easy to spot. A number of diagnostic tools can help to identify waste and its causes. With these tools, retailers can analyse their

processes, inventories, staffing, and customers satisfactorily. Some of the Lean retailing toolkit elements described in the chapter on the Institutional Theoretical Framework are useful not only for identifying waste and its causes but also for visualising current weaknesses. Visualisations help all employees to see the weaknesses with their own eyes and recognise telltale signs of future trouble. For instance, just to restock ten products while a large share of the merchandise missing from the shelves is actually hidden somewhere in the backroom is waste. With the view that Lean is a toolkit to change hearts and minds, it is imperative for a retailer to understand that getting everyone to understand what can go wrong is what ultimately creates the will to change.

**Figure 2.1: Types of waste and non-value-adding activities for the manufacturer**



Source: Womack and Jones (2006), Beischel (1990), Womack and Jones (2005) – Modified.

A systematic approach to business improvement is needed to improve performance as measured by quality, operating costs, service delivery and customer satisfaction. Customer needs are forever changing and increasing. Organisational cash flow is a critical element of the success of any institution. Thus, the improvement of business profitability provides the cash needed to fuel innovation and sustainable profitable growth. Due to Lean's focus on getting the business bottom-line results, the identification of the business impact is an integral part of the methodology. Thus no Lean project should be approved unless the bottom-line impact has been identified.

Lean is a business strategy and methodology that increases process performance resulting in enhanced customer satisfaction and improved profitability. It is also recognised as an effective leadership development tool. Welch & Welch (2005) indicated that the greatest but most unheralded benefit of Lean is its capacity to develop a cadre of great leaders. One can argue that leaders are the enablers for an organisation to move from one paradigm to another; and with these types of business shifts, all categories of work processes get changed. As such, Lean provides the concepts, methodologies and necessary tools for the change processes, Womack & Jones (2005), and that it also integrates the human and process aspects of process improvement.

In order to ensure the sustainability of the intended improvement objectives, the focus on continuous leadership development, organisational goal alignment and compliance to internal control and processes are the pre-requisites as the key foundational pillars. As tabled in the chapter that deals with the Institutional Theoretical Framework, these would typically place emphasis on specific areas. For example, leadership development would include coaching, competence-building, capacity and capability-building, education and training; goal alignment would focus on key measures, performance indicators, management and operational reviews; while compliance would finally constitute policies, guidelines, best practices, and so on.

Given these paradigms, one could conclude that Lean is an effective leadership development tool in that it prepares leaders for their roles in driving and leading business transformation. Therefore, the primary features of this transformation include (i) integration of human and process elements of business improvements, (ii) a clear focus on getting bottom-line results in terms of profitability, and (iii) the method that sequences and links improvement tools into an overall approach. It has been demonstrated that organisations that considered deploying Lean effectively obtained the following results: large organisations had returns of up to 3% of sales per year whereas a return of up to 4% was noticed by smaller and medium-sized companies, Welch & Welch (2005).

#### **2.1.2.4 Manufacturing effectiveness as a measure of Lean Six Sigma capability**

The current paradigm for assessing manufacturing overall equipment effectiveness (OEE) is challenged as being anachronistic to the needs of business that now require more holistic indicators of plant and process effectiveness. The purpose of this section is to introduce a new framework that expands the original OEE measure to inform business performance at multiple

levels focusing on adding indicators of asset management effectiveness and process capability that can be benchmarked.

As businesses look to remain competitive in their market place, they must continuously improve their opens or face closure, as Abrahamson (2000) argues, it is simply a case of change or perish. Barney (1991) presents a useful framework for understanding how sustained competitive advantage can be achieved, arguing the exploitation of internal strengths must be matched to external environmental opportunities, while managing external threats and internal weaknesses. Focusing on an internal analysis perspective taking a resource-based view (RBV) of a firm (Wernerfelt, 1984), Wilk & Fensterseifer (2003) argue that competitive advantage can be realised through different amalgams of productive and strategic resources.

Wernerfelt (1984) suggests that resources are anything that could be thought of as the strengths or weaknesses of a given firm, defining resources as tangible and intangible assets, which are tied semi-permanently to the firm. Antecedent work by Penrose (1959) argues that resources bundled together render a service as an input to a production process and it is these bundles of resources – providing potential services – that are the sources of uniqueness in each individual firm. Penrose (1984) also suggested that unused productive services are a waste in that they are potentially free and therefore, if used profitably, can provide competitive advantage. Waste elimination is a key objective of the Lean production concept (Womack *et al*, 1990) and further developments of the Lean framework provide a useful approach for realising competitive advantage through waste elimination (Womack & Jones, 1994, 1996a& b; Jones & Womack, 2003).

Adopting the RBV internal analysis (Wernerfelt, 1984) with a view to exploit internal strengths, (Barney, 1991) focusing on the improvement of resource bundles (Penrose 19659) and waste elimination (Womack *et al*, 1990), the total productive maintenance (TPM) measure of overall equipment effectiveness (OEE) is introduced as a powerful benchmarking key performance indicator (KPI) focusing on three complementary plant/process efficiencies: availability, performance and quality (Jonsson & Lesshammar, 1999, Jeong & Phillips, 2001). Nakajima's (1988) seminal work introducing the concept of TPM argues TPM is the process and OEE is the measure for unlocking the hidden factory improving resource utilisation. As a measure of TPM implementation, Raouf (1994) argues OEE focuses on maximising production equipment effectiveness (PEE) delivering higher capital productivity. Dal *et al* (2000) suggests OEE can be

used as an operational measure as well as an indicator of the improvement of activities within a manufacturing environment. This is validated by the use of OEE as a measure within the Six Sigma define-measure-analyse-improve-control improvement process as presented by Gibbons (2006b). In relation to asset management, Ahuja & Khama (2008) suggest a main objective of OEE is to focus on reducing the total cost of ownership of assets.

Although the OEE measure is seen as a useful and powerful KPI, the system is not without criticisms warranting further investigation. A taxonomic and captious review of the Lean TPM and OEE literature that identifies the original framework for calculating OEE (Nakajima, 1988, 1999) is now seen as anachronistic to the needs of businesses who require a more holistic indicator of plant and process effectiveness (Ljungberg, 1998, Jonsson & Lesshammar, 1999, Jeong & Phillips, 2001; Parida & Kumar, 2006; Muchiri & Pintelon, 2008). The proposed framework introduces an indication of Six Sigma process capability using the extant data from the quality section of the OEE calculation and an indication of asset management effectiveness through indicators of asset reliability, availability and maintainability calculated using the extant data from the availability element of the OEE calculation. The benefits of these additions are realised through the internal and/or external benchmarking of performance levels against a given requirement driving continuous improvement based around objective data (Dal *et al*, 2000).

#### **2.1.2.5 Lean production and OEE**

Womack et al. (1990) argue the lean production concept combines the best elements of craft production with those of mass production offering a pluralist approach, which focuses on delivering reductions in costs per unit and dramatically improving quality while at the same time providing an ever wider range of products and ever more challenging work.

Quantifying the potential of the Lean production concept, Womack et al. (1990) proposes when compared to mass production, which the lean factory requires (a) half the human effort in the factory; (b) half the manufacturing space; (c) half the investment tools; (d) half the engineering hours; and (e) half the time to develop new products. Imai (1986) introduces Kaizen as a useful concept for understanding the application of tools within the Lean production framework. Operationalising the approach, Imai (1986) further argues that Kaizen is simply an umbrella concept covering most of the Japanese practices that have recently achieved world-wide fame.

More recently, Hines et al. (2004) introduced a useful framework for understanding the application of lean relationships with other operational level tools. The early conceptual work of Womack et al. (1990) with regard to the Lean production paradigm is presented as a sub-system of Lean thinking (Womack & Jones, 1996b) supplemented by other concepts including DMAIC, PVAFI, TPM and Six Sigma; all with the objective to eliminate waste.

At the strategic level, Lean thinking sits alone and is relevant to all aspects of the framework with the goal of understanding value creation and customer value. Therefore, the focus at the strategic level of Lean thinking is effectiveness and the focus at the operational level of Lean production is efficiency.

The concept of Lean thinking at a strategic level is operationalised by a set of principles summarised as the five steps to becoming Lean (Womack & Jones, 1996ba, b). These include (i) specification of value; (ii) the identification of the value stream; (iii) making the value-creating steps flow; (iv) promoting a pull culture; and (v) consistently pursuing perfection.

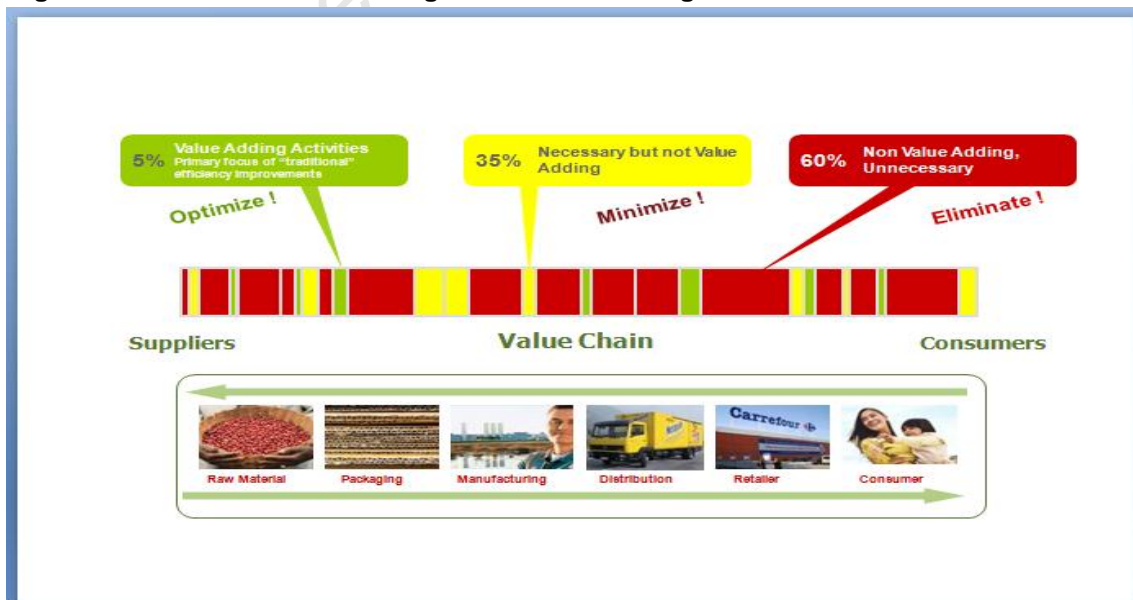
Supporting the waste elimination and value-adding (VA) focus of the lean principles, Womack & Jones (1996a) introduce the concept of customer value and define three categories which must be understood to improve a processes and activities: VA activities - that is what the customer expects to pay for; non-value-adding (NVA) activities - pure waste, what the customer does not expect to pay for; and those that are necessary but non-value-adding (NNVA) activities – which make reference to the inherent waste from existing practices that must happen to complete the process, what the customer does not expect to pay for. The segmentation and the various levels of VA, NVA and NNVA activities are presented in Figure 2.2.

Focusing on the TPM element of the Lean framework proposed by Hines et al. (2004) also introduced under the Kaizen umbrella proposed by Imai (1986) and Robinson & Ginder (1995) introduced TPM as a maintenance management initiative. Miyake et al. (1995) define TPM as a tool to maximise OEE as well as the process to transfer a great number of maintenance-related tasks to front-line operators, overthrowing the myth that dealing with “too complex” equipment is an exclusive competence of the well-qualified expert in the maintenance department. Nakajima (1988, 1989) introduces OEE as the measure of TPM used for collecting and analysing the combined effects of plant availability, performance and quality. Edward & Hartmann (1992) propose that within most plants there is a hidden factory offering some 25 to 30% more

capacity; they suggest TPM is the key that can unlock the hidden factory and OEE is the measure that allows a calculation to be made of the current equipment affiance and more important the improvement potential within the equipment. This is confirmed by Willmott & McCarthy (2000) who suggest that by combining the best individual results for availability, performance and quality, the proven potential of the equipment can be calculated and the best of OEE can be known.

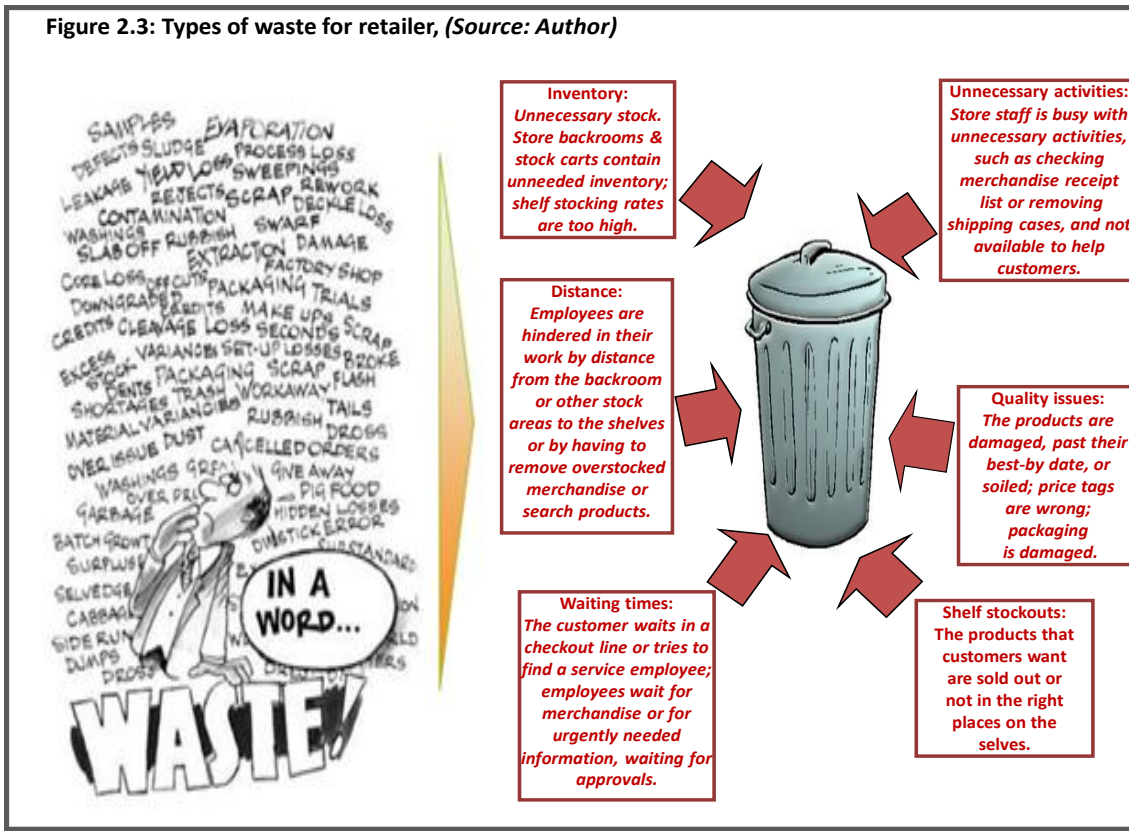
Robinson & Ginder (1995) define OEE as a measure of the effective utilisation of capital assets by expressing the impact of equipment losses based on seven types of equipment losses tracked in the OEE calculation. More specifically, looking the downtime due to machine breakdown; the time required for set-up and adjustments; the time or cycles lost to inefficient start-up; the time or cycles lost to tooling; the time or cycles lost to minor stoppages; operating at less than ideal speed; and finally, producing a defective or off-spec product that is rejected, requires rework or repair, or is sold at a lower price. *For example: With an assumption of a machine’s availability of 8 hours/10 hours, of the eight hours, the machine was run; two hours were lost due to minor stoppages and a slow cycle time: Performance = Of the six hours of output from the net operating time, two hours were lost due to rejects or rework: From the availability, performance and quality calculations, the OEE can now be calculated: OEE = The resultant OEE is therefore 40%, or four hours VA time from the 10 hours of plant operation and 12 hours of actual time available (if there was no planned down-time).*

**Figure 2.2: Levels of value-adding & non-value-adding activities.**



**Source:** Womack and Jones (1996a) – Restructured and modified

Figure 2.3: Types of waste for retailer, (Source: Author)



### 2.1.3 Lean supply chain

The Lean supply chain (LSC) can therefore be considered as an integrated process of driving all facets of the organisations to be aligned with the primary objective of reducing or eliminating waste and intensifying the focus on customer value creation; George (2003), Womack and Jones (2005). This is an operational and strategic management philosophy that effects the continuous regeneration of suppliers and service partners' network, empowered to execute superlative, unique customer-winning value at the lowest cost through the collaborative, real-time synchronisation of product movements, service delivery, demand and supply priorities, vital marketplace information and logistical delivery capabilities.

LSC seeks to reduce waste anywhere in the organisation, optimise core resources and establish a corporate culture dedicated to identifying and continuously fostering customer satisfaction. Its core principles guide the elimination of waste and the simplification of all manufacturing and business support processes. According to a study done by Ventana

Research (2007), the principles that create the foundation for a LSC include, but are not limited to the following.

### **2.1.3.1 The product values**

The product value should be defined from the customer's perspective, and not the company's. Thus making incorrect products with unsuitable quality, producing excessive or insufficient products, delivering them too slowly or through incorrect channels would only generate waste within the SC. The LSC focuses on improving products performance and quality while reducing costs. This often requires companies to reshape their processes, performance and the financial metrics that make up management scorecards. However, it is a significant mistake to view Lean solely as a cost-cutting strategy. The fundamental priority is finding better ways to deliver value to the customers.

### **2.1.3.2 The optimisation of the value stream**

The SC must flow consistently, along with reliable and accurate information that support it. Delays and discontinuations in the SC processes are generally caused by starting and stopping processes or information streams that could smooth processes if operated continuously. The value stream includes all activities required along the value fulfilment path, from product design to customer delivery on shelf. Optimising it is the task of product management and the goal is to identify the integral component process necessary to value generation. It has been long recognised that LSC originated from supply chain management. Over the past half century, this has evolved, through many stages, and has become a fundamental strategic component of today's leading institutional value chains. As shown in Table 2.1, LSC is a strategic management framework that drives execution to deliver unique customer winning value, at the lowest cost through the collaboration, real-time synchronisation of product transfers, demand and supply priorities, vital market place information as well as logistics delivery capabilities. However, given the evolving economic developments, it is inevitable that the Lean supply chain is now transforming into a Lean value chain. That is intensifying the focus on streamlining all business aspects, throughout the entire value stream, with a strategic intent of responding to the emerging demand economy.

The mapping of organisational value streams is the requisite of optimising value chain. The first map should be the visual representation of the current state of production processes everywhere in the organisation, from new product development, to manufacturing up to the retail

shelf shop floor level. It can assist all participants (management, engineers, production, schedulers, sales, marketing, planning, finance, suppliers, and customers) to recognise waste and identify its causes. A set future state map will then assist with improvement opportunities. The mapping of the manufacturing value stream marks the true beginning of the LSC, given the fact that this moves beyond the boundaries of manufacturing but to include all other internal functional departments, and suppliers and customers.

Table 2.1: Revolutionary stages of supply chain

Up to 1960s Stage 1	1970s - 1980s Stage 2	1980s - 1990s Stage 3	1990s - 1999 Stage 4	2000 - 2010 Stage 5	2011 - Beyond Stage 6
Warehousing & Transportation	Total Cost Management	Integrated Logistics Management	Supply Chain Management	Lean Supply Chain Management	<b>Lean VALUE Chain Management</b>
<i>Management Focus:</i> Operations Performance Efficiencies.	<i>Management Focus:</i> Optimizing Operations Cost & Customer Service.	<i>Management Focus:</i> Tactics/Strategies Logistics Planning.	<i>Management Focus:</i> Supply Chain Strategies, Channel Co-evolution, Goals.	<i>Management Focus:</i> Internet, e-Business, e-Marketing, SCM Synchronization, Value for money.	<i>Management Focus:</i> <b>Demand economy, Shared resources/assets, Green economy, End2end value chain, Network reconfiguration.</b>
<i>Organization Design:</i> Decentralized Functions.	<i>Organization Design:</i> Centralized Functions.	<i>Organization Design:</i> Integration of Logistics Functions.	<i>Organization Design:</i> Partnering Virtual Organization, Market co-evolution.	<i>Organization Design:</i> Networked Channel .coms Exchange, Agility/Scalability.	<i>Organization Design:</i> <b>Inter-organisational, Customer facing, Global alignment.</b>

### 2.1.3.3 Converting the process to flow

The flow principle underlies Lean operations management, including the entire supply chain. Once waste is removed or minimised from the system, the objective is to transform all the steps involved in making the products, both within and outside the organisation, from lot-size production to flow, in such a way that it continues small-lot production to on-shelf availability; Perry and Bacon (2007), Dal et al. (2000). Such small-lot frequently run transform batch-queue thinking, and the respective production batch planning and costing paradigms with their efficiency performance measurements that serve to impede flow. Thus Lean accounting and performance measurement practices replace obsolete batch production management practices.

#### **2.1.3.4 The activation of the demand pull**

All products and services should be pulled by consumers and customers, and not pushed by the company. As such, no part of the SC should be expedited without a clear understanding of the demand destination of the final products and service that would complete the cycle. The ability to design, schedule, build and deliver to customer demand pulls product through the production process and supply chain. Demand-based manufacturing and supply chain achieves the most stable and efficient work flow without the inevitable guesswork and imprecision of forecasting, costly price and discounting campaigns, and excess inventory caused by the bullwhip effect. Demand pull production also diminishes all forms of processing lead time. Furthermore, activating demand pull means discontinuing the use of forecasts for planning and production execution. Although this may seem as a radical risk or even impossible to many organisations whose present supply chain practices are forecast-based, Jeong and Phillips (2001) argued that it in fact generates more rewards than risks, but the transition may take time, practice and cooperation among the supplier-manufacturer-retailer ecosystem. This topic is discussed in detail in the next chapter, [under section 2.2 – Demand-driven supply chain].

#### **2.1.3.5 Perfecting the products, process and cultural change**

This requires the entire organisation to manage towards continuous improvement, whilst concentrating on eradicating waste and creating customer value. Lean should not be considered as a project; it is instead a long-term initiative and this requires a clear Lean SC strategy. A pull-based supply chain exposes waste and barriers in the flow for resolution, more value and more avenues to create customer value and present themselves in what becomes a perpetual improvement cycle. Schuidt and Wilhelm (2000) confirmed that Lean technologies and processes also present radical change in operations and corporate culture. Thus pull simplifies processes and creates transparency where all supply chain partners can participate interactively in enhancing customer value.

Ventana Research (2007) also highlighted some of the attributes that must be considered as integral elements to Lean. These include the following:

- Demand management: Lean's implementation requires that all suppliers and stakeholders within the SC receive demand signals generated from customers. This should not come from within the company and turn those signals into elements of saleable products and services.

- **Standardisation:** The standardisation of products, services and processes is critical to support the continuous flow of goods that Lean requires. A standardised process enables several products and services to respond to customer demands with greater speed. Product standardisation allows the company to be locked with one supplier of specific components and enable the use of the same component in many manufactured products. Industrial standardisation on the other hand assists the reduction of waste within the SC by reducing the complexity and development costs of products and product variation through interchangeability; this also reduces the cost of acquiring and processing information.
- **Collaboration:** Extended collaboration within the organisation and with both suppliers and customers is critical to Lean's success; for instance, customer collaboration enables demand signals to be transmitted efficiently throughout the SC, in order to drive reliable demand and supply planning.
- **Cultural change:** Lean's roll-out requires a shift in mindset. All stakeholders need to concentrate on waste management and it is expected that this becomes the new modus operandi for the entire organisation.

#### **2.1.3.6 The strategic value of Lean principles**

Generally associated with manufacturing environments, Lean is much more than a manufacturing strategy. Although its roots lie in manufacturing operations, Lean is a business philosophy that can be practised in all disciplines of an organisation. This philosophy offers powerful benefits to enterprise employees, upstream suppliers, and downstream customers. The need for external collaboration is absolutely vital to a Lean enterprise because all activities must be viewed holistically for true success. A number of commentators such as Hines et al. (2004) and Welch & Welch (2005) now agree that the synergies available between that physical and operational Lean strategies, combined with today's software technology, offer tremendous value in reducing costs, increasing revenue, and optimising assets – the three pillars of profit maximisation. The combination of these Lean principles and software technology holds the promise of revolutionising the way business is conducted.

Value in a Lean world can be simply defined as profitably meeting or exceeding the customer's requirements and expectations. Eliminating waste in every aspect of business provides real value to the customer. A common and pervasive Lean vision and culture must come from the top and permeate through to every individual in the organisation. Equally vital is a deep understanding of who the customer is at every level of the organisation. Achieving significant

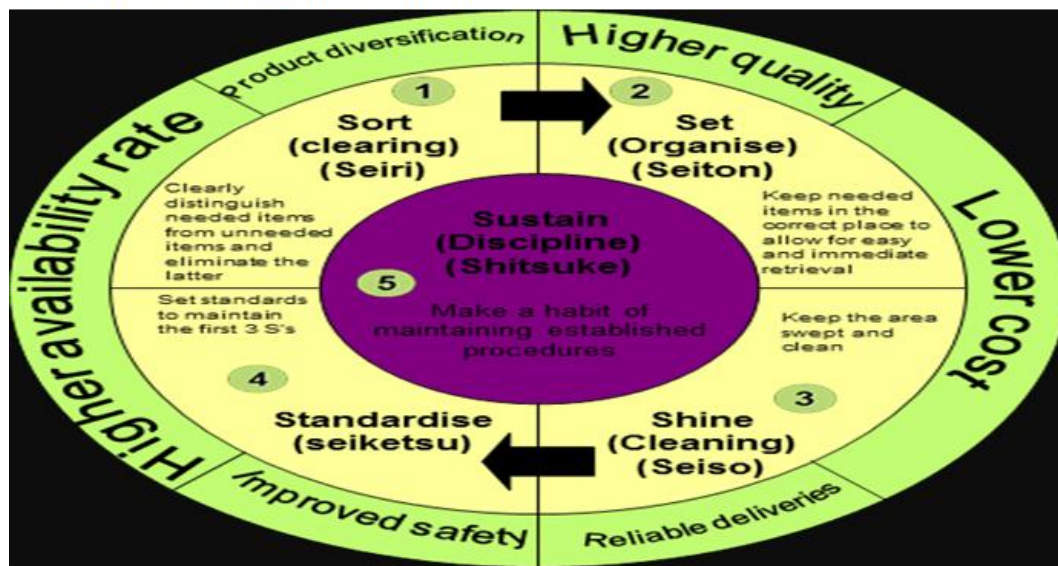
and continuous improvement in performance requires the creation of a team environment to facilitate the concept of total value creation.

### 2.1.3.7 Flow manufacturing

The debates about flow manufacturing entail arranging and defining manufacturing resources so that products flow most efficiently through the production process. A product is typically built sequentially, one unit at a time, at the optimally designed rate, Barker (1994) and Christopher (2000). Many commentators have stated that this process is in stark contrast to the movement of products through multiple functional areas or work centres that run large batch jobs. Flow lines are more like factories within a factory that produce a single item or “one piece flow” from start to finish in one cell. Materials, machines, and labour processes are designed to ensure that all transportation and movement are reduced to an absolute minimum; Christopher (2005), Drucker (1963), Dalf (1978), Dyer (1997), Barker (1994) and Levy (1997).

Small-lot sizes, significantly reduced setup times, tight supplier conformance, and increased discipline are all typical to flow. Flow manufacturing draws from numerous strategies that support the Lean principles, for example, the adoption of the Five Ss as portrayed in Figure 2.5, as well as the Six Sigma, form integral parts of streamlining manufacturing lines, supported by production scheduling, warehousing and inventory management, as explained below.

Figure 2.5: The Five Ss and Six Sigma approach



Source: Studied Manufacturer – restructured & modified during the Action-based case research (2011).

Typically attributed to the Toyota Production System, the overriding idea behind the Five Ss is that there is “a place for everything and everything goes in its place.” Every item that is used in a business process is clearly labelled and easily accessible. This requires discipline, simplicity, pride, standardisation, and repeatability as specific implementation principles.

On the other hand, the implementation of Six Sigma can achieve dramatic improvement in business performance through a precise understanding of customer requirements and the elimination of defects from existing processes, products and services. In order for one to fully embrace Six Sigma, an organisation must work intimately with all internal disciplines in addition to external suppliers and customers. This supports Lean by enabling collaborative design and shared business processes in both inter- and intra-company relationships.

#### **2.1.3.8 Shop floor management and production scheduling**

Kanbans can be preflushed, backflushed, at multiple pay-points, or super backflushed, depending on the material, demand, and accounting requirements. Manual and electronic kanban signals can be used to drive production and component replenishment both inside the plant and with the suppliers on the retailer. Management helps execute the production plan that supports the inventory, cost, quality, and lead-time objectives required to meet customer expectations. Womack & Womack (2005) advocated that production scheduling helps ensure that manufacturing processes are sequenced correctly based on demand and capacity availability so that operations are run as quickly and smoothly as possible. Inherent to the line design function of flow manufacturing is constraint- based production scheduling to identify and optimise potential bottlenecks. Creating feasible, optimised production schedules for complex products can be exceptionally difficult, even with excellent upfront line design and a flattened bill of materials.

#### **2.1.3.9 Procurement and inventory management**

In Lean procurement, purchase-to-delivery cycles must be short, purchase orders easy to track, and vendor performance simple to verify through an online review of material inspection status, which allows for immediate resolution of quality issues plus product availability. And, integrated supplier analysis facilitates consolidation of suppliers to only those that maintain the best price, lead-time, and quality performance over time, according to Dal et al. (2000). Furthermore, managing on-site physical inventory is better described as managing information about inventory anywhere in the supply chain. Instant access to total inventory visibility with laser

accuracy of product quantities and locations within the facility and throughout the Lean supply chain may be fully supported with real-time Kanban and supplier real-time scheduling, which are important flow tactics that help provide precise alignment of supply and demand.

#### **2.1.3.10 Warehouse and transport management**

Optimising physical space, material handling, and employee movement are essential flow activities. Such user-configured, rules-based software helps automate storage and handling decisions in a Lean environment. Optimum move path sequences can be determined to ensure maximum efficiency. Warehouse space and material handling time can be dramatically reduced with strategies like cross-docking and wave-picking. Warehouse management also speeds up packaging and delivery of products to individual customer specifications. As a result of customer demand for faster and more accurate deliveries, the emphasis is on accelerating product flow to save time and reduce cost. Warehouse technology is critical to profitably meeting delivery requirements such as order assembly, packaging requirements, and compliance labelling.

With Lean transportation management, customers can be automated in such a manner that would deliver better freight rates, routes, modes, carriers, and service levels (Porida and Kumar (2006). Full visibility into demand management, order entry, order processing, warehousing, inventory management, and financials mean that all costs associated with every aspect of every inbound and outbound shipment can be tied directly back to the responsible activity.

#### **2.1.4 Green, Lean, and global supply chains**

Three supply chain trends, in particular, are converging to create an increasingly complex business environment: a move towards green initiatives, the utilisation of lean processes, and globalisation. The globalisation of supply chains involves dimensions such as offshoring of production, inventories, suppliers and customers, and differences in economies, infrastructures, cultures, and politics in the competitive environment (Manuj & Mentzer, 2008; Schmidt & Wilhelm, 2000; Christopher, 2005).

Lean practices are becoming increasingly challenging to implement and sustain as today's globalised supply chains increase in complexity and length, compounded by green and environment requirements. Green supply chain strategies refer to efforts to minimise the negative impact of firms and their supply chains on the natural environment. In the wake of concerns regarding climate change, pollution, and non-renewable resource constraints, firms

are heeding stakeholder demands regarding corporate citizenship behaviour and performance (Sarkis, 2001; De Burgos Jimenez & Cespedes Lorente, 2001). A green supply chain focus requires working with suppliers and customers, analysis of internal operations and extended stewardship across the life cycles of products (Corbett & Klassen, 2006; Mollenkopf, 2006).

When Lean initiatives enable only demanded volumes to flow through the supply chain (and not the safety stock and extra inventory associated with non-lean supply chains), a reduced amount of inventory needs to be sourced, produced, transported, packaged and handled, which also minimises the negative environmental impact of the supply chain. However, Lean strategies that employ just-in-time (JIT) delivery of small-lot sizes can require increased transportation, packaging, and handling that may contradict a green approach. By recognising this conflict, firms may be able to identify tradeoffs or develop solutions that mitigate undesirable consequences.

Successful implementation of Lean and global supply chain strategies is predicated on the benefits of close buyer-supplier's relationships. However, there are several areas of conflict between lean and global supply chain strategies. In fact, Womack & Jones (1996) have suggested that Lean production is not compatible with global supply chains. Lean supply chains demand low inventory and frequent deliveries, whereas global supply chains require higher inventory because of longer transit times; this reduces the flexibility gained through Lean supply chain strategies. Finally, global supply chains traditionally use push methods, while Lean is more compatible with pull methods of inventory control. These conflicting inventory control methods often create trade-offs.

However, there is evidence that Lean and global supply chain strategies can be complimentary. When Lean is utilised as a supply chain strategy, Lean production, and Lean initiatives such as continuous improvement can be optimised along the global supply chain, whether through localised operations, postponement, or league strategies (Goldsby et al., 2006; Christopher, 2005). Firms use legality and postponement to implement Lean supply chain strategies within a global context (Bruce & Daly, 2004; Christopher, 2000; Yang & Burns, 2003; Aitken et al., 2002). In particular, a firm in the precision mechanical products industry may use an integrated-demand planning system to synchronise requirements for global manufacturing locations on a weekly basis, thus enabling physical distribution in the global supply chain to be aligned with actual demand (Mason-Jones et al., 2000). For example, Hewlett Packard (HP) shifted

production processes to fit the Lean model by customising the printers in each local market, thus providing a 25% reduction in total manufacturing, transportation, and inventory costs (Van Hoek et al., 1999). Wal-Mart however, had difficulty applying its Lean supply chain model in a global context. The logistics applications associated with Wal-Mart's success in the USA did not produce the same savings in Germany. Customers in the German market wanted neighbourhood stores, which did not work with the Lean model used with the large retail format common in the USA (Christopherson, 2007).

Although some Lean and global supply practices are incompatible, firms have used principles from Lean process management to improve their global supply chain efficiency (Das and Handfield, 1997). Bose, Kawasaki, and Ford have been successful at combining Lean and global sourcing strategies through careful logistics planning, shipment consolidation, and create separate warehouses for inventory holding to create a JIT scenario, although they have found it almost impossible to have a pure JIT system in their global supply chains (Das & Handfield, 1997). Apple uses "vendor hubs" managed by its shipping firms and foreign suppliers to warehouse parts from all over the world to serve its European operations. This allows Apple to utilise a JIT approach locally, while still sourcing globally, saving millions in inventory expense (Fyness & Ainamo, 1998). Other firms in the computer industry use a similar push-pull inventory strategy (Berry & Naim, 1996). While the barriers discussed make it difficult to implement a lean and global supply chain, the quality control and communications principles of lean and global supply chain, and the quality control and communication principles of lean management prove beneficial to the global supply chain, if strategically implemented.

### **2.1.5 Product value chain**

From a product supply chain point of view, it has been argued that the entire product value chain has become catalysed by the improvements made to the national and global information infrastructures, and the current economic effervescence is subsequently leading the way to major structural changes within our society. Many have described this revolution as the rise of the information society (OECD, 1997), the knowledge-based economy (Neef, 1998) or the global-networked economy (Mansell, 1993). Since transactions, information exchange and business activities are increasingly relying on electronic means, the terms digital economy (Tapscott, 1998) and virtual economy (Lefebvre & Lefebvre, 1998) have recently been put forward, and the business press usually refers to the new economy.

Regardless of the name that will be sanctified by history, a consensus exists among most authors: the emerging economic order has imposed changes to the very way companies are doing business. It is, therefore, argued in this section that there are three major overlapping competitive forces: namely, (i) the predominance of knowledge-based activities, (ii) an increasing propensity for velocity, and (iii) the creation of unique value for specific final customers, are shaping this new economy. These three imperatives have gained momentum lately due to technological catalysts such as internet-based tools, enterprise resource planning systems and supply chain management software. These three competitive forces are briefly individually discussed in the below sections, highlighting a number of points and main issues.

- **The predominance of knowledge-based activities**

It was articulated that the basic rules of competitiveness have changed: knowledge is now considered as the most important economic input (Morck and Yeung, 2000) and the most strategically significant resource of the firm (Grant, 1996: 375). In fact, today knowledge plays in all its forms a crucial role in economic processes. Intangible investments are growing more rapidly than physical investment. Individuals with more knowledge get better paid jobs, firms with more knowledge are winners on markets, and nations endowed with more knowledge are more productive. At the firm level, the value added to products (manufactured goods or services) is derived mainly from intelligence, brainpower or knowledge-based activities. Even manufacturing firms, which are obviously involved in physical activities such as assembly, are increasingly relying on knowledge-based activities, which typically account for 65% to 90% of the value delivered to the final customer (Quinn, 1992).

As the world economy becomes more integrated, the global value networks also accelerate the recruitment of the global best-in-class competencies in order to realise their intellectual activities (Quinn, 1992). Each activity of a product value chain can therefore be accomplished by a world-class supplier owning the very best know-how in a specific field of expertise. This leads the value networks to achieve an undeniable competitive advantage as they become consortiums of best-in-world suppliers of competencies.

Knowledge-based activities fall in the virtual world made of information (Rayport & Sviokla, 1995) and thus rely extensively on electronic integration, both internally and externally. First, they require the optimal and efficient use of information technologies with firms, an information-sharing capacity among the functional managers and employees (for instance, with enterprise-

wide system such as ERP) and, in the case of larger firms, the presence of an intranet. In fact, the ERP market has been booming and the intranet market is growing at an annual rate of 49%. Second, high levels of electronic integration between firms are also required by emergence of value networks, where business partners (suppliers, subcontractors, manufacturers, sellers, buyers, and distributors, etc.) pool core competencies in order to give added value to the final customer. These virtual value networks, networks of competences or virtual enterprises (Lefebvre & Lefebvre, 1998; Venkatraman & Henderson, 1998) manage all activities along the entire product value chain (i.e. activities related to sourcing, production, transportation and delivery of a final product) as well as the flow of goods, information and services from the suppliers' suppliers to the customers' customers (Kalakota & Winston, 1997). Value networks are therefore centred on the product, which becomes the new unit of analysis. Their competition is critically dependent on the knowledge-based activities required to cope with this complex web of commercial and non-commercial interactions.

- **An ever-increasing propensity for velocity**

The approach on time-based competition has been around for some time (Blackburn, 1991). The recent emergence of value networks entails a new meaning for speed or, more appropriately, velocity. Velocity can be defined as the optimal speed at which physical and virtual interactions must take place in order to reach the market at the customer's desired place and time (Magretta, 1998a, 1998b). Velocity is a self-reinforcing phenomenon, which leads to increasingly higher customer expectations. Today's customers anticipate an immediate or a twenty-four hour response for any of their on-line or off-line requests.

In order to meet the velocity challenge, business partners in a value chain need to optimise their interactions. The velocity of a supply chain appears to be a function of four dimensions: time to market, order cycle speed, inventory turnover, and speed to next product line. Speed-to-market is a traditional concept which corresponds to the time required to identify an opportunity, create a new product, ramp it up and bring it to market. Order cycle speed is the time period between the moment the customer places the order and the time he or she receives the product. Inventory turnover, also a well-known concept, refers to the number of replenishments during a given period.

Finally, speed to the next product line represents the overall time required to empty the supply chain pipeline of a certain product line so that it does not cannibalise the introduction of a new

line. These four dimensions boost the velocity of a product value chain and provide competitive advantages for the business partners involved. For example, Dell Computers has recently shown excellent profitability while competing on velocity: its inventory turnover is only 11 days, it offers a very short order cycle time and it introduces new products at an average of 69 days sooner than its competitors without cannibalising its former product lines (Magretta, 1998a; APICS, 1999).

- **Creation of unique value for specific final customers**

Customers are not satisfied with speed alone, they want quality and low cost and are increasingly looking for personalised products and interactive services that suit their own needs, requirements and personalities (Feitzinger and Lee, 1997). To fulfil these expectations, it is critical that the process leading to the realisation of a product or a service be designed in such a way that it can produce hundreds, even thousands, of different variations of a specific product or service. However, although mass customisation reinforces the product-centric orientation of the new economy, customised offerings should not be provided at the cost of losing the economies of scale normally associated with mass production. This is the reason why business partners within a product value chain must integrate their inter-organisational processes in order to implement and sustain the concept of mass customisation. Successful mass customisation relies on the capacity of all business partners to constantly maintain a focus on each client's specific needs and to introduce these needs at each stage of the product value chain.

### **2.1.6 Conclusion**

Lean is a philosophy pioneered by Toyota Motors, categorised as the machine that changed the world. It is based on the elimination of waste, driving continuous improvements of productivity and service delivery as well as enabling the delivery of a consistent customer value creation. Waste is classified as the consumption of organisational resources and time on activities that do not add value to the customer or consumer. The management of demand, along with the standardisation of processes and products, while driving cultural changes within the organisation collaboratively are all key success factors in the institutionalisation of the Lean management technique. An LSC network is empowered to execute superlative, unique customer-winning value at the lowest possible cost, through the collaborative, real-time synchronisation of product transfer, demand priorities, vital market place information, and logistics delivery capability.

## **Section 2.2: Demand-driven supply chain**

### **2.2.1 Introduction**

This section will focus on the end-to-end process management with the primary purpose of improving the linkages between internal processes and supply chain management, which has been about improving the linkages between firms, as an attempt to create demand-driven supply chain organisations. In today's highly competitive world successful business need to reinvent itself almost continuously. While global deregulation in many industries is opening markets to the entry of new competitors, corporate expansion and the development of global cultures are driving standardisation of business practices. As such, the reliance on cooperation between customers, suppliers, retailers and other partners is extensively based on the market demands.

### **2.2.2 Process-based management approaches**

Business process management (BPM) is considered to be a more general approach to organisational improvement. Zairi (1997) defines BPM as a structured approach to analyse and continually improve fundamental activities such as manufacturing, marketing, communications and other major elements of a company's operation. De Toro & McCabe (1997) stress the cross-functional nature of process management and highlight the need for empowered employees to have the authority to examine, challenge and change work methods. Empowerment has long been one of the stumbling blocks of process-focused management. Many employees are uncomfortable with empowerment, and many managers are reluctant to relinquish their traditional control.

However, business management and process improvement is not a once-off activity, but should be treated as a "plan, do, check, act" cycle. The path to business improvement must be an on-going series of radical adjustment; each followed by an assessment and a refinement to supporting processes. Business process management cannot be about a short-term improvement, and should not be about a gradual improvement. To maintain leadership in a fast-changing world, a world-class organisation must continually reinvent itself (Sethi & King, 1998).

The success of BPM depends on the strength of the key organisational drivers, which create the impetus for change (Peppard & Rowland, 1995). Armistead et al. (1997) identify five factors as

the main drivers of process change namely: (i) globalisation; (ii) changing technology; (iii) regulation; (iv) action of stakeholders; and (v) the eroding of business boundaries.

A recent survey of Northern Ireland's "Top 100" companies (Hill & Collins, (1998) offered three states of competitiveness, which drive managers towards considering process improvement methods. These include (1) a company in crisis; (2) a company in a strong competitive position, but envisaging greater competition in the future, and (3) a company in a strong position, and wanting to capitalise on that position. This survey indicated that that the threat of future competition was stated by nearly half of the respondents as the main reason for redesigning business processes, while less than 10% claimed that crisis was a driver. These findings support the view of Ryan (1994).

From a supply chain integration's perspective, it has been observed that many successful organisations have been co-operating with partners in their supply chains since the mid-1980s, according to Porter (1987). This cooperating and related outsourcing of non-core competencies (Hamel & Prahalad, 1989) have created inter-organisational networks. Zara, the Italian retailer, for example, is able to respond to rapidly changing customer demands, particularly seasonal changes in fashion colours, by coordinating their own activities and their suppliers' activities (Christopher, 1992). Toyota as the pioneer of the Lean production and just-in-time principles optimised this process by encouraging suppliers to operate nearby, and monitor stock levels directly to drive continuous direct line replacement. This innovation allows rapid response to changing customer demands, and eliminates the cost of holding just-in-case stock. Christopher (1992) defines supply chain management as the requirement to extend the logic of logistics integration outside the boundaries of the firm to include suppliers and customers.

Cooper et al. (1997) go further and define supply chain management as a philosophy for integrating all the activities in the life of a product or a service from the earliest source of raw materials to the ultimate customer, and beyond to disposal. They suggest that this value system is best represented by a value tree where the organisation is represented by the trunk, the branches represent multiple suppliers and the roots multiple customers. Any given path through the tree defines particular supply chain. Customer focus is an integral part of the supply chain philosophy. Every part of the supply chain must have the same mission: to satisfy the final customer and to maximise the value added by the overall chain. This implies a change in the traditional power structure seen in organisations. The most powerful employees are those in

direct contact with the final customer. This inverts the traditional organisational structure (Doyle, 1994).

The concept of integration within the functions of a firm can be represented by Porter's value chain (Porter, 1987). Porter looked at the firm as a collection of key functional activities that could be separated and identified as primary activities (inbound logistics, operations, outbound logistics, marketing and sales, and service) or support activities (infrastructure, human resource management, technology development, and procurement). He arranged these activities in the value chain. Maximising the linkages between the activities, maximises the efficiency of the firm and so the margin available for increasing competitive advantage or for adding shareholder value.

According to Doyle (1998), a well-organised supply chain leads to increased efficiencies, faster response to market changes, better design and manufacturing processes, and increased productivity. However, it is worth stating that the value chain integration model does not come without shortcomings in the context of poor consideration of the planning function. It's important to recognise the strategic role played by the planning function, with particular focus to demand and supply planning (D&SP), or sales and operating planning, as described by other researchers and commentators. The D&SP elements that form part of the end-to-end integrated process and collaboration are explained in the next section.

### **2.2.3 Customer demand-pull management**

The key to success in today's customer demand management is to develop a hypothesis about the future of demand while it is still forming; Christaanse and Kumar (2000). That is, while the competitors are asking questions about the present demand, winning organisations attempt to determine where future demand will be, in the context of short-, medium- and long-term outlook.

These organisations devote all energies and resources to looking not just at current, but latent and emerging demand; more specifically, concentrating on many levels, such as: (i) the use of macroeconomics to look across multiple markets, to draw potential lessons; (ii) assess the customer and consumer trends to anticipate how to interact with emerging trends; (iii) review the adjacent categories to identify best practices, successes, and failures from business similar to the customer; (iv) look at the most profitable segments with other customers to detect even small variations in their behaviour and buying patterns; and (v) take advantage of the real-time ability

to get an overview of the emerging opportunities through the use of technologies to access new insights with reference to the consumers or product categories (Kash,2002, Kash & Calhoun, 2010).

The combination of all these investigations enables a demand-orientated organisation to formulate a new hypothesis about the future direction of the consumer demand, and to make these hypotheses more insightful and more future-oriented than any other insight that one could receive from merely asking the customers.

Kash (20002) reported that a pull system is a production scheduling method in which materials are pulled only when they are needed. Sometimes referred to as a postponement strategy, a sales order pulls work off a shop floor, instead of a work order pushing activity through a facility. The idea is to keep the time spent producing parts as close as possible to the time when the parts are needed. Need in a Lean environment is typically associated with true demand or a real live customer sales order. In a pull environment, finished goods inventories are non-existent or extremely limited. When a product is made available, it is typically shipped out quickly without spending time tying up cash in finished goods inventory.

As highlighted in Figure 3.1, a demand-pull process is the Lean transformation, and it requires level loading or balanced flow to be successful. Level loading describes a continuous stream of products through the manufacturing process arranged for the most effective application of resources based on existing demand. Without level loading and line balancing, pull systems would demand a chase or hire and fire capacity strategy. Basically, these ideas are diametrically opposed to the Lean principles. An organisation that chases demand by hiring employees when demand is high and laying off the same employees when demand is low does not grasp Lean concepts and eliminates the need for this type of behaviour.

Supplier and customer partnerships are essential for a pull system to be effective. Partnerships are stable, long-term relationships between companies focusing on reducing costs for everyone through shared quality goals, shared design responsibility, frequent deliveries, and continual reviews. For a pull system to be effective, (Kash and Calhoun 2010), intimate and open communication with suppliers and customers is mandatory. The commonly held principle that any waste passed to a supplier or to a customer always returns to the originator in the form of cost is the foundation of demand-pull partnerships. On the customer side, timely demand

requirements must be communicated accurately for the manufacturer to be able to react accordingly. On the supply side, capacity and resource constraints must be visible so that the consuming manufacturer can respond to any disruptions in supply. The proliferation of communication tools available via the internet has dramatically elevated the level of collaboration possible among trading partners.

In an attempt to streamline demand planning processes when organisations are under capacity constraints, collaborative planning and constraint-based statistical forecast generation go far beyond the traditional forecasting, and this eventually opens a world of opportunities for a demand-pull system. Automatic demand generation is driven directly from sales orders, while the associated bill of materials and purchase orders can also be initiated automatically. This leads to the customers' requirements being brought closer, enabling higher customer satisfaction and increased market share.

#### **2.2.4 Demand and supply planning: a supply chain essential**

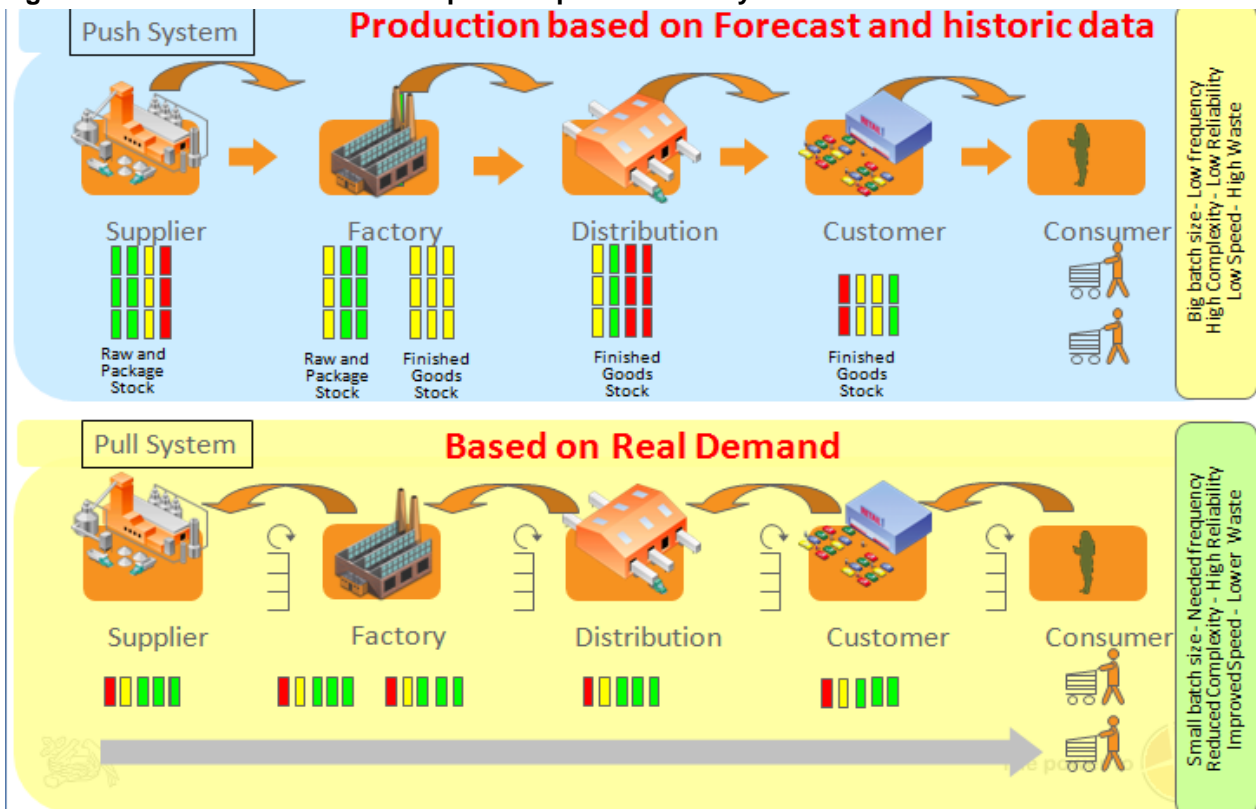
Demand and supply planning (D&SP), as a forecasting platform, is a critical consideration for manufacturers, distributors, retailers, and other supply chain members. It is a central activity for many mid- to senior-level executives who manage their companies' supply chain activities as well as those specialists responsible for developing and monitoring sales to forecasts, schedules, and budgets.

Yet, despite the importance of demand planning and sales forecasting, a lack of communication within the company's functional areas and across trading partners often leads to separate and disjointed forecasts. To compensate for these uncoordinated forecasts and the related negative impacts on customer service, companies often resort to building excess inventories and fixed assets. Consequently, they turn to expensive, inefficient and uncompetitive premium logistics.

As an attempt to understand the specific challenges faced by practitioners seeking to implement an effective D&SP process, the answers are embodied in set of questions. Some of these include the following: *How can customers be integrated with other supply chain members to realise supply chain efficiencies? What role does the sharing of business plans and schedules play in demand planning and sales forecasting? What information technologies enable the realisation of DP&SF goals? How do vendor- or supplier-managed Inventories (VMI/SMI) relate to demand planning and sales forecasting? How do channel members share the cost of*

*inaccurate forecasts in terms of buybacks, reverse logistics of returns, ineffective promotional campaigns, and the costs of improved D&SP? What metrics should be used to monitor improvement of the forecasting process? How can top management be sold on the ROI opportunities from these techniques and processes?*

**Figure 3.1: The difference between pull and pull-demand system.**



Source: Nestle Brazil, 2011

#### 2.2.4.1 The D&SP framework

Demand and supply planning is receiving much attention in the literature as well as in educational programmes and conferences. Christaanse and Kumar (2000)'s commented that this D&SP topic is most often addressed as (1) an approach focused on the use of statistical forecasting tools; (2) an operations planning and budgeting process; (3) an approach in which trading partners share production and operations schedules, data on sales activity, and/or information on inventory levels through VMI collaborative practices; (4) an overall business planning and market forecasting approach; (5) a behavioural approach requiring a forecasting champion and consensus team actions; and (6) as a step-by-step process flow to link and reconcile supply chain member forecasts.

Advocates often make the argument for their particular approach to D&SP without adequately identifying the linkages to the other perspectives. What is however needed, according to Barrat and Oliveira (2001) and Zairi (1997), is a structured approach to identifying those linkages that gives forecasters and planners direction on when to use the alternative techniques. As such, the development of a top-management event flowchart integrates the various decision levels of D&SP. The flowchart, shown in Figure 3.2 (see List of Addendums), illustrates how forecasting at five alternative business levels must be mutually supportive and reconciled to keep everyone moving in concert. The broad business perspective suggested by the process approach shown in the flowchart has five levels of D&SP, and these are addressed in the matrix: strategic planning, macro/market, channel/supply chain, tactical (VMI), and operational. The vertical topics in the column identify areas to be considered in selecting and implementing each of these approaches. The cells within the matrix illustrate specific selection and implementation considerations for the topic and forecasting approach. Table 3.1 (see Addendums) thus provides a road map for helping companies implement the flowchart as they progress through the various stages of demand planning and sales forecasting.

It must be noted that the selecting factors highlighted as Champion and Team Representation in Table 3.1 call for consensus decision-making both among functional areas of the company and with trading partners. Given Barrat and Oliveira (2001)'s findings, it's fair to state that consensus decision-making based upon effective and diligent communications among supply chain parties is essential to a sound D&SP. The following ingredients are seen as key principles in successfully implementing a consensus D&SP forecast process:

1. For sales, forecast will be used as a means of increasing customer-service levels: for marketing, measuring the effectiveness of the trade and advertising programme; for finance, projecting and tracking returns to financial plans; and for the supply chain, driving production scheduling, inventory deployment, and capacity planning.
2. Get people committed to one integrated process. Eliminate confusion over who should talk to whom. Get consensus on the forecast across all functional areas.
3. Identify a forecast champion who has the support of upper management. That individual must think cross-functionally, possess clout within the organisation, and demonstrate leadership skills.

4. Rigorous utilisation of the forecasting tools and technologies. These could include: (1) forecasting software to initiate quantitative forecasts and to accommodate management overrides; (2) supply chain software to track performance and connect to the Enterprise Resource Planning (ERP) system; and (3) communication software to download and upload forecast information across functional areas in an easy-to-use manner, including other templates to collect data, insights and information from stakeholders, i.e. customer demands, planned promotions, discounts, among others.

For example, the monthly process to develop a Level 5 operational consensus forecast has specific steps for each week, as specifically described below:

- ✓ **Key steps for Week 1:** The supply chain group uses forecast models to build and maintain three forecasts: 1) a quantitative forecast with history filtered to add or remove non-recurring events; (2) a consensus forecast, which includes qualitative overrides, that drives the business; (3) an annual operating plan based on key result measures. This forecast is completed at the beginning of the year. It is used as a barometer of how the consensus forecast is attaining key results measures (KRM).

Data for the baseline forecast are sourced from customer electronic point-of-sale (ePOS) information, warehouse pulls, orders, or invoices for products shipped. The forecasting software tests multiple variations of forecast models and selects the best model based on sample data. Models are maintained for the top customers that represent 80% of the business. The remaining customers are grouped into all other by sale channels. The forecast is for consumer package sales, and the forecasts software contains conversion factors for dollars and manufacturing units. Forecasts are automatically developed at three levels of a product hierarchy - SKU, product group, and product family. The forecast analyst reconciles any differences. Accuracy is tracked for the 30 - 60, and 90-day forecasts.

- ✓ **Key steps for Week 2:** Sales and supply chain management review the information and enter overrides to the consensus forecast. The main level of engagement is the customer/product family/month level. For unique promotions or new customers, SKU level detail becomes the main level of engagement. For vendor-managed inventory customers, inter-organisational teams work at lower levels of the product hierarchy using tools to

analyse POS data and inventory activity EDI transactions used to transmit ePOS information.

- ✓ **Key steps for Week 3:** Consensus team meetings are held. Teams are organised around the four major sales channels and include leaders from each functional area such as sales, marketing, finance, and supply chain, which includes manufacturing, distribution, and transportation plus purchasing as a recipient of detailed forecast. During the meeting, the teams review KRMs, forecast accuracy, and the consensus forecast updates made in Week 2. If there are differences between consensus forecast and plan, the teams discuss tools available to change customer demand or prepare a revised plan for management. This is an interactive process that provides ample early warning to adjust expectations (either up or down). If changes to the forecast are appropriate, overrides are entered at the customer/SKU level. This process ensures team ownership of and accountability for the forecast.
- ✓ **Key steps for Week 4:** The supply chain group disaggregates the company forecast to distribution centre levels and pushes the forecast into the ERP system. During this process, inventory levels and production schedules are optimised. The plans are shared with purchasing to assist upstream suppliers. Pushing the forecast through an ERP system keeps all functional areas marching in the same direction.

### **2.2.5 Evolution of point-of-sale data management**

Traditionally, the supply chain environment considered the Enterprise Resource Planning (ERP), Supply Chain Planning (SCP), and the Transportation Management System (TMS) as the most important technologies. However, another, perhaps more accurate perspective in today's supply chain would be the cash register, or what those in the industry formally refer to as the point-of-sale (POS) system; Kash and Calhoun (2010), Barrat and Oliveira (2001).

One reason for the importance of this technology would be the fact that the POS represents the most critical function in a retailer's supply chain, in particular, the checkout process. The cash register is viewed as the moment of truth when consumer has to commit to a purchase and offer tender in exchange for goods. The POS acts effectively as the collections system for a retailer. Consequently, it is critical that the POS correctly identifies each item in the customer's basket; match the barcode label to appropriate SKU for accurate pricing; and perform authorisation of

any electronic transactions. The importance of POS from a receivables perspective is probably obvious to most.

The second reason that was stipulated by the Barrat and Oliveira (2001)'s findings, is probably less apparent to most people that are not part of the supply chain and merchandising circles. The Point-of-Sale represents the most effective point to collect data about shoppers, their purchases and behaviours. The data is useful to a retailer to analyse buying trends. It is even more valuable to upstream manufacturers, distributors and suppliers for activities such as the following:

- **Demand planning and forecasting:** POS data offers excellent visibility to consumer demand. Analysing last week's sales or yesterday's sales can help to identify low inventory positions that could result in an out-of-stock. Armed with better consumer demand insights, manufacturers and distributors can proactively address product availability issues before sales opportunities are missed. In some cases, according Barrat and Oliveira (2001), POS data can identify issues such as distribution voids in which stores are not receiving, selling or allocating shelf space for items that should be in the merchandise mix.
- **Consumer marketing programmes:** Armed with rich data about consumer spending pattern, manufactures can modify trade promotions and pricing strategies to optimise product sales. POS data can also be used in efforts to rationalise product portfolios by identifying under-performing SKUs. New product development efforts benefit from POS data sharing as well. Ackerman (2000) advocated that by analysing consumer demographics and "market basket" data, which shows all the products the consumer purchased on a shopping trip, brand owners may identify new concepts they can bring to market.
- **Strategic account development:** Manufacturers who can outperform their peer group and other competitors with sophisticated POS data analysis can position them for long-term account growth. For example, demonstrating superior insights into shopper behaviours and market dynamics can position a supplier to assume a category captain role. Alternatively, differentiated approaches to shopper data analysis and demand planning might lead to a selection of preferred programmes such as New Ways of Working Together (NWWT) or Collaborative Planning, Forecasting and Replenishment (CPFR), Ireland & Bruce (2000).

Extensive research studies have been conducted by various industry associations, analyst firms and educational institutions documenting the benefits of POS data for a demand-driven supply chain. The focus of the section below is, therefore, to examine the use of sales transaction data

in the retail supply chain today and to explore potential new demand signals to augment the use of POS. The focus of the POS discussion will be primarily towards demand forecasting and product availability rather than consumer marketing and strategic account development.

#### **2.2.5.1 Stockholding levels**

To date, it is self-evident that the largest challenge in retail supply chains continues to be product availability. Retailers and their suppliers either have too much or too little of a particular SKU. Merchandise with long product lifecycles such as consumer electronics, luxury goods and high fashion apparel are often in excess supply. However, the fast-moving consumer goods segment typically is challenged with OOS for popular SKUs. Consumer goods have shorter product lifecycles, but greater sales fluctuations due to manufacturer and retailer-driven trade promotions.

Retailers and their suppliers both seek to avoid the costly out-of-stock situations that result in a lost-revenue opportunity for both parties. Out-of-stock can also damage shopper loyalty as frustrated consumers might seek out alternative retailers for the same merchandise. In other scenarios, supplier brand loyalty can be impacted if a competitor's product is substituted instead. The most in-depth analysis of out-of-stock has been done in the grocery industry. For example: the Food Marketing Institute (FMI) 2002 study on out-of-stocks found that, on average, 8% of all SKUs are not available to consumers when shopping. Thirty% of out-of-stock items are purchased at another store. In some cases they are not purchased at all, resulting in a lost opportunity for the manufacturer of \$23M for every \$1B in sales.

As mentioned above, there are numerous occasions in which retailers and suppliers are burdened with too much inventory rather than not enough. The fate of excess inventory depends upon the type of product and the reason it was not sold. Some products, such as books or DVDs, may be returned to the manufacturer then-circulated back into the channel. If a product was damaged, expired or no longer retains any useful value, then it will likely be destroyed. Products with relatively low market value, such as discontinued food items, may be donated to charities. Destruction, donations and returns, however, represent the minority of outcomes for excess inventory. Most overstocks are liquidated, often at a significant price reduction, to online and offline discount retailers.

### **2.2.5.2 Retailers' promotions in FMCG environment**

Today's experience suggests that the Fast Moving Consumer Goods (FMCG) segment spends a considerable amount of its marketing budget on trade promotions. It is not uncommon for FMCG brands to spend 15% of sales on promotions with retailers. Trade promotions are designed to generate an increase in sales for the brand owner. There are hundreds of different types of promotions. Many involve a discount to the end consumer. Some of the examples include price discount; manufacturer coupon; value packs and special events. Manufacturers also offer financial incentives to retailers to perform specialised in-store advertising and product placement on an end-cap or near a checkout. However, observations drawn from Annexure 4.13 (see page 177), suggest that retailers and wholesalers of FMCG products also use the promotions as a strategy to maximise profits and growth through better promotional execution.

Annexure 4.13 also seems to suggest that Wholesalers and Retailers will often forward-buy inventories during a promotional period. In other words, the retailer purchases greater quantities of merchandise than are needed to satisfy near-term sales. The excess inventory is held for sale at a later point in time, often for higher prices than consumers would obtain during the promotional window. Forward-buying strategies can be quite sophisticated. Some retailers use a process called diversion, which is a price arbitrage strategy to exploit the differences in promotions offered in various geographic regions. A buyer will purchase large inventories of a SKU from a manufacturer offering a deep discount. The inventory is then transferred internally to another division of a retailer. In other cases the inventory may be resold to a third-party distributor or retailer. The transfer is typically to a different geographic region where the promotion is not currently being offered. These are specialised companies that have developed new business models to take inventory under consignment and then divert it to other buyers.

Forward-buying and diversion challenge the demand planning efforts of FMCG manufacturers. Large one-time purchases distort demand signals from downstream buyers. FMCG brands cannot distinguish the quality of SKUs ordered to satisfy end consumer demand from the inventory stockpiled as a forward-buying strategy. FMCG manufacturers might misinterpret a large purchase order from a retailer as a signal that end-consumer demand for a product has grown. As a result, the manufacturer may over-produce new inventory, which then must be discounted to be sold. The challenges are compounded when products are sold through multiple tiers of distributors. Brand owners do not have visibility to the shopper or end-customers' purchase order and the forward-buying tactics. The amplification of demand signals

across multiple tiers of a supply chain is often referred to as the Bullwhip Effect, which results in large swings in demand, inventory and production, as highlighted in Annexure 4.13.

All the above developments have driven the 21<sup>st</sup> century supply chain strategies to call for upstream suppliers and manufacturers to adapt to more demand-driven planning, forecasting and replenishment models. In these demand-driven models, brand owners attempt to gauge actual end-consumer and/or shopper demand, rather than their immediate customer's needs. By planning manufacturing, logistics and fulfilment activities upon end-consumer demand, the distortions of forward-buying, diversion and other retailer strategies can be avoided. It's observed in Annexure 4.13, that one of the best techniques through the POS data is that Retailers have the capacity and capability to share the POS data for specific stores, neighbourhoods or entire chains on a daily or weekly basis, which can create significant competitive advantages through effective on-shelf availability of products, derived from efficient D&SP and business forecasting processes; according to Barrat & Oliveira (2001), Zairi (1997).

### **2.2.5.3 Retailers demand planning and forecasting**

Retailers and suppliers can avoid out-of-stock and excess inventory scenarios through better demand planning and forecasting. The primary methodology used in supply chain planning today is to establish a continuous replenishment model that is driven by actual consumption of product at the stores. The key to these demand-driven supply chain models is more active involvement of the supplier in the demand-forecasting processes. Collaborative Planning, Forecasting and Replenishment (CPFR) is one of the demand-driven approaches that retailers and suppliers are utilising. In CPFR both parties work towards an agreed-upon forecast that factors in recent consumer-buying trends, planned trade promotions and upcoming new product introductions. Most retailers today are not implementing a formal CPFR approach with suppliers, but using a subset of the collaborative demand planning principles, Ireland & Bruce (2000).

For categories with more challenging forecast models, retailers are turning over planning and replenishment to suppliers as part of a vendor-managed inventory (VMI) programme. VMI is popular in the home entertainment merchandise category for items such as movies, music and video games. With VMI the supplier owns demand planning, including the recommended order quantity. An extension of the VMI model is scan-based trading. In a data scan-based trading scenario, the supplier owns the inventory until it is scanned at the point-of-sale. There are numerous other permutations of supplier-led or collaborative demand planning primary

information being used for replenishment decisions. Yet despite the potential for improvements in supply chain efficiency, POS data sharing is not as broadly and universally adopted as one might expect (see working group's notes and minutes described in Annexure 4.13).

#### **2.2.5.4 Challenges with sharing POS data**

It is clear that the availability and sharing of POS data comes with its own issues and challenges. Numerous studies have been performed to assess the level of data sharing between retailers and upstream suppliers. In particular, two excellent quantitative studies are from Capgemini and Forrester Research (2006), where Capgemini performed a study of 16 retailers from 11 countries in Europe and North America, and the study found that only 40% of retailers shared shopper data with all of their suppliers. On the other hand, Forrester Research teamed with RIS News and Consumer Goods Technology to conduct a broader study in 2006 that included 89 retailers and 80 consumer products manufactures. Forrester's study found 27% of retailers shared shopper data. These percentages (27%-40%) may sound impressive at first but the sharing of POS information and collaboration generally seems to be limited to:

- **Subset of the supplier community**, whereby most retailers are only sharing shopper data with a limited set of their supplier community. For example, POS might be share with contract manufacturers producing private-label products; brand owners who provide VMI services, or just a handful of suppliers who represent the largest volume of product.
- **Event-driven activities**, where some retailers and manufacturers collaborate on demand planning, but only for short time periods around specific events. For example, shopper data might be shared as part of a collaboration program to support new product introductions, targeted joint promotions or category planogram designs.
- **Monthly reporting** - Other retailers share the data with suppliers, but only on a monthly basis. The syndicated providers contribute value-add such as normalisation, cleansing and trending of the data. However, the analysis process delays distribution by several weeks. Thirty-day-old data is not useful for replenishment and other supply chain activities. In many cases it is not useful for merchandising or trade promotions activities either.
- **Sharing of only chain-level data**, whereby some retailers only share aggregated POS data for their entire network of stores. Such chain level data is much better than having no insights into shopper behaviour at all. However, chain level data cannot be easily utilised for targeted marketing campaigns to reach specific geographic regions, nor can it be used to drive store level replenishment decisions. Distribution centre-level data offers insights into

demand pattern within a geographic region. Store specific data is the optimal level of granularity needed by suppliers to perform accurate demand planning.

Furthermore, Capgemini and Forrester (2006) stated that there are numerous reasons why data is not shared more broadly. Some chains lack the IT resources or budget to develop data sharing portals or systems. Another barrier has been the retailer's desire to charge suppliers for the data. For example, the Capgemini study indicated that over 40% of retailers charge their suppliers for data. A significant amount of value can be derived from analysing shopper data. Retailers know this and seek to profit from the consumer insights they capture. Also, it is costly for the retailers to continuously collect, store and share the massive amounts of data with manufacturers. In recent years, the market dynamics have shifted in favour of sharing the data with suppliers due to the numerous benefits to be gained from collaboration.

However, there are three key reasons challenging the broader sharing of POS data:

- 1. Retailers' lack of trust on suppliers:** Many of the branded suppliers use the data to develop better marketing strategies to compete with the retailers private label portfolios. Almost 70% of manufacturers surveyed by Forrester stated that competition between private label and brands created significant or moderate barriers to collaboration. Consequently, retailers want to ensure they receive some monetary compensation for sharing information that might be used in a competitive manner.
- 2. Suppliers' inability to analyse the data:** Most of the blame for low levels of data-sharing typically is cast on retailers due to their desire to charge and their lack of trust in suppliers. However, retailers believe that the barriers to collaboration are more related to the manufacturer's inability to perform the analysis. However, there are also many instances in which the supplier lacks motivation to analyse sales transactions. In merchandise categories with highly-fragmented distribution, minimal product innovation and stable market share, there may be very little incentive for suppliers to perform POS analysis.
- 3. Retailers' inability to respond to changes:** Some retail chains have delayed data-sharing due to concerns about their ability to accommodate corrective actions that suppliers may request following data analysis. For example, suppliers may identify scenarios in which the product is in the backroom of the stores, but out-of-stock on the shelves. Another example might be trade promotions, which were funded by the manufacturer, but not executed in selected stores. Such scenarios often have root causes, which are not easily fixed within the retailer's store operations.

The sources of data included in POS transactions for demand planning and forecasting can vary considerably from retailer to retailer. At its most basic form, POS includes a descriptor for the item, the store location and the quantity sold within a week or an individual day. With these simple and basic data elements, suppliers can perform much better demand planning and replenishment than was ever before possible. However, there is a wealth of additional information that retailers capture in sales transactions that provides further insights into who the consumer is; what motivated the purchase and what else they purchased.

In addition to the basic POS, five other types of data are commonly shared between retailers and suppliers for collaboration purposes. They include the following:

- **Market basket** data extends basic POS by including not only the quantity of each individual SKU purchased, but by showing what other SKUs were purchased by the same shopper during the same store visit. Some retailers will only share market basket data with suppliers for their own brand. For example, suppose a consumer purchased 100 items in a shopping trip, five of which were PepsiCo products. The retailer would share only the 5% of the market basket data that are specific to their brand with PepsiCo. Other retailers will share the entire market basket with suppliers. In such a scenario, PepsiCo products were purchased, but with other brands that the shopper selected (i.e. the other 95%).
- **Loyalty card:** Programmes have become mainstream amongst retailers around the world. In order to register for a loyalty programme, a consumer will provide detailed information about their identity, address, income, ethnicity and family size, and shopping preferences. Consumers provide these details in exchange for the benefits of the loyalty programme, such as special pricing available only to members or for the ability to accumulate points, which can be redeemed for merchandise. Privacy restrictions prevent sharing of data about the actual consumer's identity. However, "de-identified" data can provide substantial value to suppliers especially when correlated with the actual purchasing transactions.
- **Consumer demographics** include data such as the ethnicity, age, household income and average family size for a particular store's shopper population. A loyalty card is preferred over consumer demographic data as it offers the ability to tie specific purchases to the shopper profiles. Many retailers view loyalty information as distinctly different from POS transactions. Consequently, retailers simply may be unwilling or unable to share the data

with suppliers. Some retailers do not offer loyalty programmes. For retailers with loyalty programmes, only a percentage of the shoppers participate.

- **Trade promotions** included with POS transactions enable suppliers to correlate investments in marketing programmes with changes in consumer purchasing behaviours. Manufacturers spend significant percentages of their marketing budgets (up to 50%) on trade promotions. Consequently, brand owners are seeking to measure the ROI of trade funds and the associated impacts on sales. Retailers also manage their own promotions programmes. Retailers use many of the same techniques, including free goods; buy one, get one free items, price discounts in store displays, retailer coupons and promotional sweepstakes.
- **Retailer pricing** linked to the quantity of each SKU purchased offers manufacturers insights into the optimal selling price for a particular product. Manufacturers know the prices they negotiate with distributors and retailers for cases or pallets of goods. However, most suppliers do not know the actual price charged by the retailer to the end consumer. One of the significant challenges associated with sharing pricing data is related to promotions measurement. Many suppliers believe that the trade promotions funds allocated to retailers are not fully applied to the program. Instead, the retailers retain the funds as an effective discount towards the purchase. As a result, the sharing of retailer pricing data might be limited.

### 2.2.6 Conclusion

Increasingly, retailers are sharing other types of related data with distributors and manufacturers for merchandising and supply chain collaboration purpose, and this is a platform that plays a significant role in streamlining and synchronising the demand and supply planning process. Retailers are providing stock positions for inventory on hand at the distribution centre and individual stores. Data such as store receipts, distribution centre receipts and warehouse to store shipments can add to the supplier's visibility into overall inventory positions. Other examples of data shared include planogram configurations, merchandise returns, shrink reports and RFID reader results.

It is important to recognise the fact that daily POS transaction feeds from retailers are one of the key inputs used in forecasting and planning algorithms by fast-moving consumer goods companies, consumer electronic, mobile phone manufacturers and other manufacturers. POS data provides a highly detailed and near real-time view into actual end-consumer shopping activity, and the use of POS to monitor demand patterns has the ability to assist companies to avoid misinterpretation and amplification of downstream demand signals such as forward buying, diversion and duplicate ordering. The use of POS data and information is a much better demand signal to create a demand-driven organisation, than the purchase- order-driven approach of the 1990s that up to this stage continues to cause the bullwhip effects and frequent out-of-stocks.

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## **Section 2.3: Retailer-Manufacturer integration**

### **2.3.1 Introduction**

This chapter deals with the end-to-end supply chain collaboration and integration, as well as the establishment of a long-term relationship between retailer and manufacturing organisations, actively working together towards common objectives as one inter-organisational network. Retailers operate in a complex and competitive environment, and because of this, retail managers need to be aware of the need to seek market opportunities and develop long-term sustainable relationships with partner organisations. In order for a retail organisation to develop a sustainable competitive advantage, it is essential that a partnership arrangement with a manufacturer is viewed as necessary and is based on trust.

### **2.3.2 Retailer-Manufacturer partnership development**

The creation and development of partnerships between retailers and manufacturers requires a high degree of transparency and it is critically important that open communication is encouraged. It also means that various types of information are shared and staff involved in the partnership arrangement is committed to personal development. Awad and Nassar (2010) recommended that this is necessary if an organisational cultural value system is to be produced that gives rise to a set of common goals and objectives that translate into a highly motivated workforce.

In order to implement a true demand-pull process effectively, a manufacturer must allow customers fast and cost-effective access to enterprise information, whenever and wherever they need it. Providing customers and retailers with real-time, twenty-four hour access to conduct business electronically can help eliminate waste by significantly decreasing the time and cost of routine transactions and enquiries. Other researchers such as Larsen (2003), Christopher and Jutluer (2000) suggested that management systems must diagnose the nature of a customer enquiry and provide problem resolution through integration with other enterprise applications like accounts receivable and sales order management.

For example, by developing, designing and creating joint information systems and secured technologies, retailers and/or manufacturers can provide each other with designated levels of access to quotations and purchase orders, view accounts payable, manage release schedules, view performance analysis, and update their own user profiles over the internet.

Synchronising sales activity with channel partners is the ultimate goal of lean. It is however critical that this is reapproved by a management integrated information systems with a robust software, such as a channel portal. This software provides an extranet that integrates channel partners into sales operations. By using a standard web, both retailer and manufacturer have immediate access to producer performance service and price data, regardless of location. The capability to post leads, track opportunities, and deploy a comprehensive view of customer account history also becomes indispensable in a lean environment. Furthermore, the manufacturer or upstream company can do a rollup of all channel partner pipelines and feed information into forecasting algorithms that optimise inventory levels to meet those forecasts.

### **2.3.2.1 The impact of retail strategy on partnership arrangements**

Howe (1998: 215) has made a valid point by suggesting that the retailing environment is undergoing constant change, however, when market is relatively static and highly competitive, retailer organisations need to formulate and implement a strategy that repositions the organisation; and this happens from time to time in order that the corporate objectives set are indeed realised and the various stakeholders are satisfied.

Sparks (1995: 83, 87) has made several references to the importance of meeting customer needs, and this is encouraging as it links more firmly retailing policy and marketing strategy. Another useful contribution to the retailing body of knowledge has been made by Walters (1997), who has focused attention on a number of environmental factors, which help to shape various retailing formats, and, in particular, marketing channel considerations and various factors such as technological development. One element of Walters's (1997) work is that a wide range of issues can be highlighted that have direct relevance to customer service and it is clear that customer service can be placed within a retailing-marketing context. Although much of Waters's (1997) material relates to the food industry, there are nevertheless important retailing considerations that are cited, such as new product development, the marketing mix and established vertical marketing arrangements (partnership can be also be included here). A key point to note according to (Walter, 1997: 214) is that: "the manufacturer and retailer have a shared relationship with the consumer, and therefore a mutual market responsibility". By recognising this, issues such as new product development are viewed with enthusiasm and after-sales-service is given a high degree of importance. This will ensure that customer

expectations are met, trust is established and loyalty result in repeat business. Hence the retailing-marketing divide narrows and retailing becomes more integrated with marketing.

It is logical to say that retail managers are required to manage dual relationships (with their staff and suppliers), and retail managers also need to manage the relationships with end users and partner organisations. It can also be suggested that managers need to identify how the organisation can adapt to changes in the business environment, so that the distribution system is improved. A long-term sustainable marketing strategy needs to be developed that takes into account the availability of internal resources, the management of change, and how partnership arrangements can be developed and improved. Therefore, with respect to a partnership strategy, it is important that the partnership mission statement incorporates the values of the various partner organisations.

### **2.3.2.2 The importance of clearly defined Retailing strategies**

As the domestic market becomes more competitive, managers seek new opportunities abroad. Managers in retail organisations are no exception. They need to evaluate existing business relationships, negotiate new partnership arrangements, and deal effectively with local government (Lowe & Wrigley, 1996: 13-16; Christopher & Juttner, 2000: 119; Porter, Takeuchi, & Sakakibara, 2000: 24-25 and 29-35). Hence retail organisations are required to have a clearly defined retailing strategy, if they are to develop a sustainable competitive advantage.

In order for a retail organisation to build long-term working relationships, as Lamming (1993: 252), and Hines (1996: 4 and 636) have indicated, the organisations concerned (both retailers and suppliers), should be able to establish a common culture, which can be accepted by each partner, and each organisation needs to have a clear structure to facilitate communication and enhance coordination (retailer-supplier partnership) (Buzzell & Ortmeyer, 1995: 93; Hines, 1996: 4 and 636; McIvor & McHugh, 2000b: 12-13). If retail organisations have a clearly defined retailing strategy, the retail organisation can find the right supplier and can build a partnership culture and structure by establishing common business goals. As a result, both the retail organisation and the supplier organisation are able to obtain financial benefits and this result in mutuality (Hines, 1996; McIvor & McHugh, 2000b).

Juttner & Peck (1998: 227) have pointed out, as a result of fieldwork conducted, that the degree of integration of the retail organisation and the supplier organisation is strongly influenced by the

way in which an organisation participates in the business relationship and the individual responsibilities of each partner. If the retail organisation has a clearly defined strategy, the retail organisation is able to establish common norms with its supplier, and as a consequence each organisation can interpret the business situation and respond accordingly with each other without any conflict resulting (when changes or improvements in product design are required by customers) (McIvor & McHugh, 2000b: 16-17).

### **2.3.2.3 The strategic retail information system**

Fisher et al. (2000: 115-116), Lewison & DeLozier (1998: 62), Lewison (1997: 5) have argued that in order for a retailer to offer the right product in the right place at the right time and at the right price, it is important to have both a traditional intuitive-based forecasting system and a departmental survey of thirty-two retailing organisations, in order to explain why accurate forecasting, speed in the supply chain, inventory planning and gathering accurate and available data, are important and how this can all be achieved. First, Fisher et al. (2000: 116-118) have argued that in order for a retailer to achieve accurate forecasts, they should have a tracking system in place to identify sales to date, and use a variety of forecasting approaches: bottom-up and top-down; and have the appropriate communication systems in place. The bottom-up approach is developed by merchandisers and planners, and is concerned with the fitness derived from matching the products on offer with what the target customers want; whereas the top-down approach is based on macro-economic factors, such as national economic growth and corporate growth objectives, and is the responsibility of planners, who develop plans based on market expectations.

Fiorito et al. (1998: 227) have indicated that retail organisations need to be supplied with products and services on what can be considered a just-in-time basis. Furthermore, electronic data interchange (EDI) can facilitate the manufacturer/retailer relationship, and as a consequence buyer/supplier relationships evolve and organisational change becomes evident (Buzzell & Ortmeyer, 1995: 85; Fiorito et al., 1998: 238).

Another point to note is that a sophisticated tracking and forecasting system will allow the retailer to understand and predict geographical reasonability, consumer reaction to a promotion, and differences in sales patterns between different stores (Fisher et al., 2000: 122). The right tracking and forecasting system, can help an organisation in the partnership arrangement to improve the way in which they exchange information and this is an important point with respect

to fast-moving consumer goods; the development of efficient consumer response (ECR), vendor managed inventory (VMI) or co-managed inventory (CMI) as mutual systems, for example. Hence tracking and forecasting systems influence collaborative relationships between buyers and supplier as forecasting; ordering and distribution are all linked. The information flow can assist company-specific issues such as pricing; promotion; new product development; planning; improved customer service; and transportation (Buzzell & Ortmeyer, 1995; Christopher & Juttner, 2000: 122). However, sharing information requires a high degree of trust and openness that may not always be evident. Cultural changes may prove difficult to achieve in the short-term (Buzzell & Ortmeyer, 1995; Christopher & Juttner, 2000: 122) as high levels of capital investment may militate against profit-making.

With respect to the issue of 'lead-time', accurate forecasts are important in terms of how many orders or additional orders are classified as 'markdown' (McIvor & McHugh, 2000a: 223; Fisher et al., 2000: 119). Another relevant point highlighted by Fisher et al. (2000: 118) is that with respect to speed to market, factors such as short product life cycles need to be borne in mind. As regards inventory planning, retailers need to communicate accurately and work closely with distribution channel members (Fisher et al., 2000: 120; Christopher and Juttner) to purchase various raw materials, components and finished goods. Such an approach should reduce losses (Fisher et al., 2000: 121); and by tracking stocks more effectively, sales can improve by 10% (as a result of decreasing the level of inventory held in the store; Fisher, 2000: 121), due to the just-in-time philosophy. As Fisher et al. (2000: 123) have indicated, the reason why retailers need to forecast accurately and segment the market effectively, is to meet customer expectations and thus raise customer satisfaction levels. Factors such as price, the quality of the service offered and staff involvement (high employee morale) are key factors.

The importance of partnership and the relevance of selecting appropriate channel members have been widely recognized by academics and practitioners such as Arthur & Co. (cited in Siguaw et al., 1998: 99); Frazier & Antia (cited in Siguaw et al., 1998); Buzzell & Ortmeyer (1995); Cespedes (1995: 244-245); Kumar, Scheer, & Steenkamp (1995); Weitz, Castleberry, & Tanner (1995: 34-49 and 382-511); and Christopher & Juttner (2000: 117). This is because retail organisations can achieve vertical marketing integration and as a consequence both retail organisations and supplier organisations are able to achieve competitive advantages. As a result of this, retail organisations can increase the level of service available, can distinguish

themselves from the competitors by providing a high level of customer service and this can improve profitability (Baker, Penny, and Siguaw, 1999: 50).

#### **2.3.2.4 Development of a trusted partnership**

Managements need to establish common corporate norms, goals, a commitment to the relationship, and satisfaction with the relationship (Baker et al., 1999: 53-54). If retail organisations are able to establish a strong partnership with their supplier organisations, and trust is evident, they are able to share sensitive information, which can be used to improve existing product performance, to innovate, develop new products, and reduce total costs. This being the case, retailers will be able to meet the needs of their suppliers more efficiently and reduce the level of risk, which is associated with opportunistic behaviour of suppliers. As a result, retailers and suppliers are able to achieve long-term benefits, which result in mutuality (Doney & Cannon, 1997, .p. 46; Wicks et al., 1999, p. 100).

Retailers and suppliers do build long-term, positive relationships in order to achieve a competitive advantage(s) based on creating fitness (Ganesan, 1994: 3). This is because, retailers are able to meet their customers' needs and demands more effectively and efficiently by being able to share sensitive information with their suppliers in order to improve the company's performance and/or to provide innovations to meet latent needs. Reducing the lead-time is also another important factor. This means that suppliers can meet their customers' needs and wants more effectively and efficiently through distributors. It allows retailers, suppliers and distributors to provide a continuous service in the competitive marketplace.

### **2.3.3 Retail performance management**

#### **2.3.3.1 Background**

Over the last few years there has been a tremendous shift in the manufacture of consumer goods to low-wage countries throughout the world. In some cases retailers have sourced products internationally, while in others, domestic manufactures have outsourced part or all of the manufacture of product, seeking the low-wage advantage. King (2001) points out that often the sourcing decision is made without complete knowledge of the true costs of the various alternatives (consider the increase in logistics costs that accompanies importing).

For example, if the goal is to maximise gross margin, i.e. revenue minus cost of goods, a typical assumption is that revenue is unaffected by the source. Therefore, gross margin is maximised

by choosing the cheapest source around the world. The error in this logic is that the source can have a significant impact on revenue. The longer the chain, the more the merchandise must be “pushed” towards retail; this relies on typically poor, long-range forecasts. The results of chasing lowest-cost production are excess inventory, more merchandise sold at discounted prices, greater consumer dissatisfaction due to lost sales, and ultimately reduced profits (Lowson *et al.*, 1999; Hunter *et al.*, 2002). Estimates are that the amount of merchandise sold at mark-down has grown to over 33%, while about one out of three customers who know what they want are able to find it in stock (Fisher *et al.*, 2000).

The contrast to this is a fast, flexible, efficient supply chain that is able to operate more like a pull or just-in-time (*kanban*) manufacturing system. Since orders and production decisions can be delayed and be based more on actual consumer demand, the right inventory can be pulled through the supply chain and the commitment of inventory (and thus risk) can be significantly reduced. A study by Fisher and Raman (1996) showed that pre-season forecast errors were in the neighbourhood of fifty% whereas forecasts based on observing were about twenty% while actual sales had forecast errors of only about 8%.

A completely integrated process, i.e. tight coupling between suppliers and retailers freely sharing information, can lead to the consumer demand pulling inventory through the chain. As the degree of collaboration decreases and lead-times increase, uncertainty increases the risk and exposure. The longer the lead-time, the greater the impact of uncertainty and the greater the advantage of a cheaper supplier is offset by the decrease in logistics costs and the reduction in lost sales and in goods sold at mark-down afforded by a faster supply chain. Where this breakeven point lies is dependent upon product. The emphasis on low-cost labour suffers from another key assumption. According to Abernathy *et al.* (1999), emphasis on labour productivity had preoccupied managers and analysts in many industries.

Quick customer response programs, just-in-time inventory systems, efficient consumer response and other similar philosophies have been developed and applied in order to cope with the market uncertainty. However, a clear majority of apparel buying is done up-front and based on forecasts. If the forecasts are wrong, the supply chain will be partly filled with products that do not meet the demand. The cost of forecast errors can be greatly reduced by implementing accurate response methods together with improved supply systems. The basic idea with the accurate response approach is to determine what can and cannot be accurately forecast, and

decisions regarding the most unpredictable items should be postponed until more market information is available (Fisher *et al.*, 1994).

Forecasting errors have two kinds of undesirable effects, i.e. missed sales opportunities through stock-outs, and mark-downs through high unsold inventory level. Both of these have a negative impact on sales and profits. The SCM system should be designed in such a way that both of these are considered. Those products for which demand is easier to predict should be distinguished from the unpredictable ones, and different forecasting and sourcing techniques should be applied. Products with predictable demand can be sourced cost-effectively well in advance of season allowing for long lead-times, while sourcing of products with unpredictable demand should be based on market information using short lead-time suppliers that are capable of replenishing through the season. Usually this distinction means basic products and products with high fashion content.

The mismatch of supply and demand is constant to all members in the supply chain and in the end to the consumer, as the mismatch costs are naturally built into the prices. Fisher *et al.* (1994) argue that by using accurate response the companies could actually lower prices instead of making the consumers pay for their inaccurate forecasts. The reason why this is not widely done is twofold. First, the dramatic increase in demand uncertainty is a recent phenomenon and most retailers still plan their production and sourcing as if forecasts were reliable. Second, it is difficult to run multiple-demand scenarios and incorporate them into the planning process simultaneously.

The adoption of a quick response (QR) strategy is based on a mixture of upfront buying and replenishment during the selling season. A certain quantity is sourced conventionally and delivered prior to the start of the selling season. In-season garment manufacturing based upon re-estimation of actual demand by using POS data takes care of the rest. QR strategy requires re-estimation and reorder systems that turn POS data into information that can be transmitted via electronic data interchange and used for manufacturing and delivering products that are currently in demand (King & Hunter, 1997).

According to a survey in the USA reported by Little and Heinje (1998) forecast accuracy achieved by firms using QR can be as high as 95%, sell-through is ninety five% and DC lead-time is eliminated by delivering goods floor-ready directly to the store.

### **2.3.3.2 Key success factors**

The critical success factors associated with the sourcing of seasonal products such as textiles or fashion content according to Mattila (1999) include the following: forecast accuracy; process lead-time; offshore/local sourcing mix; and up-front/replenishment buying mix.

The accuracy of a demand forecast is a fundamental success factor since a majority of merchandise is bought with a long lead-time on the basis of the buyer's plan. The plan is made as much as seven to eight months prior to the start of the selling season. The forecast error is a combination of volume error and assortment error. The total error rather than the distribution of forecast error over each individual style, colour and size is considered in the analysis in this research. Goods over-bought are discounted and sold during the season or sold later through clearance. Sales at mark-down price lower gross margin and profitability, while the under-buying, on the other hand, causes out-of-stocks and lost sales as the customers cannot find their preference in colour, size or style.

Forecast accuracy depends on lead-time. When making the first buying plan, very little information is available regarding the demand during the coming season. More information is obtained closer to and during the selling season. Reducing lead-times improves forecast accuracy, especially if in-season POS data can be used for improving forecast accuracy in connection with replenishment buying. Therefore, lead-times increase inventories and consequently slow down stock-turns.

An offshore/local sourcing mix, where offshore sourcing with attractive prices but long lead-times competes with local sourcing with quick deliveries but higher prices, is a strategic decision for the retailer. When analysed using a predicted GM percentage, an offshore strategy seems to be more profitable, simply because the cost of goods is lower. The margin at the end of the season is, however, reduced by mark-down sales, job-off costs and inventory carrying costs, which are not accounted for when using GM as a planning measure.

GMROI considers the impact of the inventory and in this way is a better measure in this case. The appropriate mix of up-front and replenishment buying to use depends largely on the offshore/local sourcing mix. Given the fact that offshore sourcing normally requires up-front buying due to the long delivery time, replenishment buying must be done from nearby sources

as delivery times need to be short. A quick response strategy may be far better than traditional sourcing when measured by GMROI (King & Hunter, 1997). Use of POS information for replenishment buying is possible if delivery times are short, as this in turn, lowers the forecast error and causes fewer out-of-stocks and mark-down sales.

### **2.3.3.3 Performance measures**

Mattila (1999) advocated that the commonly used measures for evaluating retail performance are service level; lost sales; product substitute percentage; gross margin; stock-turn; GMROI; and sell-through percentage. The service level indicates the percentage of the product categories and merchandise assortment that is available in store at SKU level; but such service level varies from one category to another. With up-front buying, a high service level is the result of high forecast accuracy. The more accurate the demand forecast, the higher the service level; therefore, by using in-season replenishment buying it is possible to correct the overall forecast error to a certain extent.

It's easily explanatory that lost sales are caused by stock-outs. With high forecast accuracy and high service level, lost sales can be minimised. The lost sales figure indicates what additional sales could potentially have been achieved had the inventory corresponded with demand in a better way. Lost sales are a measure that is useful in planning, but impossible to calculate afterwards due to complex consumer behaviour. First, no one knows, without asking, which customer is browsing and which one is looking for a particular product. Second, customers may select a substituting product. However, a relatively simple procedure for estimating lost sales is as follows. In any week, if inventory of a SKU runs out, it is assumed that it occurred in the middle of the week and, therefore, half of the demand for that item is lost in that week. If there was no inventory of a SKU during the entire week, then all of the estimated weekly demand for that SKU in that week is lost.

Gross margin percentage is perhaps the most commonly used measure in retailing and in business in general. But it is not a good tool in planning when, for example, sourcing decisions are made. Gross margin considers only selling price and purchase price but leaves out the effect of forecast error. It is not the best tool for evaluating sourcing decisions, because it does not consider the inventory investment required to generate the margin. Gross margin return on inventory (GMROI) explicitly combines profitability and inventory investment and is perhaps a more effective measure.

Stock-turn is calculated by dividing annual sales by average annual inventory. Both of these figures are evaluated at the retail price level. Stock-turn is a measure of inventory management. The higher the stock-turn, the more efficiently the capital invested in inventories is used. GM dollars are divided by the average annual at-cost inventory value in order to calculate GMROI, thus combining profitability and asset management. It can be interpreted as the amount of money earned per dollar invested in inventory. As GMROI does not indicate the relationship between gross margin and the retail value of inventory, GMROI-R can be used. GMROI-R is calculated by dividing gross margin dollars by the retail value of the inventory. Sell-through percentage is the total percentage of goods sold at first price without any mark-downs.

The bottom-line is that retailers want to make money by carrying less inventory, but that it is in stock for their customers, i.e. high gross margins and service levels but with increased stock-turns. The measures listed above address aspects of this, but no one measure encompasses all. The following proposed measure, gross margin return on investment-lost sales or GMROI-LS, is one way to capture all three aspects of performance. It is derived from the GMROI measure that incorporates tradeoffs between high inventory turns and high gross margin. Maximising customer service is equivalent to minimising lost sales.

### **2.3.4 Supply chain integration and collaboration**

#### **2.3.4.1 Definition and challenges**

Supply chain management (SCM) system facilitates inter-enterprise cooperation and collaboration with suppliers, customers, and business partners. Although this system can bring benefits and competitive advantage to organisations, the management and implementation of this system pose significant challenges to organisations. Process integration and redesign is an important component of SCM implementations. To succeed in today's economy organisations must manage the integration of business, technology, people, and processes not only within the enterprise but also across extended enterprises.

Integration involves not only implementing ERP systems and ensuring they communicate or interface with legacy systems, but it also involves integrating ERP and SCM systems with customer relationship management (CRM), product lifecycle management (PLM), and e-procurement and e-marketplaces, as well as making them available over the web to foster

cooperation and collaboration across the entire value chain. In today's dynamic business environment, many companies are expanding, merging, contracting, or otherwise redesigning their supply chain. Due to the rapid advancements of technology such as pervasive or ubiquitous wireless and internet networks, the basic supply chain is rapidly evolving into what is known as a supply chain network. The supply chain network is a dynamic and integrated system in which all firms integrated to increase the value of every chain. Integration is a process of redefining and connecting parts of a whole in order to form a new one. In traditional supply chain integration, the definitions of parts are usually limited by the boundary of the enterprises: the integration emphasises connecting each enterprise with logistics and information communications, according to Juanqiong et al. (2007).

In the 21<sup>st</sup> century, there have been a few changes in business environment that have contributed to the development of supply chain networks. First, as an outcome of globalisation and the proliferation of multi-national companies, joint ventures, strategic alliances and business partnerships, there were found to be significant success factors, following the earlier "just-In-time", "lean management" and "agile manufacturing" practices. Second, technological changes, particularly the dramatic fall in information communication costs, which are a paramount component of transaction costs, have led to changes in coordination among the members of the supply chain network, according to Chopra and Meindl (2001). These factors create many challenges to the integration of the supply chain network.

A supply chain consists of all stages involved, either directly or indirectly, in fulfilling a customer request. This includes manufacturer, supplier, transporters, warehouses, retailer, third-party logistics provider, and customer. The objective of supply chain management is to maximise the overall value generated rather than profit generated in a particular supply chain, Chopra and Meindl (2001), and this encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers, Awad and Nassar (2010).

The driver behind such collaboration was the desire to extend the control and coordination of operations across the entire supply process, replacing both the market and vertical integration as the means of managing the flow process according to Larsen (2003), and Lee and Wang (2001) on the other hand defined integration as the quality of the state of collaboration that

exists among departments that are required to achieve unity of effort by the demands of the environment. While this definition refers to integration internal to a firm or organisation, the emphasis here goes beyond the firm and encompasses external entities that are players in a supply chain.

As a result of a globalisation of markets and supply sources, and value and cost-conscious customers, companies must possess more and more capabilities of flexibility and responsiveness in the today's business world (Sharman, 2002; Christopher, 2000; Kumar & Christiaanse, 1999). Supply chain strategies are undergoing tremendous changes in response to these pressures. Outsourcing and partnering with other enterprises are becoming more commonplace as companies seek to share the burden of uncertainties (Anderson & Lee, 1999). Blackwell & Blackwell (1999) suggest that the new competitive realities are causing suppliers, manufacturers, wholesalers, and retailers alike to rethink their strategic initiatives with their supply chain partners (Barra & Oliveira, 2001). By using supply chain management the companies working in a supply chain cooperate to respond to its customers in the most efficient and effective way.

In this context, supply chain integration (or synchronisation) is to a large extent still only a promise, despite many considerable efforts by organisations and their customers and suppliers. Anderson & Lee (1999) recommend that industry participants collaborate on the planning and execution of supply chain strategy to achieve a synchronised supply chain. Inter-firm transparency and connectivity are needed to reduce supply chain uncertainties.

Collaborative planning should not be restricted to synchronisation on an operational level, but should be initiated at both tactical and strategic level to fully grasp the benefits of collaboration. Many organisations primarily focus on the exchange of information between organisations and the synchronisation of processes within the current supply chain structure. Although benefits may be realised by this exchange, it may be a sub-optimisation if the fundamental issue, whether the current supply chain structure is appropriate of the markets that the supply chain is serving, is not addressed. A redesign of some processes or parts of the chain may result in both efficiency gains as well as customer service improvements.

Although supply chain integration describes the supply chain elements that need to be integrated to achieve improvements in supply chain performance, it only regards supply chain

relationships as an important contingency. An integral approach pointing out the interrelation between the need for integration and the related relationships is lacking. The integration required can be translated into these relationships using supply chain collaboration. In the supply chain collaboration process, the decision-making plays a crucial role at strategic, tactical and operational levels.

#### **2.3.4.2 Supply chain collaboration**

Today, the Lean supply chain is believed to be the integral management solution to minimise supply chain inefficiencies and fulfil the customer demand effectively. Supply chain collaboration is also described by (McCarty & Golicic, 2002) as a business tool that builds sales (Andraski, 1999); as an interaction among peers sharing a common set of goals and measures (Citera et al, 1995); as a process for parties to jointly search for solutions (Haeckel, 1998); and as a relationship in which trading parties develop a long-term cooperative effort (Sriam et al, 1992). Anderson & Lee (1999, 2001) state that supply chain synchronisation encompasses the collaboration among supply chain partners to fine-tune the operations. It comprises supply chain design, collaborative manufacturing, and integrated fulfilment.

Mentzer et al. (2002) further defined supply chain collaboration as a long-term relationship among organisations actively working together as one toward common objectives. On the one hand, these objectives refer to the reliable creation and movement of materials to satisfy customer requirements, Muckstadt et al. (2001). On the other, they refer to the accomplishment of efficiency and effectiveness of the supply chain activities needed. Anthony (2000) also specifies how organisations cooperate: Supply chain collaboration occurs when two or more companies share the responsibility of exchanging common planning, management, execution and performance measurement information; collaborative relationships transform how information is shared between companies and drive change to the underlying business processes.

Within the concept of supply chain collaboration, management is becoming closely tied to the concepts of partnerships, strategic alliances and other cooperative relationships between supply chain members. Greater emphasis is put on the relational as opposed to the transactional factors involved in the supply chain. Where other schools of thought focus primarily on which processes and activities can be coordinated to improve competitiveness and increase customer

satisfaction, supply chain collaboration focuses on how supply chain activities can be governed and how supply chain relationships can be designed and established.

#### **2.3.4.3 Types of supply chain integration**

Frohlich & Westbrook (2001) use a list of eight potential integration tactics to identify how firms collaborate in supply chains in the metal and machine industry; these are as follow: (1) access to planning systems, (2) sharing production plans, (3) joint EDI access/networks, (4) knowledge of inventory mix/levels, (5) packaging customisation, (6) delivery frequencies, (7) common logistical equipment/containers, and (8) common use of third-party logistics.

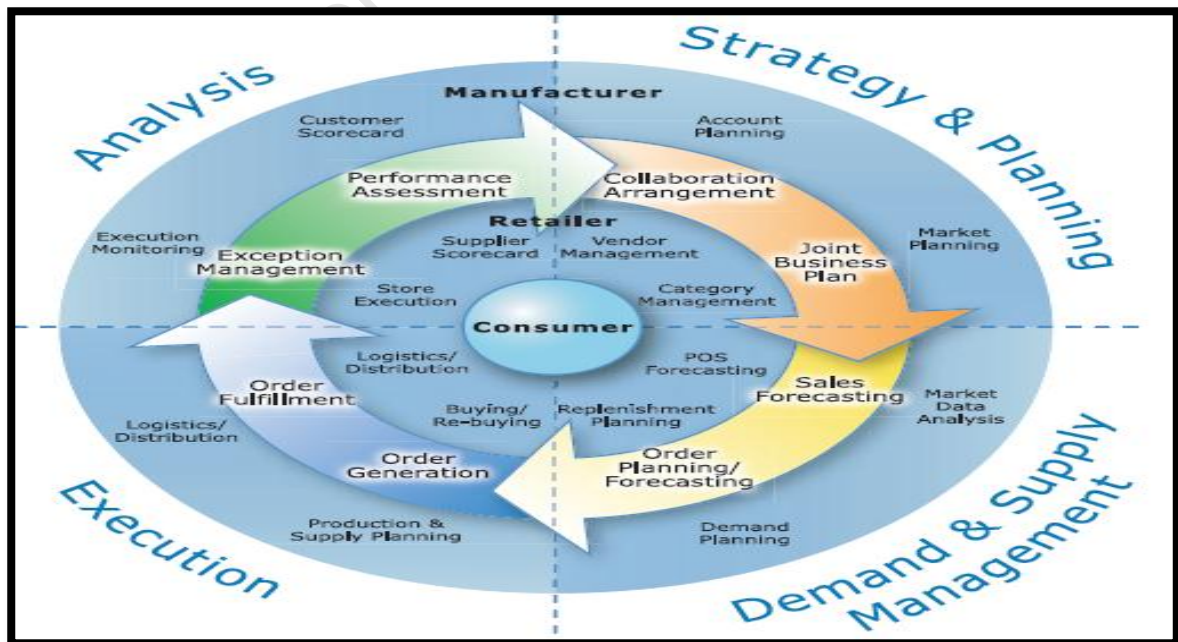
However, Boorsma & Van Noord (1992) group the above-mentioned and other types of cooperative activities into four types of supply chain integration:

- *Physical integration*; refers to changes in processes and activities that aim to improve the efficiency of the primary process. As a result of improving the interface between two companies the logistics costs can be reduced. Two main types of improvements are: a) adjustments/standardisation of transport and material-handling equipment and b) the adjustment/standardisation of packaging and loading units. Transport backhauling, centralised distribution, direct delivery from factories, joint distribution and networks also form part of the physical logistical opportunities.
- *Information integration* refers to the exchange of information related to inventory levels, manufacturing or transport planning, forecasts, actual status of processes, etc. with supply chain partners. Transparency within the supply chain is improved as each company has a view on what is happening elsewhere in the supply chain that might affect demand and its own operations in the near future. This allows companies to anticipate these events and to take appropriate measures. Information integration can also reduce supply chain cycle times. Examples of concepts related to information integration are use of point-of-sale information in retail supply chains, and the use of pre-alert or pre-arrival information in container transport chains.
- *Coordination integration* refers to the alignment of the decision-making processes along the supply chain. Information from other parts of the chain is systematically used to planning and control activities. The supply chain operates as if it was a single organisation. The primary goals are to realise cost reductions by means of lower inventories along the supply chain and efficient use of resources, and to improve customer service levels. Recently, the concept of collaborative planning, forecast and replenishment (CPFR) has been introduced

(Barrat & Oliveira, 2001). Collaborative planning serves for cross-organisational coordination of planning activities of several organisational units (Schiegg et al, 2002). Supply chain inefficiencies, like the “bullwhip” effect, can be counteracted by collaborative supply chain coordination initiatives (Lee et al., 1997). As depicted in Figure 3.3, the focus is on designing and operating a joint decision-making process that coordinates the whole material flow between two supply chain partners (Ackerman, 2000; Ireland & Bruce, 2000; Andraski, 1999). The concept of collaborative planning goes beyond earlier concepts like ECR, CPR and VMI because firm share the responsibilities in inventory management.

- *Supply chain design integration* refers to cooperation in which the structure of the supply chain changes. The design of a supply chain involves four design decisions (Christiaanse and Kumar, 2000): the choice of actors in the supply chain, governance mechanisms in the chain, structuring (i.e. sequencing order) of the activities in the chain and the choice of coordination structures in the chain. As a result of design integration, tasks and responsibilities may shift from one supply chain partner to another. This shift of tasks and responsibilities exceeds the more traditional outsourcing of logistics or manufacturing activities. An example are the concept of a vendor-managed inventory in which the task of monitoring the inventory level and triggering of replenishments is transferred from the buyer to the vendor and the concept of consolidarity, in which several vendors and/or buyers use the same warehouse or distribution system to gain cost efficiencies.

**Figure 3.3: Retailer-Manufacturer’s integrated replenishment.** (Source: Barrat & Oliveira, 2001).



#### **2.3.4.4 Degree and intensity of collaboration**

In principle, the important question that organisations generally ask makes specific reference to how closely they should collaborate with supply chain partners. There are three levels of decision-making that also include a notion of the time frame of collaboration and the size of investments and adjustments in supply chain processes and coordination.

##### **2.3.4.4.1 Supply chain and levels of decision-making**

Decision-making is often said to belong to one of three levels, the strategic, tactical and operational level. Strategic decisions typically deal with market entry and mobilising resources needed to meet market requirements over time (Muckstad et al. 2001). On the tactical level, medium-level decisions are made, such as weekly demand forecasting, distribution and transportation planning, and materials requirement planning (Huin et al., 2002). The operational level is concerned with the very short-term decisions made from day-to-day (Huin et al., 2002). Van Goor et al. (1996) also present a categorisation of logistics decision-making using strategic, tactical and operational levels. Strategic logistics decisions concern major capital commitments and long-time horizon (typically several years), including the location choices within a distribution networks or more basic make or buy decisions. Tactical logistics decisions are made on an annual, semi-annual or monthly basis. Tactical logistics decisions entail choices such as mode of transportation, type of materials handling equipment or layout of warehouses. Operational logistics decision-making relates to day-to-day operations and usually involves low capital investment. Examples include the order control policy (frequency, replenishment time, back order procedures), order picking (order picking strategy procedure, warehouse routing) and route planning (scheduling, assignment of vehicles).

##### **2.3.4.4.2 Decision-making levels in supply chain collaboration**

Instead of collaborating only in the operational level, organisations can also cooperate on the tactical and strategic level. The idea of cooperation at the tactical and strategic level is expressed in Figure 5.1. At the strategic level, the supply chain partners define the goals of their collaboration in terms of market positioning (which customer requirements are fulfilled) and which type of supply chain strategy will be used to fulfil these demands. Together, the partners determine what requirements it will bring and how each of the partners will contribute to the realisation of this strategy. The tactical level comprises the coordination and design of the procedures, instruments and tools that will be applied in the coordination of the day-to-day coordination and planning of supply chain activities, i.e. design of collaborative planning tools. At

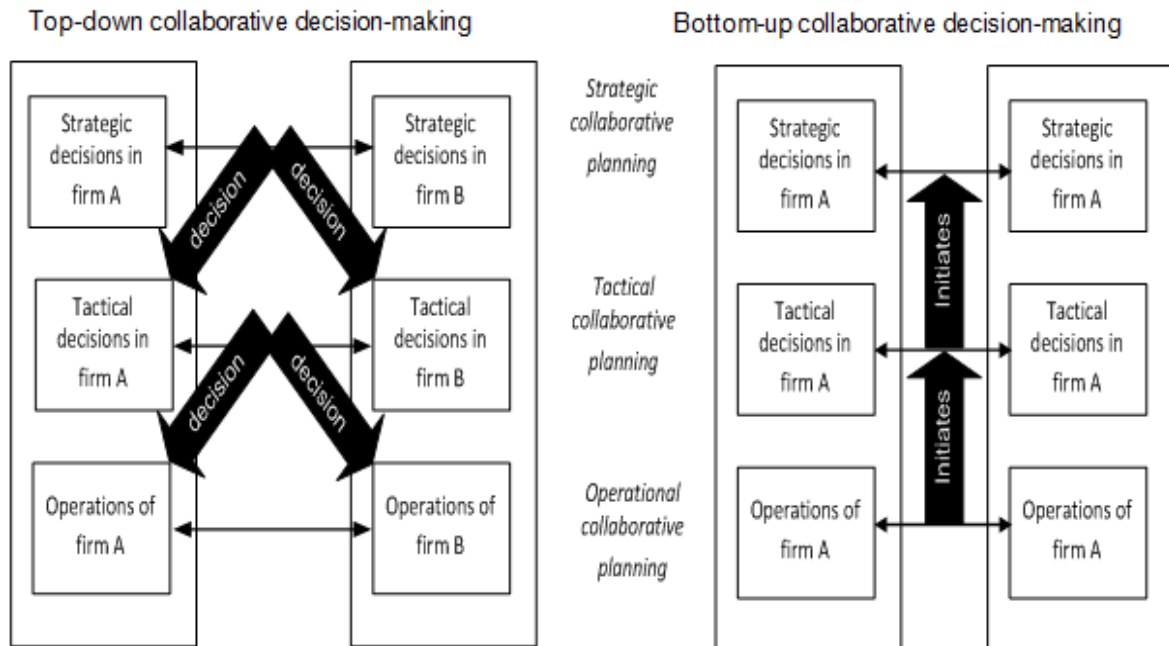
the operational level organisations deal with the coordination of the operational planning of manufacturing, inventory management and transportation processes. Exchange of order and planning information allows the actors in the chain to jointly optimise their processes and inventory levels.

Fisher (1997) and Lee et al. (1997) argue that firms should tailor their supply chain strategies according to the type of product/market environment. Fisher (1997) concluded that different product environments would require companies to configure and direct their supply chain management resources differently. Lee et al. (1997) state that managers need to design and develop supply chain strategies in accordance with – among other contingencies – market characteristics like demand frequencies, order quantities and price fluctuations. Examples of strategy-driven supply chain collaboration are found in the fashion industry. In these supply chains, the supply chain strategy is the key factor in creating and maintaining a competitive position.

Alternatively, a bottom-up process can be observed if the initiative for supply chain collaboration originates from the logistics function. Increasing costs or need for reliable processes may be reasons for logistics managers to investigate how supply chain collaboration and collaborative planning can lead to more efficiency in the chain. Initially, the collaboration will focus on low cost and easy-to-realise modes or inter-organisational coordination and planning.

An example of a bottom-up driven collaboration process is the Flora Holland Logistics data hub in the flower industry. This information platform facilitates the exchange of logistics information between growers, transport companies and the flower auction. The initial step is realisation of connectivity and supply chain transparency between the various parties. Once all the information is available, increased transparency and mutual understanding between the parties provides a basis for developing more advanced operational and even tactical modes of coordination.

**Figure 5.1: Inter-organisational interaction of collaborative and decision-making.**  
 (Source: Lee et al. (1997))

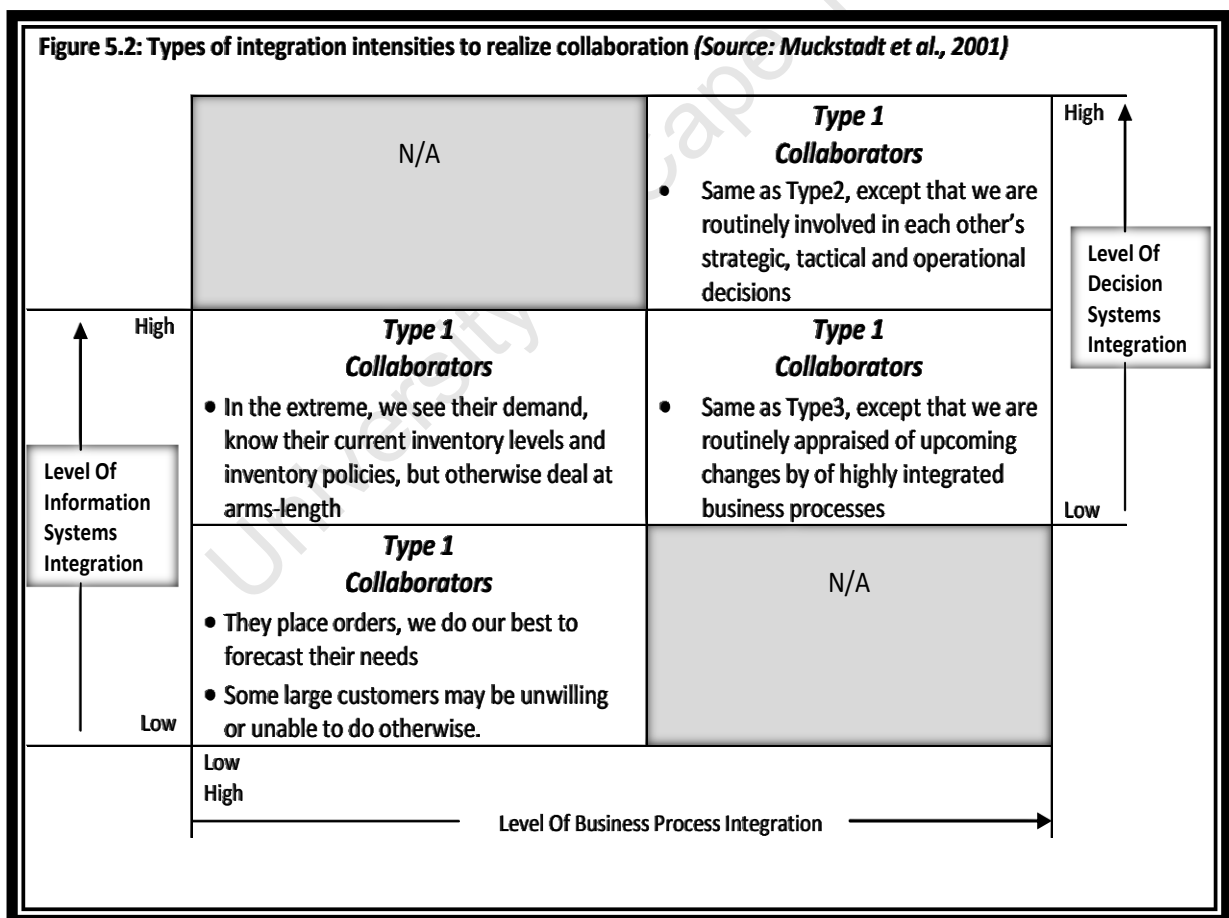


#### 2.3.4.4.3 Linking modes of integration and levels of decision-making

Muckstads et al. (2001) present a framework of collaboration that includes the different types of integration and different intensities of collaboration. Central to the framework are four intensities or types of collaboration, as shown in Figure 5.2. The four types express to what extent organisations are integrated in three specific domains: information system integration, business process integration and decision systems integration.

In the most basic of relationships, customers transmit orders to the firm and the firm is expected to respond to these orders in the lead-time requested by one customer. This type of relationship is called communicators (Type 4). As firms evolve to share and capture more detailed operational data about inventory levels, stock policies, and the customer's customer demand, a Type 3 'Coordinator' relationship may result. While building the information infrastructure to support coordination is critical, it alone will help mitigate only a portion of the uncertainty that exists, namely only that related to the customer order.

To progress to a Type 2 relationship, customers must also communicate plans that are out of the ordinary. Examples are sales promotions that are likely to increase the demand or order temporarily and plant or line closings that will decrease the demand rate or capacity for some time. Firms that effectively communicate these types of anomalies are called cooperators. For supply chain partners to be considered 'collaborators', they must do more than cooperate. Together they must carefully plan how capacity should be created throughout the system. They must decide jointly where and what quantities of inventories of various types should exist. They must also decide in advance what actions will be taken when various unplanned events occur. Thus strategic and tactical plans must be created collaboratively by supply chain partners and executed collaboratively to achieve the maximum system effectiveness.



### **2.3.4.5 Selection of the collaboration intensity level**

#### **2.3.4.5.1 Inter-organisational dependency**

In an environment characterised by scarce resources, increased competition, higher customer expectations, and faster rates of change, organisations are turning to partnerships to strengthen supply chain integration and provide sustainable competitive advantages. According to Moss Kanter (1994), being a good partner has become a key corporate asset. In the global economy a well-developed ability to create and sustain fruitful collaborations gives companies a significant competitive leg up". Lambert et al. (1997) argue that a supply chain partnership is not necessarily a requirement for achieving business success. Partnerships, while necessary and beneficial, are costly in terms of the time and effort required. While most partnerships share some common characteristics, there is no one ideal or benchmark relationship which is appropriate for all situations. Because each relationship has its own set of motivating factors driving its development as well as its own unique operating environment, the duration, breadth, strength and closeness of supply chain collaboration will vary from case to case and over time. The main challenge for organisations is to balance the need for or the benefits of supply chain integration with the viability of closer collaboration with supply chain partners.

#### **2.3.4.5.2 Need for supply chain collaboration**

The need for collaboration is primarily triggered by interdependencies of processes in the supply chain. These interdependencies and needs can be distinguished at the three decision-making levels namely, the strategic, tactical, and operational decision-making level.

From a strategic perspective, collaborative planning aims at a joint operational excellence. Due to an increasing competition between supply chains, competitive forces are shifting the competitive focus from competitive advantage of firms towards competitive advantages of entire supply chains (Christaanse and Kumar, 2000). In addition, increasing market fluctuations and shortening product life cycles lead to a degradation of the single firm's control on order fulfilment of the entire supply chain. Corporations need therefore a joint bottle-neck planning, co-ordination of independent activities in their supply chain management. The need for supply chain collaboration is closely related to the supply chain strategy.

Tactically, collaborative planning aims at configuring the supply chain in a lean manner in a cost-oriented market. An improved insight in demand for products, components and raw material is necessary to cope with demand uncertainty and supply chain inefficiencies like the

bullwhip effect. It also reduces the inventory levels required. And as a result of less inventory present in the chain, obsolescence can be diminished. Tactical decisions relate therefore to capacity utilisation, resulting in a shift of resources over time.

At operational level, collaborative planning can fulfil the need to achieve an efficient process execution *in* time and to improve customer service. Through a joint planning, companies can prevent stock-outs. In addition, a supply chain obtains a higher responsiveness if processes do not have to wait intensely on each other. In this context, new logistics concepts have arisen, such as the merge-in-transit concept. Merge-in-transit is a service that collects shipments from multiple origin points and consolidates them in transit, into a single delivery to the customer.

### **2.3.5 Implementation challenges**

#### **2.3.5.1 SCOR management model**

The SCOR model was developed in the mid-1990s by a cross-industry consortium of over 70 companies in the USA called the Supply Chain Council. SCOR defines common supply chain management processes and matches these with best practice, benchmarked performance measures and use of software. The purpose is to provide a generic framework for measuring supply chain performance and identifying areas for improvement (Allnoch, 1997). The intent of the SCOR model is to create a business model for supply chain management that can be used worldwide regardless of industry or geographical location. SCOR is not meant to be a “one size fits all” solution for doing business. Instead, it is supposed to give organisations a common language to discuss supply-chain issues, develop benchmarking measurements and give direction to the development of supply-chain management software (Saccomano, 1998: 27).

The model is based around four generic supply chain management functions of planning, purchasing, manufacturing and distribution, also known as the Plan-Source-Make-Deliver framework. Across these four functions information and material flows are analyzed as three separate levels: (i) At first level, a firm defines its performance targets and gathers the information needed to build its own SCOR model. At second level, it creates its own supply-chain configuration that takes into account assets, product volume and mix, and technology requirements. With this information a company can determine its expected performance so that at the third level, it can work on fine-tuning its performance (Saccomano, 1998:1).

The benefits of the model reported include, but are not limited to the following aspects: (i) the potential for strategic level improvements in supply chain management through the use of the benchmarking tools (McGrath, 1997); (ii) the provision of a common platform for communication between trading partners that does not require specialised training or expertise (Asgekar, 1998); (iii) the identification of points of leverage in the supply chain enabling more effective allocation of resources (Allnoch, 1997); (iv) provision of clear standards, processes and performance measures for the management of a supply chain at the industry level (McGrath, 1997); and (v) the enabling of more rapid development of supply chain management software applications (Saccomano, 1998).

Huang & Mak (2000) take the view that models such as SCOR are useful, yet limited in their application because they fail to model the interfaces between trading partners, and because they ignore product development processes. Saccomano (1998) also notes that Supply Chain Council members have identified that the model is also deficient in the areas of asset recovery, maintenance, and repair and customer service. These shortcomings perhaps provide some explanation for the low levels of implementation that have been recently reported (Stedman, 2000). Although it is apparent that some large and well-known organisations have accepted the guidelines provided by SCOR, Stedman (2000: 46) reports that the number of companies that have fully implemented the guidelines and have had positive results is relatively small.

### **2.3.5.2 Agile vs Lean supply chain models**

The requirement for organisations to become more responsive to the needs of customers, the changing conditions of competition and increasing levels of environmental turbulence are driving interest in the concept of agility. 'What it really means for an organisation to be agile, as opposed to just being efficient, effective, lean, customer-focused, able to add value, quality-driven, proactive rather than reactive, etc. has been the source of considerable debate and academic conjecture. Christopher (2000) makes a clear distinction between speed (meeting customer demand in the context of shortened delivery lead times), leanness (doing more with less) and agility (responding quickly to changes in demand in terms of both volume and variety). Naylor *et al.* (1999: 108) go further by stating that agility means using market knowledge and a virtual corporation to exploit profitable opportunities in a volatile marketplace.

The notion of agility is therefore recognised to be holistic rather than functional, and of strategic, rather than tactical importance. The concept has also been extended beyond the traditional

boundaries of the individual organisation to encompass the operations of the supply chain within which the organisation operates. The effectiveness of an organisation's response to rapidly changing market conditions will be largely determined by the capabilities of trading partners.

A manufacturer with key suppliers that have poor quality and delivery records will find it very difficult to provide high levels of customer service, even in stable environments. Place this manufacturer in a rapidly changing environment and it will be eliminated from participation in the competitive game altogether. In this context reliability of supply becomes a critical issue that can best be facilitated by the sharing of accurate and timely information with suppliers. At the downstream end of the supply chain this same manufacturer will again find it hard to operate in this environment if distribution channels are unable to respond due to physical logistics or information-flow-related issues. Towill (1997) expresses this in terms of creating a "seamless supply chain" where territorial boundaries between trading partners are eliminated and they become part of the one organisation.

Christopher (2000: 38-9) has identified a number of characteristics that a supply chain must have in order to be truly agile. These include the market sensitivity through the capturing and transmission of point-of-sale data; the creation of virtual supply chains (based on information rather than inventory); the process integration (in terms of collaboration between buyers and suppliers, joint product development) and networks (such as confederations of partners linked together opposed to stand-alone organisations). An underlying assumption of this model is that of open relations between the supply chain participants, the sharing of information and the use of technology to share information in real-time. Christopher (2000: 43) also stresses that agility in individual organisations can be significantly hindered by the level of complexity in terms of brands, products, structures and management processes.

In developing a model for achieving agility in manufacturing organisations, Zhang & Sharifi (2000) identified a number of agility providers (also called practices, methods, tools, or techniques facilitating a capability for agility). Narasimhan & Das (2000), based on the result of an empirical study of purchasing managers in manufacturing firms, found that a key determinant of the ability of manufacturing to make rapid changes was the selection, development and integration of suppliers with appropriate capabilities. Gunasekaran (1999) has proposed a conceptual model for the design of agile manufacturing systems based on the four key dimensions of strategies, technology, people and systems. He also notes that most of the

literature in this area focuses on strategies or techniques, but there is little or no focus on the integration issues. He further states that there is a lack of empirical studies testing hypotheses based on theory in this area.

### **2.3.5.3 Sales and marketing collaboration**

Collaborative and productive relations between sales and marketing departments (Cespedes, 1996), combined with the alignment of sales and marketing objectives (Strahle, Spiro & Acito, 1996), are prerequisites for the successful implementation of marketing strategy in any business sector. However, faced with increasing levels of retailer strength and sophistication (Dobson & Wateran, 2003; Lehmann & Winer, 1997), collaborative sales-marketing relations in FMCG companies have become an even greater strategic imperative (Cespedes, 1996; Corsjens & Cortjens, 1995; George, Freeling & Court, 1997).

The sales personnel who manage the external relationship with the retailer must collaborate internally with their colleagues in marketing to agree to joint commercial goals and to develop marketing programmes such as new products and promotions, for example, that meet the needs of the retailer and trade that receive ready adoption by them (Corstjens & Corstjens, 1995; Gruen & Shan, 2000). By way of response to increasing retailer sophistication and strength, consumer-packaged goods firms have experimented with new organisational designs and philosophies for sales and marketing that explicitly incorporate the perspective of trade sales and the marketing of product brands (Keller, 1998; Lehmann & Winer, 1997; Mitchell, 1994).

The most prevalent new structures and philosophies for sales and marketing are trade or customer marketing and category management (Cespedes 1993; Davis, 1993; Dewsnap & Jobber, 1999; George et al., 1997). However, Kahn (1996: 139) found that collaboration, measures as the more effective, volitional and unstructured process of integration and subsuming the notions of achieving collective goals, as well as of mutual understanding, and of ideas and resources, had a very strong and significantly positive relationship, resulting in both individual and organisational performance.

### **2.3.6 Conclusion**

Retail success can be defined as achieving high gross margins and customer service levels (i.e. being in-stock) with as little inventory as possible. Forecast accuracy, process lead-time, offshore/local sourcing mix and up-front/replenishment buying mix can have a significant impact on success in connection with sourcing seasonal products with fashion content. Forecast accuracy depends on the characteristics of the product and supply lead-time. Lead-times are traditionally long and buying decisions are often made seven to eight months prior to the start of the selling season. Forecast errors lead to some of the items being liquidated at clearance prices while others stock-out and lead to lost sales. As a result retailers often resort to higher mark-up prices with fashion products. However, typical retail performance measures such as service level, lost sales, product substitute percentage, gross margin, gross margin return on inventory, sell-through percentage and mark-down rate mask the source of the problems.

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## **Section 2.4: Institutional theoretical framework**

### **2.4.1 Introduction**

This chapter deals with the development of an institutional theoretical platform, with particular emphasis on the internal and external elements that affect organisational change. It also highlights the manner in which Lean can be applied to support competitive strategies through cost-effective on-shelf availability of products.

The use of a Theory Specification Case, advocated by (Keating, 1995), was seen as appropriate in that the researcher started by developing an integrated model that had to be evaluated and further specified through the empirical study. As Keating (1995) explains, the purpose of the theory specification or illustrative case is typically to establish a broadly defined theoretical perspective in an operational manner within the field. The literature served the basis for developing this theory and it was used to assist the researcher in answering the research question.

The theoretical framework as shown in Figure 6.01 on page 97, assumes that Lean integrates and aligns the management of all functional areas to support the organisational objectives; particularly in the context of delivering greater on-shelf availability for shoppers and consumers. However, the model will be tested in the market, with specific emphasis on the chosen manufacturing and retailing organisations to substantiate its relevance, practicality and credibility and within the competitive environment.

As highlighted in Figure 6.01, it is expected that the manufacturer drives the process of ensuring that the foundational modules are in place in order to ensure the sustainability of organisational change; these, for example, would include compliance to internal controls, leadership development in the context of capability building, and internal alignment of process, objectives, and standards. Some of the key joint benefits, for both the manufacturer and retailer as shown in the figure, include but are not limited to the organisational profitability, asset return on investment and more importantly, the opportunities in increasing economic value-add. Furthermore, the strategic levers for the retailer's supply chain are similarly articulated as an attempt to demonstrate the manner in which both organisations' supply chains can be integrated to improve product availability. As such, it is expected that the use of Lean tools would support

the delivery of the described levers, subsequently resulting in the improved presence of products on shelf, and thereby lead to more economic benefits for both organisations.

#### **2.4.2 Institutional factors**

The application of Lean is viewed as an enabler for organisational change and transformation. Commentators recommended Lean for organisational economic with deterministic and transformational reasons in response to institutional change. Burns & Scapens (2000) defined institutions as the shared taken-for-granted assumptions, which identify categories of human actors and their appropriate activities and relationships. Institutionalisation is intended to reflect the processes of habituation of social activity, where repeated actions in organisational life become routinised and such routinisation provides a relatively stable environment for social actors that simplifies organisational decision-making and reduces the overheads incurred when confronting novel but similar activities, (Coad & Cullen, 2006). As such, the institutional theory provides the framework to produce a generic process of unfolding transformational developments, in a sense that change is depicted as a consequence of human action which involves cumulative change of habits. The key attributes of institutional theory include changes management, business processes analysis, organisational development analysis, management practices, structures, rules and routines, organisational capabilities, learning and development.

As proven in other business improvement field studies, such as within the management accounting areas, Soin et al (2002) applied the institutional theory in order to create understanding of change, as a process of evaluating the relative roles of other institutionalised practices apart from management accounting and to assess the organisational impact of the new management accounting systems. As such, this theory was seen as a suitable explanatory framework to make sense of the manner in which Lean supports competitive advantages. Its attributes provided a general framework for conceptualising institutional change in the sense that produced a useful starting point through which the adoption of Lean to support competitive on-shelf availability of products at retail store levels can be understood.

Meyer & Rowan (1977) emphasised the importance of legitimacy in explaining organisational structures and working practices. The new institutionalism has adopted a more sophisticated view of organisational structures that enable management to analyse the dynamics of organisational processes. Structure is seen as a dualism, according to Giddens (1984), because of the inconsistent outcome of the inter-play between structure and action. As such, whatever

the status of Lean as an abstract socio-technical system, the organisational outcomes of an implementation process are likely to be uncertain. This uncertainty is even more likely when, as Jones & Dugdale (2002) point out, the Lean system is subject to constant revision and reinterpretation as it is embedded, dis-embedded and re-embedded over a number of years in different settings.

#### **2.4.2.1 Initial conception**

The initial conception of a need to change may be either in response to external or internal pressures for change - called reactive change, or through a belief in the need for change to meet future competitive demands – called proactive change. The increased complexity and uncertainty of international business markets have led some organisations to base change on imitation, rather than on any conception of a need to adopt untried technologies or management techniques, (Bennis & Nanns, 1985; Clarke & Bellis, 1996).

It is therefore imperative for management to understand the perceived driving forces within the institution. Leaders of change need to answer questions such as: What is the change supposed to do? What should be different when Lean techniques are successfully rolled out? What actions might specifically assist the organisation to get there? Given the fact that change, by definition, involves territory that has not yet experienced; as such, how will management know what works and what does not? Which is the best way to get Lean started? Is Lean chosen because it uses the most efficient techniques and tools for meeting organisational needs for better? Is Lean viewed as a trigger of organisational change?

The work of Burns & Scapens (2000) on organisational change, specifically within the management accounting environment, explained four categories of organisational changes ranging from (i) what is being changed or left unchanged, (ii) the pathways and timing of change, (iii) management accounting [*also interpreted and considered as transformational change in this case study*] change as an evolutionary process and (iv) the classification of change. Despite Burns & Scapens' predominant focus on management accounting change, this approach has been considered as an appropriate and relevant model to adopt and apply to this case study research, in an attempt to understand the manner in which the implementation of Lean tools can transform the organisational value chain to accelerate the extent of products' on-

shelf availability. The key fundamentals of these change categories are explained in the following sections.

#### **2.4.2.2 What is being changed or left unchanged**

A theory of organisational change should generally comprise a number of characteristics. First, the theory has to indicate what is being changed or left unchanged. Given that institutions can be regarded as imposing form and social coherence upon human activity, through the production and reproduction of settled habits of thought and action, (Burns & Scapens, 2000), institutional theory tends to concentrate on patterns and configurations that persist. As such, it argued that organisational change must be based on showing changes in routines and reproducing new patterns of behaviours.

Once a need for change has been identified, the complex non-linear and the so-called black box process of organisational change begin. This period comprises a number of different tasks, activities and decisions on the general theme or context of change. Activity assessment may then follow, with focus on areas where employees set out to find the best option for achieving the change objectives. With needed change to meet competitive pressures and a fall in profitability, for instance, management has to decide on the type of change managers to introduce. This may be in human resources, products or services, tasks, technology, management information systems, consumer and shopper marketing, and so forth.

The 'what' is being changed – the aspect of business performance or organisational life being adjusted, according to Burns & Scapens (2000), is not an end in itself. Rather, it is largely a means to bring about some new state of the organisation at a later time, a new state that usually cannot be achieved by a different step. These actions should solve problems and be useful in them to provide immediate benefits and results.

#### **2.4.2.3 The pathways and timing of change**

Jones & Dugdale (2002) developed a procedural framework that is based on the assumption that organisations continuously move in and out of many different stages, often concurrently, during the history of one or a number of organisational change initiatives. Since organisations undergoing change comprise a number of states which interlock and overlap, the processes

associated with change should be analysed as-they-happen, for individuals and groups both within and outside the organisation.

The introduction of action offers a second desirable characteristic; that the theory can trace both to pathways of change – how has change tracked its way through the organisation - and the timing of change. Burns & Scapens (2000) introduce a distinction between action and institutions by arguing that institutions constrain and shape action synchronically, such as at a specific point in time, while actions produce and reproduce institutions diachronically, i.e. through their cumulative influence over a period of time.

Furthermore, Burns & Scapens (2000) introduced a distinction between the realm of action and the realm of institutions, with organisational rules and routines linking the realms through processes of encoding, enacting and reproducing management accounting change. The first step in applying the theory, as suggested by Burns & Scapens is an analysis of the institutional realm with an identification of the initial set of routines and rules that characterised management control in the organisation. This would result in the main actors and their relationship with the wider institutional realm being easily identified.

#### **2.4.2.4 Transformational change as an evolutionary process**

Burns & Scapens (2000) argue that management transformational change may not necessarily lead to more efficient practices. Change is path-dependent, subject to satisfying criteria and to a mixture of random, systematic and inertial forces. The extent and type of change may be influenced by organisational resistance in the enactment of rules and routines, particularly if they challenge existing meanings and values.

Once the final general timeframe has been determined, following the implementation of change, new organisational arrangements and operation of new work practices, begin to emerge. During this period, a number of novel developments or contingencies may comprise the change outcomes. Unanticipated technical or social problems, for instance, may undermine the usefulness of the newly changed management system in its replacement of the traditional methods. This may cause conflict and confusion among staff and management and threaten the establishment of new working relationships.

The early stages of operating under new systems may be characterised by uncertainty, conflict and misunderstanding among employees, who may variously adapt, modify, reassert or redefine their positions under the new operating procedures and working relationships set up in the implementation of change. This is also the period in which a relatively stable system of the Lean methodologies and operations may emerge with new patterns of relationships and new practices. It is during this timeframe, therefore, that the outcomes of change can be examined and contrasted with the operating system prior to change. Although in reality it is often unrealistic to talk of an endpoint of change, it does make sense to talk on the effect of a particular type of change.

#### **2.4.2.5 Classification of change**

The institutional theory of change also offers a way of classifying the impact and severity of organisational change and the management of process innovation and renovation. Burns & Scapens (1999) proposed three dichotomies to this aspect; namely formal versus informal change, that is, conscious design as against tacit change, revolutionary versus evolutionary change, or in other words, fundamental disruption as opposed to gradual change; and regressive versus progressive change, that is, ceremonial as opposed to instrumental change.

According to Burns & Scapens (2000), an institutional framework has a direct correlation with organisational rules and routines and defines institutions as a way of thought or action of some prevalence and performance, which is embedded in the habits of a particular group or the customs of people. They further argued that organisational rules are the formally recognised way in which things should be done, while organisational routines are the way in which things are actually done. When looking at Lean value chain optimisation, rules may be seen as the formal management demand and supply planning mechanisms set out in the organisational manual while routines are the management and operational practices actually in use, in this particular case between the manufacturer and retailer. Institutional framework recognises the fact that these practices can both shape and be shaped by the institution, which governs organisational activities.

There can be a two-way relationship between rules and routines; rules may be established and through their implementation, routines will emerge. Routines may emerge under certain circumstances and later be formalised as rules; and these procedures support the sustainability of institutional strategic changes.

The three dichotomies of change classification are as follows:

- (I) Formal changes occur by conscious design according to Burns & Scapens (1999) and usually through the actions of a powerful individual or group, i.e. the introduction of Lean value chain systems into the organisation. Informal change on the other hand occurs tacitly. According to Burns & Scapens (1999), formal and informal changes are relatively similar to intentional and unintentional changes. Such a distinction focuses on change, which follows new rules, being the intentional changes and change which evolves at a tacit, subconscious level, likely to incorporate both types of change.
- (II) Revolutionary changes involve a fundamental disruption, while evolutionary changes involve incremental change, which is only a minor disruption to existing routines and institutions. When routines are widely accepted in the organisation, they are likely to influence organisational activity and are also likely to be quite resistant to change. A process of such nature may be classified as evolutionary because it changes over a certain period of time and comprises both random elements and inertial forces, which provide continuity over specific periods of time.
- (III) With regressive and progressive changes, Burns & Scapens (1999) talked about ceremonial and instrumental organisational behaviours. They argued that ceremonial organisational behaviour emerges from a value system that discriminates between human beings and preserves existing power structures within the organisation. Instrumental behaviours emerge from a value system that applies best available knowledge and innovation to problems and seeks to enhance relationships. However, regressive change has been described as reinforcing ceremonial dominance, therefore restricting organisational change. Hence, the progressive change terminology is basically the displacement of ceremonial behaviour by organisational behaviours.

#### **2.4.2.6 Socio-technical systems**

Organisational survival today depends on courage and innovation – the courage to challenge prevailing business models, the innovation to invent new services, products and markets. Hence, competitive success in the 21<sup>st</sup> century will belong to organisations that escape the tyranny of their served market to create new ones, a process that requires sweeping challenges to obsolete assumptions. Increasingly, business leaders and rank-and-file employees question not whether to change, but how. The challenge is not simply a large-scale conceptual and philosophical issue.

Existing innovation system approaches mainly focus on the production side where innovation emerges, (Geels, 2004). To incorporate the user side explicitly in the analysis, the first contribution is to widen the analytic focus. Geels (2004) proposed the socio-technical system (ST-system), which encompasses production, diffusion and use of technology. He defined ST-systems, in a somewhat abstract, functional sense, as the linkages between elements necessary to satisfy society, such as information, operations and distribution. As technology is a crucial element in modern societies to fulfil those functions, it makes sense to distinguish the production, distribution and use of technologies as organisational sub-functions. To fulfil these sub-functions, the necessary elements can be characterised as resources. Hence, ST-systems consist of artefacts, knowledge, capital, labour, cultural meanings and so on. ST-systems do not function autonomously, but are the outcome of the activities of human actors. Human actors are embedded in social groups, which share certain characteristics such as responsibilities, accountabilities, norms and perceptions.

Scott (1995) advocates the coordination of organisational activities through the institutional rules namely, regulative, normative and cognitive rule, semi-coherently linked together to enhance efficiencies. These three levels introduced above can be used to understand system innovation. As long as ST-systems are stable and aligned, (Geels, 2004), radical innovations have few chances and remain stuck in particular niches. If tensions and mismatches occur, however, in the activities of social groups and in ST-regimes, this creates a window of opportunity for breakthrough of radical innovation.

In the case of technology, a number of strategic objectives have been identified that influence management's decision to embark on a programme of change. These may include market objectives, operating cost objectives, product/service quality and operating control objectives. A

change in technology may offer several possibilities for increasing the organisation's ability to adapt to changing market conditions. Alternatively, a new management technique may enable a more effective use of existing resources and increased operating efficiency while reducing overall operating costs, thereby improving the organisation's business market position. Such an objective is achievable in cases where modern or advanced management techniques are introduced for the purpose of providing rapid access to accurate, up-to-date information on the disposition of material resources.

Apart from improving the organisation's market position and reducing operating costs through the more efficient use of resources, savings could also be made by reducing the total number of jobs required, (Geels, 2004). Alternatively, the introduction of new technology could be used to eliminate management's dependence on in-house labour by transferring from employment to an outsourcing basis. This framework also mirrors the work of Soijn et al. (2002), who characterised organisational transition as a movement from a present state of organisation to some future state.

#### **2.4.3 The limitations of institutional theory**

The institutional theory developed by both Soijn et al. (2002) and Burns and Scapens (2000) is perceived to be an established framework. It has however been criticised by other commentators in that it had little focus on a number of key imperatives. For instance, Hopper & Major (2007) chose to rather focus on proposing the application of a theoretical triangulation, with specific emphasis to theoretical reconciliation and cross-fertilisation in response to the limitation of mono-theoretical explanations. The theoretical triangulation focused on three elements: (i) Economic approaches and the public interest, (ii) Dialectics and intra-organisational dynamics and (iii) Actor network theory stipulating the change process when implementing advanced management techniques such as the Lean technique and methodologies.

The institutional theory applied in this research study did not elaborate the strategies applicable to dialectics and intra-organisational dynamics, (Hopper & Major, 2007). Dialectics analysis associated with labour process theory revealed how struggles, autonomy, self-identity and inter-professional rivalry affected management practices and differences in institutionalisation. Hopper & Major (2007) noted a central paradox in new institutional sociology; if organisational actors' actions, intentions and rationality are conditioned by institutions, it would be difficult to

change institutions that form part of their mind-sets. So, they use dialectical analysis to reformulate institutional change theory. They further advocated that social expectations, often with a long history continually reproduced in social interaction, produce widely held beliefs and perceptions about institutions.

Continuous recursive relations across and within levels can produce mutually incompatible arrangements or contradictions leading to conflict, (Hopper & Major, 2007). As such, it was recognised that contradictions do not automatically stimulate institutional change because actors would mobilise others only after praxis and they then act strategically. Therefore, dialectics analysis provides a deeper, dynamic analysis of institutionalisation that resolves the new institutional sociology paradox of embedded organisation. The institutional contradictions that precipitate collective action, according to Hopper & Major (2007), ranged from the legitimacy that undermines functional efficiency, to adaptation that undermines the adaptive, intra-organisational conformity that creates inter-institutional incompatibilities, to the isomorphism that conflicts with divergent interest. Hopper & Major's (2007) theoretical triangulation model stipulated that the Actor network theory reinforced the need for new institutional sociology to pay attention to organisational practices rather than rationalities. As such, the establishment of Lean as a tangible management technique throughout the value chain with explicit characteristics requires translation, mediation and enactment, which can produce multiple and sometimes unstable versions of Lean in action. In this regard, extensive intermediaries for establishing broad knowledge on Lean value chain and the relevant practices therefore becomes of paramount importance.

Coad & Cullen (2006), on the other hand, did not criticise the institutional theory. They rather explained the institutional theory model from an evolutionary economics perspective, which includes four inter-related elements; namely, institutionalisation itself, trust, capabilities and learning and change. They nevertheless recognised their selection of these four concepts as parsimonious in that they believed that it captured the main elements of evolutionary theory and furthermore, the concepts themselves are overlapping and interrelated, leading them to suggest no clear boundaries between them. They specifically highlighted the importance of trust based on experience and repeated interaction, i.e. that a partner will not behave in an opportunistic manner. As such, high levels of trust are expected in inter-organisational relations to reduce expenses of governance such as cost control, increase relationship investments in specific assets and increase the scope of inter-organisational activities along with the performance of

the third parties. Generally, trust allows transaction that would ordinarily require hierarchical arrangements to be completed by a network of partner organisations, (Coad & Cullen, 2006). This leads to competitive advantages of market transactions, such efficiency incentives, knowledge-sharing and reduced need for contractual controls.

Capabilities refer to the capacity of knowledge-based humans to leverage services from resources to perform economic activities; hence the application of resources rather than their mere possession, (Coad & Cullen, 2006). These core competencies (also termed as resource-based theories or capabilities) assume that organisations comprise bundles of resources that may be heterogeneously distributed and that resource differences between organisations may persist over time. Based on these assumptions, Coad & Cullen (2006) argued that when organisations possess resources that are valuable, rare, inimitable and non-substitutable, they can achieve sustainable competitive advantage through strategies that are not easily imitated by competitors.

The fourth element of learning and change represented a powerful critique against certain aspects of the neo-classical economic theory of organisations. Coad & Cullen interpreted this theory in the context that it included no notion of an internal process of development in organisations, leading to cumulative movements in any one direction and consequently regarded growth as simply a matter of adjusting to the equilibrium size of an organisation. They argued that if services are produced endogenously through various intra-organisational learning processes involving increased knowledge of resources, new combinations of resources are possible. As such, organisational development is depicted as an evolutionary and cumulative process of learning about organisational resources, in which increased knowledge creates opportunities for further growth, (Coad & Cullen, 2006).

However, the empirical evidence is collected through the application of Burns & Scapens' (2000) institutional theory regardless of the criticisms made by Hopper & Major (2007). This is because Burns & Scapens' (2000) model adequately provided a general analytical and evaluation framework to investigate institutional change and most of their contributions/arguments - what is being changed/left unchanged, the pathways and timing of such change, management accounting being evolutionary, change classification along with the associated technological innovation - would inevitably lead to the achievement of the same results and points made by Hopper & Major (2007) on the theoretical triangulation - involving

economics issues, dialectics and intra-institutional dynamics and the actor network theory - which refers to change processes.

In summary, one can finally argue that Coad & Cullen's (2006) suggestions have strong similarities to those in the theoretical framework articulated by Hopper & Major (2007), given the fact that they recognised that these interrelated and overlapping variables were of no difference to the well-developed institutional theory. Also, Burns & Scapens' (2000) framework highlighted the key focus areas for analysis, in the context of investigating the nature of organisational working structures, processes and practices as well as action plans and also generates the causes motivating organisational change such as the adoption of advanced management accounting techniques. The contributions made by the framework are also extended to the possibility of exploring and analysing the exact areas being changed along with new organisational rules and routines, as well as what was left unchanged. The definition of change categories whether formal or informal, progressive or regressive, revolutionary or evolutionary, or a combination of a number of these categories, also form part of their framework. This institutional framework also enables the examination on the manner in which strategic change is sustained once implemented, more specifically in the context of its life cycle from implementation to its maturity.

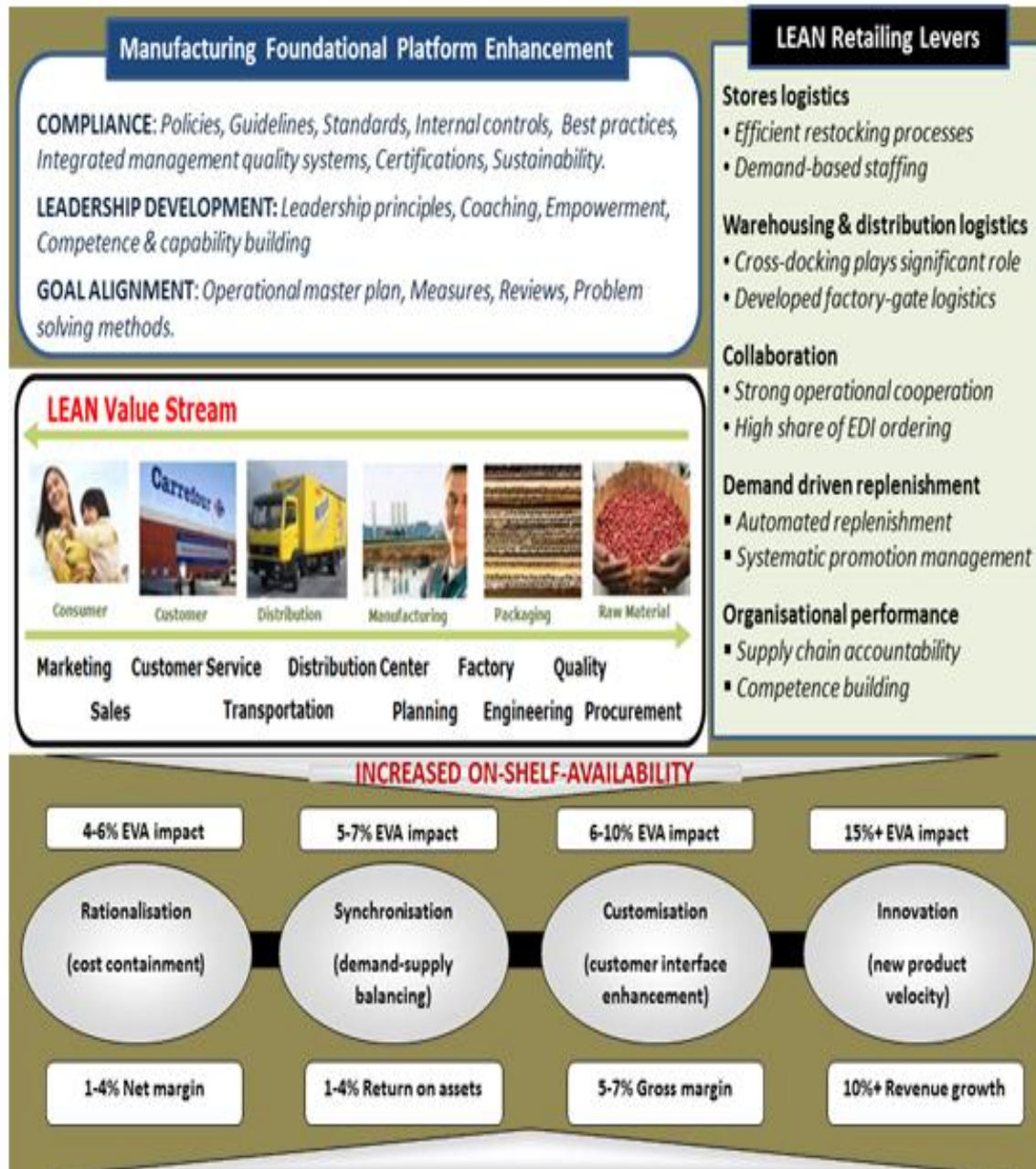
#### **2.4.4 Conclusions**

This chapter focused on the institutional change dichotomies with various classifications, ranging from formal to informal changes, to revolutionary and evolutionary changes and regressive and progressive changes and the manner in which institutional rules and routines emerge, along with their associated implementation processes. The developed framework for institutional theory demonstrates the manner in which Lean can be used to optimise on-shelf availability and support the delivery of competitive advantages.

Sustainable competitive advantages require that organisations continually innovate to create new products, services and processes that are well-matched to target market customers' needs and expectations. Product innovation is a prerequisite for participation in some dynamically technological sectors. Information technology is increasingly becoming a vital component for any product development process. Beyond the use of information technology for product and

service innovation, institutions can exploit information technology to achieve rapid introduction of new products and services and the development of the existing ones, as well as reposition themselves in a manner that enhances social integration with the target markets that are served. These are all integral parts of an institutional theoretical framework that provides an overview of organisational change.

Figure 6.1: Integrated Institutional Theoretical Model for Manufacturer & Retailers, (Source: Author)



## **2.5. Main conclusions on Literature Review**

The use of Lean tools has gained much credibility and been classified as the machine to lead fundamental organisational changes. It is based on the elimination of waste, driving continuous improvements in productivity and service delivery, resulting in enhanced customer value creation. Despite the historical predominance of Lean within the production operations environment, its use throughout the supply chain, including the retail and trade arenas continues to gain momentum. In this context, collaborative engagement between retailers and manufacturers through information and asset sharing, as a platform that plays a dominating role to streamline and synchronise the demand and supply planning is of paramount importance. Retail success is generally defined as achieving greater gross margins beyond the market average and customer service levels in the context the right stock at the right time. The dependency on reliable and dependable forecasts becomes one of the drivers for in entire value stream, considering the fact that forecasts errors only lead to either greater working capital in the context of poor cash flow management or lost sales.

In order to create visibility of the change requirements, along with the intended actions and results, this chapter also focused on the institutional theoretical framework, which enables the actors to detect both formal and informal management changes, determine whether these are revolutionary or evolutionary changes and regressive or progressive changes, including the manner in which institutional rules and routines emerge in organisations, as well as the implementation processes. The developed framework for institutional theory demonstrates the manner in which Lean techniques can be applied in an attempt to improve the levels of on-shelf availability of products. To date, it's evident that the sustainability of business and its competitive advantages requires consistent innovation of new products, services and management processes that are well-matched to the needs of consumers, customers and shoppers. Information technology has increasingly become a vital component for any process or product development strategy, and organisations are expected to exploit information systems to achieve rapid introduction of new products, process or services and the enhancement of the existing ones, as well as reposition themselves in a manner that enhances socio-ecological, technical and economic integration of the target markets.

Therefore, Lean provides the concepts, methodologies and necessary tools for the change processes and integrates the human and process aspects of process improvement. At the strategic level, Lean thinking sits alone and is relevant to all aspects of the framework with the

goal of understanding value creation and customer value. The focus at the strategic level of Lean thinking is effectiveness and the focus at the operational level of Lean production is efficiency. The concept of Lean thinking at a strategic level is operationalised through the application of different tools and techniques such as DMAIC, Autonomous Maintenance, Electronic Kanban, and so on, supported by a set of principles summarised as the five steps to becoming Lean. These include the specification of value, identification of the value stream, making the value-creating steps flow, promoting a pull culture, and consistently pursuing perfection in support of waste elimination. As such, Lean value stream is a strategic management framework that drives execution to deliver unique customer winning value, at the lowest cost through the collaboration, real-time synchronisation of products transfers, demand and supply priorities, vital market place information as well as logistics delivery capabilities. Lean is therefore believed to be the integral management solution to minimise inefficiencies. A leaner and collaborative value chain is described as a business tool that builds sales, as an interaction among peers sharing a common set of goals and measures, as a process for parties to jointly search for solutions, and as a relationship in which trading parties develop a long-term cooperative effort.

The next section focuses on the mechanism used in the context of this research study, particularly describing the used research method, in an attempt to answer the main research question that was posed in chapter one.

## **Chapter 3: Research Methodology**

### **3.1 Introduction**

This chapter focuses on the method that was employed during the empirical study to collect and analyse the information in order to address the research question. Researching sociological science assumes considering the ontology, epistemology and correct methodology to be used in the collection of information.

### **3.2 Action Research**

In order to have greater insight into the nature of reality, it was important that the relationship between the researcher and the subject under investigation be integrated. The researcher established an adequate association with the research sites through interaction with the key players, with greater observation of the systems being used and involvement with the business society that formed part of the study. In particular, it is worth stating that the researcher is one of the senior management executives for the selected manufacturing organisation. A case study methodology was therefore used in order to create an in-depth understanding of how the Lean tools could be adopted in order to assist management to optimise the levels of OSA of products, which could then possibly lead to improve business performance and accelerate economic growth of the studied organisations.

Given the fact that the researcher is one of the senior executive team members of the manufacturing organisation as one of the research sites, the consideration of Action Research (AR) methodology formed an integral part of the chosen case study framework in collecting information and observing trends. AR is viewed as a generic term that covers many forms of action-driven research, whereby the results are simultaneously categorised as actions and research that aim to create the body of knowledge (Coughlan & Coughlan, 2002).

The selected AR as the research methodology was further seen as best in class for this research due to its ability to influence a more collaborative working environment, in that it involves people who are concerned about a common issue at hand, whilst simultaneously taking a leading role in the production and use of knowledge about the subject in questions. This practice led the researcher to originate, design, conduct, analyse and act on Lean supply chain topics. In other words, the method was viewed as (i) a participatory action based approach, that drove a group of people categorised as participants who have a common interests, (ii) it

provided a democratic solution of who within the working group could produce and use the knowledge, (iii) it involves discussions that pooled every skilled individuals to work together, and (iv) the actions were intended to deliver key results, changes and desired improvements on the challenges being addressed.

According to Earl-Slater, 2002 & Coughlan, 2000, AR is a family of approaches that is driven by a cooperative problem-solving relationship between researcher and client systems, which aims at both managing change and generating new knowledge. As such, AR involved the participation of the researcher in the actual implementation of the redefined systems and processes, while simultaneously requiring the researcher to evaluate a certain intervention technique (Westbrook, 1995). AR was, therefore, the most appropriate approach for this research, because the psychological contract that arises between the researcher and the organisation gave the researcher access to data that is not usually available (Ahlstrom & Karlsson, 1996). As such, this research was conducted through practical actions rather than theoretical actions or about the intended action (Coughlan & Coughlan, 2002), in that it entailed several phases of discussions, observations, data collection and analysis, roll-out of the new practices, progress monitoring as well as performance evaluation, by the researcher during the study period.

### **3.3 Type of case study**

The use of the institutional theory of Burns & Scapens (2000) as a well-developed and established theoretical mechanism also helped to explain the intended purpose of the research case study, was being changed, the manner in which change took place and the associated reasons thereof.

The objective of this research study was thus to examine the use of Lean tools in today's manufacturing-retail supply chains in an integrated fashion, to investigate the potential benefits and contributions made by these Lean techniques, with specific emphasis to the reduction of OOS and driving better on-shelf presence and availability of products and merchandises at the retailer's store shelf for shoppers, to understand Lean's capabilities to support business performance and growth; and to explore the manner in which the joint adoption of Lean techniques could lead into a collaborative partnership for a manufacturer-retailer relationship. Therefore, the institutional theory was used to assist the researcher in answering the main research question.

### **3.3.1 Case study definition**

According to Yin (2003 and 1994), a case study is defined as an empirical enquiry that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used. Jankowicz (1995) further advocated that case study methodology is suitable for explanatory, descriptive and exploratory researches. A case study is a very worthwhile way of exploring existing theory and practices, and this enquiry method copes with the technical distinctive situation, in which there will be many more variables of interest than data points, Yin (2003). This, as a result, then relies on multiple sources of evidence, with data needing to converge in a triangulating fashion. Boris et al. (2005) also defined a case study as the development of detailed, intensive knowledge about an individual case, or a small number of related cases. This strategy was of particular interest to gain a rich understanding of the context of research and the processes being enacted in the organisations.

### **3.3.2 Suitability**

Given the need to generate in-depth insights that would allow the testing of the institutional theory in order to confirm or challenge its usefulness as an explanatory framework that sheds light on the application of Lean, a single inter-organisational case study method was used in this research. This single case study approach, using AR method, also created a better understanding of the nature of management changes that were required to support the acceleration of business performance. Further, the use of a single inter-organisational case study was seen as an effective research method because of the enormous similarities of challenges and opportunities interfaced with the practicality of real-life issues in both organisations, as well as the inter-dependence of both companies, including the fact that they have common objectives in improving OSA, (Yin, 1994). Jankowicz (1995) highlighted the fact that the case study approach has a considerable ability to generate answers to the Why, What, and How? questions. Although the What and How? questions tend to be more the concern of the survey method, which is not in this particular case, these types of questioning were applied in many occasions during the research phase and were found to be very useful to interrogate both the traditional and new ways of delivering business activities.

The AR method was thus seen as the most appropriate method due to the fact that the data collection techniques included various discussions, observations, business management reviews, on-going evaluation of key integrated initiatives, assessments of project and key

performance indicators, as well as various documentary analysis. This enabled the researcher to explore and understand the existing management theories and operating and mechanisms within the manufacturing and retailing environment, which led to the challenging of some of these theories and practices, and then providing sources of other advanced management techniques such as the introduction of Lean methodologies and tools.

### **3.4 The research setting**

The research site is one of the largest global food manufacturing companies, with operations in South Africa, along with a large retail trading partner. The site selected for this case study research was dependent more on the research question stated than on resource limitation and statistical sampling (Eisenhardt, 1989). The consistent factors that influenced the research site focused on the failure of the existing supply chain management divisions for the selected companies, in delivering better customer service through consistent availability of products at stores for their consumers and shopping customers, predominantly due to the continued use of historical and conventional supply chain models in today's new reality of business with enormous complexities, challenged by the ever increasing consumer demands and expectations.

This sector was understood as a viable research site mainly due to the following reasons:

- (a) The significant growth in consumer demands on food products and related customer services such as product ranges, value for money, convenience, quality and product availability – delivered whenever and wherever consumers want and need them, consequently increasing the level of competition.
- (b) A number of SA food retailers and manufacturers have experienced significant criticisms from their shoppers and customers, due to unmet expectations primarily driven by out-of-stocks of the required products categories at stores.
- (c) Increasing competitive intensity for retail floor space for product displays and merchandising at retail stores, driven by manufacturers' battle for store shelf.

In this particular research was done in two specific SA-based institutions, one manufacturer and one retailer. Given the interconnectivity and interdependence between these two companies in satisfying the consumers and shoppers, it was important to consider both organisations interchangeably in the research process. Furthermore, due to confidentiality, the identity of these companies was not revealed. The manufacturing company (described as MAN) selected

is the largest global food manufacturing organisation with operations in South Africa, but it is worth indicating that from a South African’s perspective, it is the third biggest food manufacturing institution. The retailer (described as RET) selected for this research study is one of the three largest retailers within the South African arena.

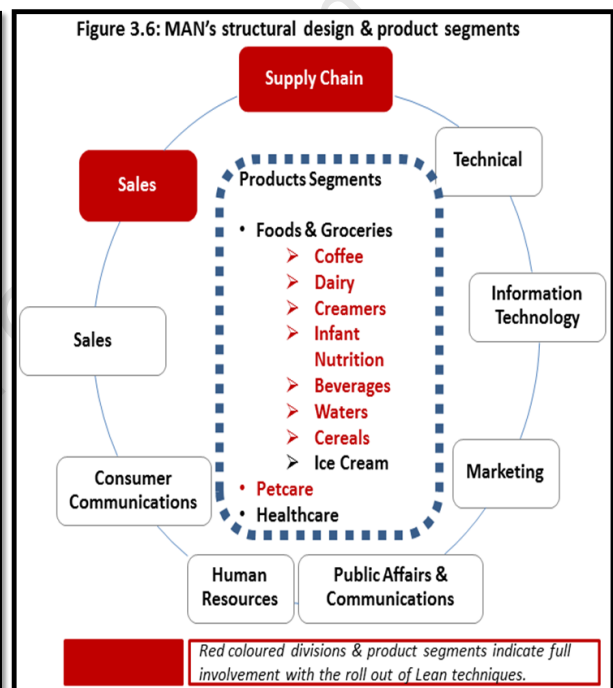
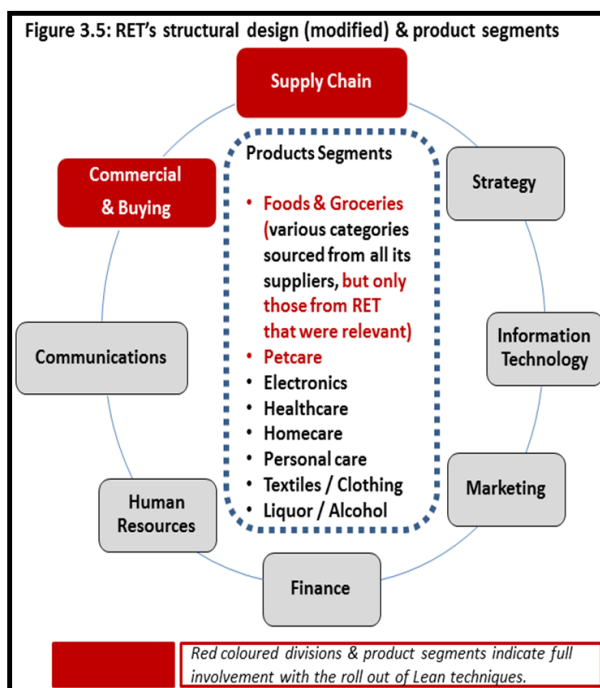
The overall audience and constituency forming part of the integrated Lean implementation team from both organisations, consolidated as one inter-organisational set up, included the functional areas indicated in the below Figure 3.4:

**Figure 3.4: Inter-organisational Lean Project team. (Source: Author, Action Research project)**

	Position	Responsibility
<p style="text-align: center;">Manufacturer “MAN”</p>	1) Supply Chain Director	1) Co-Sponsor
	2) Customer Facing Supply Chain Manager	2) Project lead & coordinator
	3) Customer Service Operations Manager	3) Order capturing & fulfilment
	4) Supply Chain Analyst/Planner	4) Stock analytics & replenishment
	5) Customer Business Manager	5) Commercial planning
	6) Logistics Manager	6) Distribution & transport
<p style="text-align: center;">Retailer “RET”</p>	1) Supply Chain Director	1) Co-Sponsor
	2) Commercial Executive	2) Project lead & coordinator
	3) Chief Buyer	3) Order planning
	4) Group Planning Manager	4) Stock replenishment
	5) Logistics Manager	5) Distribution & transport
	6) Stores Operations Manager	6) Stores operations & shelf management

The two chosen organisations are of great significance in terms of size. On one hand for instance, RET is structured with all the necessary traditional functional divisions such as Marketing, Finance, Supply Chain, Information Technology, Commercial, and so on, as shown in Figure 3.5. However, the only two divisions that were involved in the study include the Supply Chain and Commercial Division (the later also known as the Group Buying) division. RET products and Merchandises range from Foods to Textile, including Home and Personal Care. From a RET’s perspective, it’s worth stating that the only product categories that were part of this study include those highlighted in red, (see Figure 3.5), more specifically in the context of the Foods and Petcare products supplied by the associated MAN’s product catalogue, as shown in Figure 3.6.

Also, MAN is similarly structured with its traditional functional areas, as indicated in Figure 3.6, which also shows that its entire bucket of product categories formed part of the Lean's journey; with exception to the Ice Cream and Healthcare product categories which did not form part of the Lean's roll out due to prioritisation and complexities in its manufacturing processes. Also, it's only the Supply Chain and few members from the Sales division that formed part of this study. The decision to focus on both supply chain divisions in an integrated fashion, with support from certain members of the Sales and Buying divisions, as well as the limitation to the selected segments of product categories from within the inter-organisational set-up, enabled a more focused approach and advanced the AR based agenda throughout the study.



Furthermore, RET has just over 1300 stores or retail outlets across the African continent, with 89% of these stores within the South African territory, all categorised at different formats such as Super-Market, Hyper-Markets, Pharmacies, Express, and so on, segmented between corporate stores (meaning stores that are solely owned by RET itself) and Franchise stores (meaning outlets that owned by independent entrepreneurs but compliant to RET's operating principles), as may be seen in Table 3.3. With such magnitude, this study only focused on 63% of the total number of retail outlets, specifically concentrating on 841 Super Markets and Hyper-Markets stores within South Africa.

It's important to highlight the fact that the stores seen as the relevant sample for this research are located throughout the country. Table 3.2 makes reference to the national distribution platform which aligns with the overall retailers' landscape, that not only places particular emphasis to the regional demographics that simultaneously represents the bulk of consumers, but also talks about the respective gross domestic product as contribution to the South African economic platform as whole.

**Table 3.3: Number of RET's outlets.**

<b>Number of Stores by format</b>	
<b>Total Group</b>	<b>1326</b>
<b>Total Corporate Stores</b>	<b>774</b>
<b>Hyper Markets</b>	<b>176</b>
<b>Super Markets</b>	<b>386</b>
<b>Pharmacy</b>	<b>25</b>
<b>Liquor Stores</b>	<b>119</b>
<b>Clothing</b>	<b>68</b>
<b>Total Franchise Stores</b>	<b>552</b>
<b>Super Markets</b>	<b>279</b>
<b>Express Stores</b>	<b>43</b>
<b>Liquor Stores</b>	<b>78</b>
<b>Stores in the rest of Africa (excluding South Africa)</b>	<b>152</b>

Source: RET's supply chain strategy office

Red coloured store format & number of stores indicate number & types of retail outlets that formed part of the Lean techniques' roll out

**Table 3.2: South Africa's Retail Territory; Source: RET's Supply Chain strategy office.**

Province Name	Capital	Contribution to country's GDP	% Languages Spoken by consumers
Western Cape	Cape Town	14.0%	Afrikaans 49,7% / isiXhosa 24,7%
Eastern Cape	Bhisho	7.6%	isiXhosa 78,8% / Afrikaans 12,7%
Northern Cape	Kimberley	2.3%	Afrikaans 53,8% / Setswana 33,1%
Free State	Bloemfontein	5.5%	Sesotho 64,2% / Afrikaans 12,7%
KwaZulu-Natal	Pietermarizburg / Durban	16.1%	isiZulu 77,8% / English 13,2%
North West	Mafikeng	6.5%	Setswana 63,4% / Afrikaans 9%
Gauteng	Johannesburg	33.9%	Multilingual
Mpumalanga	Nelspruit	7.1%	Multilingual
Limpopo	Polokwane	7.0%	Multilingual

### **3.5 Data collection**

One should approach the data collection process with a well-defined research focus, using the existing literature to identify potential important variables, Eisenhardt (1989), but not to specify the associated relationships among these variables. Also, the process of data collection responded to Eisenhardt (1989) who pointed out that the overlapping of data collection with data analysis not only gave the researcher a head-start in analysis, but more importantly allowed the researcher to take advantage of flexible data collection.

Given the above arguments, a stratified sampling of the type of data and information to be collected as shown in Table 3.4, was used in this research due to the dynamics of the organisations being investigated. Martin & Kevin (1999) defined stratification as a modification of sampling in which one divides the population into two or more relevant and significant strata based on one or a number of attributes. As such, the organisation was stratified according to the management team, by different departments such as Commercial Buying, Demand and Supply Planning, Customer-facing Supply Chain, Sales, Store operations, Logistics, and so on, the overall audience as part of the sample driving the Lean initiative may be seen in Figure 3.4, dividing the sample into a number of subsets, with the management being categorised a set of relevant strata to enable the sample to be more representative of inter-organisationally integrated supply chain and ensure that each stratum is represented proportionally.

#### **3.5.1 Observations, meetings and discussions**

Given the adoption of AR methodology, the primary data, respective sources and the respective collection methods are reflected on Table 3.4, shown on page 109, which entailed in-depth discussions on the subjects; business reviews; visits to stores, factories and distribution centres; micro management of key actions and clear observation with the working groups, as well as informal meeting.

The researcher also gathered data by looking at the various strategies, documented profiles, information systems, sales reports, business reviews, spreadsheets, graphs and other management reports. Informant discussions during the weekly visits that were conducted at stores, production plants and distribution centres were crucial parts of this case study. The key participants and respondents were expected to provide valuable insights through other sources of evidence, such as relevant buying behaviours analysis by product categories, stock management process at the receiving back doors of the retail stores, frequency of store

replenishment, average number of selling unit per day, sales trends due to stock levels at stores, levels of availability of key SKUs and consumer buying patterns, and son on; and the respective business reviews were scheduled with people who possessed these types of information through the weekly operations reviews, monthly operations reviews and quarterly strategy reviews in order determine the levels of performance and compliance on the set processes.

Given the position of the researcher, the research setting was further seen as favourable for AR and this suited the researcher and other internal practitioners. The data collection methods included the use of a dialectic approach, in that various stakeholders were used as source of collecting information or data, through various types of face-to-face interactions, pre-during-post the research study. According to Stringer (1996), AR is always rigorously empirical, as it requires people to define clearly and observe the phenomena under investigation. In this context, it's fair to indicate that mutual agreement between the researcher and the working group on the said phenomena and the types of events, process and observations to be evaluated, as well as the data collection methodology underpinned the expected value of the research project. The collection of various types of data and insights from different sources, resulting in the generating analytics as an opportunity to establish the trends in the performance levels, led to an increased rigor and reliability of data as well as the intended actions. This seems to be in support of Stringer (1996)'s arguments on the need for triangulation of data during AR.

The researcher used a number of tactics during the various observations, to collect information, namely: process quality, measurements assessment, designs of experiments, complementary data, capability, statistical process control, brainstorming, expert opinions, informal assessment, and the selection of rational subgroups to assess process stability. The researcher who was part of the practitioners' group, used a set of key questions during the course of this AR, as shown in Table 3.4 (bottom of the table), as part of the observations. Finally, the use of self-reflective minutes from meetings or personal journals about events also formed an important source of AR, as one of the key sources of data, in that these notes enriched the picture of what was occurring. Some of the entries into the self-reflective journals included behaviours, cultures, dedication level to the delivery of strategies, patterns and practices, systems being used, evolutionary changes, root causes and effects, proposed actions, decision making processes, unintended consequences, levels of influences within the working groups, and so on.

### 3.6 Information access strategies

It's worth starting that given the fact that the researcher is one of the senior executives at the manufacturing organisation, supplemented by the adoption of AR, there was a predominantly free access to information. However, access to information on the retailer was sometimes based on the researcher's request to seek access to a range of participants within the retailer. The researcher acknowledged the potential sensitivity of confidential information using these methods of collecting data. Also, based on the existing inter-organisational modus operandi, the presence of status between the two institutions enabled such access to information with no difficulties.

**Table 3.4: Source of Data/Information & Portfolio of evidence. (Source: Author, Action Research project)**

Integrated supply chain segments	Required type of data or information	Source of data (departments)	Data collection method
<b>Manufacturer</b> "MAN"	Production costs (as a % of turnover)	Supply chain KPI dashboard	Factory visit & monthly reviews
	Productivity (throughput per man hour)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	Market share (by product category or segment)	Marketing insights	Monthly product category reviews
	Retail ready product working capital (total inventory in days & value)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	Case fill rate (% of fulfilled orders)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	0-90 days supply & promotions planning accuracy (in %)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	>90 days Planning & forecasting horizons	Supply chain KPI dashboard	Future supply risk meetings
	Root causes of OOS	Supply chain strategy office	Strategy meetings & observations
<b>Retailer</b> "RET"	Retail ready product working capital (total inventory in days & value)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	On-shelf availability (in %)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	0-90 days demand & promotions planning accuracy (in %)	Supply chain KPI dashboard	Forecasting review,
	>90 days Planning & forecasting horizons	Supply chain KPI dashboard	Future supply risk meetings
	Case fill rate (% of fulfilled replenishment to stores)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	In-distribution centre stock availability (in %)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	Operating efficiencies at stores & distribution centres	Logistics	Visits to stores & distribution centres
	Transport reliabilities & on time deliveries	Logistics	Observations
	Root causes of OOS	Supply chain strategy office	Strategy meetings & observations
	Order execution performance	Buying & planning	Weekly order fulfilment meetings
<b>Key Questions asked by the Researcher during the interactions &amp; as part of Observations</b>	<ul style="list-style-type: none"> <li>How is what you're doing working for you?</li> <li>What assumptions are you making and what's their validity?</li> <li>What issues are we avoiding?</li> <li>What options do you see for the challenge?</li> <li>What ideas do you have to making this project even more successful?</li> <li>What are the measures &amp; KPIs telling us?</li> <li>What else can we do differently?</li> <li>How would the root causes affect the process output? What's the greatest impact on business?</li> </ul>	<ul style="list-style-type: none"> <li>What are the resource requirements?</li> <li>What's the source of data &amp; how frequently is it collected? What's the communication plan?</li> <li>Which solutions are most likely to work?</li> <li>How will we control the process to sustain the improvements?</li> <li>What are opportunities for us to apply the learnings to other areas or product categories?</li> <li>What's the scope of the problem, how often does it happen &amp; which other areas are affected?</li> <li>How sustainable are the solutions &amp; results?</li> </ul>	

### **3.7 Data analysis**

The proposed data analysis methods used in this research is aligned to Eisenhardt's (1989) recommended techniques. This involved the identification of common patterns and unique conceptions derived from Lean events. Thus, archival record chronology provided a sanitised perspective of critical issues and their resolution during Lean's implementation process, Eisenhardt (1989). Another method of data analysis required dissecting the major factors suspected to influence the implementation of Lean tools within the integrated supply chain set up, which involved the examination process of whether Lean implementation was well-described by the institution to improve on-shelf availability.

The analysis of data and other information also entailed the process of inter-organisational cross-case analysis, as highlighted by Eisenhardt (1989), in order to identify cross-case patterns within the inter-organisational cluster. This involved the selection of categories or dimensions that was identified within the similarities between inter-organisational value streams; coupled with the key inter-organisational differences.

### **3.8 Qualitative analytical protocol**

Lillis (1999) recommended that the analysis of any qualitative data involves the procedure of summarisation, classification and interpretation the information. As such, a qualitative analytical approach was applied to analyse and interpret the information in this research, supported by the need to conduct in-depth conversations, along with the contextualisation of the process used in the implementation of Lean.

The goal of AR is both diagnostic as well as remedial. As a systematic process for finding the solution of a problem at hand, the researcher chose to adopt a number of on-going and repetitive steps during the research study. These included (i) the identification of a problem area, such the increasing OOS for a specific food product, (ii) collecting and organising the data and other analytics, (iii) interpreting the actual data through various types of root causes analysis and paretos, (iv) developing, creating and agreeing on actions with the relevant practitioners in to improve or amend the situation or practice, and (v) reflecting on the outcome which also allowed an on-going process of self-evaluation.

The systematic approach suggested by Lillis (1999) was also applied in order to reduce the level of uncertainty and hence increase the level of trust in the research results. The information

collected during the discussions needed to be aligned to the themes that were under investigation in an attempt to understand the manner in which Lean was able to deliver greater OSA of products for customers and shoppers at stores. As such, the researcher was expected to look for supportive arguments and evidence to minimise the level of bias, resulting in an audit trail enabling the reader to track and trace the source of the conclusions. Based on this, the information concluded whether the Lean techniques can indeed optimise OSA of products in order to further contribute to a better level of business performance within the SA manufacturing-retailing sector. According to Yin (2003), the lack of formal database for most case efforts is a major shortcoming for case study research. This has, therefore, been rectified in the case study through the visibility of factual data and the monthly reporting of key performance indicators, which led to the study's conclusions in a formal and presentable database that also provides recourse, and therefore increased the reliability of the entire case, through quantitative facts.

### **3.9 Potential bias with qualitative analytical protocol**

Given the potential inevitability of the qualitative analytical protocol for possibly not eliminating all potential bias, the researcher decided to interpret the information extracted from management reports and archives, including the various discussions and observed behaviours and trends. Some of the means to control bias and to produce reliable data, analysis, and draw adequate conclusions from this AR research included the facts that the researcher: (i) Ensured that the validity of the AR skills were depended on whether the actions that arose from the research helped solve or improve the OSA challenges and increased the participants' controls over the situations, more specifically in the context of pragmatic workability; (ii) Drove the contribution steps to the reorganisation of new patterns of communications, by encouraging new ways of engagement, discussions or dialogue between different groups of people; (iii) Ensured that each member of the working group and authority was consulted, with all the guiding principles being accepted well in advance; (iv) Created an environment where all the respective participants were allowed to influence and challenge the work being carried, with the progress being made consistently visible and open to further critics from other stakeholders; (v) Was mindful that all the necessary permissions were sought and obtained in advance on any visit to stores, distribution centres or factory being conducted, as well as the analysis and examination of any document or management report; and that maintenance of the confidentiality was not negotiable due to competition; and finally, (vi) carefully recorded of all decision and actions taken, including the accumulation of evidence to determine the degree to which the objectives

were being met enabled the researcher to minimise potential bias [even though these confidential records are not for public consumption, directly or indirectly, through this case study research]. This method has been advocated and applied by a number of commentators, such as Boris et al. (2005), Jankowicz (1995), Martin & Kevin (1999), Yin (2003) and Eisenhardt (1989).

### **3.10 Validity**

#### **3.10.1 Internal validity**

The research was intended to analyse, investigate and describe the manner in which the Lean tools can be applied to support consistent availability of products on shelf, ready for consumers and shoppers, and ultimately support the stimulation of business performance, in an inter-organisational supply chain environment. The relevant need for ensuring internal validity during the investigation and the application of qualitative protocol to evaluate the research results was, therefore, of utmost importance. Yin (1994) and Saunders et al. (2000) advocated that an exploratory research study allows an in-depth understanding of observations and a greater level of involvement with the organisation under investigation. This enhanced the reliability of information supplied in this research and enabled the researcher to provide empirical evidence to support the conclusions. Also, the development of portfolio of evidence through data and management reports that led to the study's conclusions that provides recourse was applied in this case study, in response to Yin (2003), and hence increased the reliability significantly.

#### **3.10.2 External validity**

The extent to which the research design was structured may certainly cater for generalisation, as the application of the findings and results to other organisations was expected to be highly unquestionable. However, this was of a particular worry because the study was based on two companies but classified as one specific inter-organisationally clustered research site, and such inter-organisational supply chain was relatively different from competitors. Given the fact that this research was Action-based, where qualitative analysis and semi-structured, unstructured and in-depth discussions and observations were applied, it was feasible to make some generalisations about the entire industry, due to the focus on customers as a whole, along with the aspirations to develop compelling techniques and strategies in response to the intensive competitive environment.

## Chapter 4: Case study results and analysis

### 4.1 Introduction

This chapter deals with both the results and analysis extracted from the empirical case study as an attempt to understand the manner in which the implementation of Lean techniques can support the supply of the cost-effective and consistent presence of products at stores in the context of OSA, within the South African manufacturing and retail industries. The case analysis follows the approach propounded by Eisenhardt (1989), which involved inter-organisational cross-case analysis. The manner in which the institutional theory proved useful in explaining and contextualising the application of Lean methodologies in supporting the drive for an improved OSA of products, thereby improving the business performance, is also discussed at a later stage of this chapter.

This research study focused on the application of Lean within the manufacturing and retailing environment and attempted to answer the following research question: *How can Lean techniques stimulate business performance in an integrated supply chain environment?* The two studied companies (viewed as a single inter-organisational case) included one of the three largest retailers, which has a direct interface with consumers, as well as one of the three largest food manufacturing companies in southern Africa. More specifically, RET has an approximate growing number of 650 store outlets generating about US\$6,5billion in turnover, with four cross-docking and primary distribution centres, made up of hypermarkets, supermarkets and franchise stores, employing over 35 000 people, with its headquarters based in Cape Town, SA; while MAN has operations with 11 factories, generating about \$3 billion, with three primary distribution centres and two cross dock facilities within the country, employing approximately 9 000 employees, with its headquarters in Johannesburg, SA.

Given the enormity and significant size of the chosen inter-organisational research site, the research did not focus on all the product segments, merchandises and divisions; but instead, the research only focused on (a) specific product categories or segments, and (b) the two integrated supply chain divisions from both MAN and RET, viewed as one inter-dependant factory-to-stores or end-to-end value stream, as indicated in Chapter 3, Section 3.3 of the Research Setting, discussed in the previous chapter. As an inter-organisational study, the presentation of results in this case study is divided in two segments, namely the manufacturer and retailer structured with two specific panels of executive team members from both

organisations or set of groups, also shown in Figure 3.4. The key relevant panels that formed part of this Lean initiative include functions such as production and manufacturing supply chain, demand and supply planning, corporate strategies, merchandising, sales and customer business management, store operations, procurement, customer facing supply chain, logistics, customer services operations looking after order to cash, brand and category management. These were from the Manufacturer and Retailer, both expressed as MAN and RET respectively, and the key relevant results are presented in their respective sequence.

#### **4.2 Processes and practicalities of the Lean Tools**

This section deals with the means by which the Lean processes were employed to achieve the results, focusing on specific areas such as OSA, DPA, CFR and Working Capital, as follow:

- The main trigger that precipitated the deployment of a Lean Technique such as Process Value Analysis & Focused Improvement (PVAFI), as a solution to deliver the required interventions and improvements was the "Consistent empty shelf spaces at stores, which were found and detected through the weekly stores' visits". It was found that the main problems were (1) inadequate stores replenishment processes, (2) poor shelf restocking execution by the stores operations and merchandising teams, and (3) more stock being kept at the stores back rooms, consequently resulting in the empty shelves, which was then reflected and reported as poor On-shelf Availability (OSA) of products, through the KPI dashboard.

In order to address OSA, the implementation of PVAFI entailed looking at the process of a number of steps. Some of the specific activities for instance, ranged from, understanding the current process flows of stock movements within the stores, identifying areas of the flaws where certain activities could be reduced; redesigning and optimising the value chain's process maps by eliminating (i.e. driving more direct deliveries straight from MAN's factories as oppose to MAN's DCs, ordering in full pallet and full layers with single SKUs per pallet, started sharing supply chain assets such as trucks and DCs storage capacity, and changed certain packaging on Chocolate products in order to reduce heat related consumer complaints) , combining, reducing & simplifying certain conditions and processes such as frequency of stock replenishment from DCs to stores from 3 times per week to daily replenishment; setting the necessary KPIs whilst tracking performance supporting the

changes that were made; standardising all the products and information flows between the stores back rooms and the stores' receiving areas; analysing the missed and lost opportunities such as lost sales; and sharing the key learnings with selected key stakeholders to improve competence building; as well as the introduction of a problem solving and audit team that that drove the streamlining of the value streams. The resulting benefits from this process are shown in Annexure 4.2

- This AR study also discovered that the key reason that elicited the utilisation of the Define-Measure-Analyse-Improve-Control (DMAIC) as one of the key Lean tools entailed the overall bad performance in Cash Flow Management and Financial Capital Deficits, which were noticed through the corporate finance reviews. These cash flow deficiencies were predominantly instigated by the drastically poor and suboptimal Demand Planning Accuracy (DPA) performance. It was also noted during the AR studies that such poor DPA, generally led to substantial increases in working capitals, specifically with regards to the inventories in finished products of up to 47 & 27 days for both MAN & RET respectively, raw and packaging materials, as well as much shorter lead time in number of days for the suppliers' accounts payables.

There were a number of key actions and steps undertaken, as part of the DMAIC processes, specifically designed to improve the DPA level, consequently resulting in the improvements of inventories as the working capitals (as shown in Annexure 4.1, 4.4 & 4.5). Some of these steps included the following: definition of the problem at hand led by the project team; pre-emptive validation of the financial benefits in addressing the noticed negative trends in market shares and business growth; creation of a clear project and communication plan to tackle the issue; identification of the key factors and relevant metrics; collection of the baseline data in terms of actual performance as shown in the above Annexures; identifying and reducing the list of potential root causes and their subsequent effects (for instance: started forecasting demand at DC levels as oppose to a national forecast, use of the point of sales data for the selected stores, moving from a 0-to-30-days forecasts to a 0-to- 90-days forecasts time horizon, moved from transaction shipment analysis to a joint or co-managed inventory process, early reservations of promotional stock 4 weeks in advance, synchronisation of production scheduling between MAN & RET, forecasting sales volumes at SKUs level as oppose to value forecasting, and so on) ; estimating and confirming the impact of root causes on key results (i.e. conducting regression and gap analysis, assessing

the strategic demand data against inventory turns, ensuring prioritisation and segmentation of key SKUs, and adopting pareto analysis on demand by each store format and product category); developing, evaluating and selecting the best solutions (which entailed the development of a new demand forecasting system and technology, jointly utilised by MAN & RET); confirming the delivery of the DMAIC project objectives in terms of expected target; rectifying the mistakes and developing the operating standards; as well as monitoring the news ways of working by the cross-functional consensus process owners pertaining to the inter-organisational set up.

- Furthermore, there were other top issues that motivated the adoption of Autonomous Maintenance (AM), also considered as a key member of the Lean techniques; namely: the (i) decline in growth of real volumes and (ii) the decreases in market shares of product categories, both being below their respective targets. This field based AR study revealed that the two mechanisms used to detect these negative trends were the business performance reviews and supply chain operations reviews. These 2 issues were specifically caused by the delivery of low Case Fill Rate (CFR), also traditional known as the Customer Service Levels in terms of stock being supplied against orders.

Although the AM had a predominant focus on the production line of MAN, there was a notable contribution of RET in terms of the stock replenishment processes. It was clear that MAN relied on the traditional Planned Maintenance (PM) mechanism which is a periodic process, but this was soon seen as inadequate. In addition to PM, the above reasons led MAN to further adopt AM. This included key step changes, such as: extending it focused on implementing basic daily machinery inspections, lubrication and cleaning methods; creating standards in order to detect the abnormality level of the machinery's performance against normality (i.e. speed of the production line, waste generated by the production line, efficiency ratios, volume per hour, and so on); implementing an automatic failure mode effect analytical systems and technologies; identification and elimination of sources for potential contamination during production (for instance: mixtures of different raw materials, conservation of vitamins, metals and foreign materials protection); and rolled out a self-reliability centred maintenance programme with the engineers, artisans and factory management teams.

The low performance in CFR also led the team to implement the Go-See-Think-Do (GSTD) as a Lean method. As the everyday problem solving tool, the processes associated to this entailed clarification of the issue at hand (well known as the depressing CFR performance) and the intended actions; drawing the flows and steps regarding the process, information and product flows (these ranged from joint business planning, to order planning, order creation, order execution and fulfilment, stock replenishment and final delivery); focusing on the who/what/when/how questions (these being the noted problems on orders between MAN & RET people and their processes, DCs, distributions, factories, stores, and so on); analysing the root causes and effects (between MAN & RET's processes, technologies, degree of alignment, ultimately leading to the poor CFR which essentially means OOS); asking the critical 5 WHYs questions to determine the real reasons products were OOS (in many cases, the 1<sup>st</sup> WHY=lack of robust accurate forecasts, 2<sup>nd</sup> WHY=lack of review of order vs demand, 3<sup>rd</sup> WHY= RET process only forecast to 3 weeks, 4<sup>th</sup> WHY=no robust joint planning tool exists, 5<sup>th</sup> WHY=collaboration at infancy level); planning and implementing preventative and sustainable solutions linked to each root cause; and finally developing the relevant standards and communicating to all stakeholders on the new ways of working. As shown in Annexure 4.3, the subsequent results became visible.

#### **4.3 Presentation of results**

##### **Section I: Manufacturer (MAN)**

###### **(I) Organisational strategy prior to changes**

The backbone of the company's strategy was established on the basis of Nourishing Southern Africa as the primary operating region, through the manufacturing and supply of innovative and renovated nutritional, health and wellness-related products, thereby creating stakeholders' shared value, delivered through flawless execution.

Traditionally, the organisation adopted an aggressive approach in pushing its products to stores without deeper understanding of the consumer and customer preferences; this was exacerbated by the inability to effectively and efficiently detect the ever-changing as well as emerging consumer test profiles, consumer typologies and portraits, potential impact on brand essence and superiority. Furthermore, all its productions plants and factories operated on a philosophy of bulk production, with bigger product batch production, with less production change-overs, compounded by high inflexibilities on each production line. Although this has some positive

spins on the economies of scale, it led to high inventory levels; most of the time incorrect inventories held in its warehouses and distribution centres.

The organisational relationship with MAN and RET was predominantly transitionally driven, with no or limited focus on the future, thereby disabling the company from developing sustainable partnerships. One of the key influencers linked to such a short-term transactional relationship was the intensive drive for pure sustainable profitable growth and shareholder satisfaction.

## **(II) The fierce urgency and needs for organisational change**

Institutional change emerged because of the need to redirect and align MAN with the market consumers and customers' expectations and to meet the intensified competitive demands within the fast-moving consumer goods environment. Also, the increased uncertainty on the trend and behavioural shifts experienced with the targeted consumers have enforced the organisation to base change on intensifying its performance at retail stores shelf level as well as generally deepening the understanding on consumers, shoppers and customers.

### *Internal and external drivers*

Various drivers formed the foundation to stimulate change, specifically motivated by both external and internal pressures in order to meet the existing and potentially future competitive challenges. The internal political dynamics seemed to be severe and manifested through the enormity of dissatisfaction from the sales community, in the context of poor availability of products for the customers. There was a sense of misalignment of goals and objectives in terms of growth rate; that is, both the sales division and strategic business units had different sets of growth rates; the Sales division generally being less realistic when compared to the market expectation, while the growth rate expected from the strategic business units, integrated through the demand and supply planning networks seemed to be more accurate and reliable. Consequently, this consistently led the company to be missing the targeted sales objectives, creating significant frustrations within the organisation.

Externally, competitors observed the market opportunities and attempted to increase markets shares, as well as gaining competitiveness in a number of product category areas. Also, the RET's average growth rate was significantly higher than the MAN's growth. This resulted in tensions and dissatisfactions and subsequently dampened the level of trust between the RET and MAN. Government agencies on the other hand extended their focus on controls of health-

related components claimed on products produced by MANs; the applied quality processes as well as the government's implemented rules as part of its Consumer Protection Acts, which elevates the degree of accountability and ownership of suppliers of products and services to consumers.

#### *Product availability*

The poor performance on the availability of products for consumers and shoppers in a number of specific product categories was consistent when visiting any retail store. The disappointments from consumers, customers and shoppers expressed verbally or observed during the moments-of-truth (which is also known as the emotional condition that consumers and shoppers experience at the exact time when the shelf is found to be empty when products are wanted and needed), continued to affect the relationships within the inter-organisational arena as well as cross-functionally, thereby contributing to the sense of urgency to formulate different modus operandi that would improve the organisation's image, credibility and minimise the associated potentially damaging reputational risk.

#### *Assets and capacity utilisation*

The extent of low assets utilisation at production plants, poor space and capacity utilisation at distribution centres, inefficient manufacturing lines performance, lower master schedule attainments and throughput from the production lines, inaccurate consumer demand planning and inconsistent replenishment to stores, high inventories on incorrect product stock keeping units, including its uncompetitive performance on fixed and variables costs are all contributing factors that led the management team to rethink the organisational strategies and the company's future direction.

### **(III) The formulation of the new strategic approach and change management**

As an attempt to formulate the desired strategic interventions in response to the various issues faced by organisation, the following aspects were highly considered for the new competitive strategy.

#### *Strategic intents*

The MAN's competitive strategy needed to be aligned with the overall market trends and requirements. It, therefore, created customer-focused capabilities such as the formation of a new department called Customer Facing Supply Chain, and simplifying business processes that

deliver the correct products and quantities with extended speed to market, increasing and improving the levels of on-shelf presence and cost-effective product availability. Other high-level key strategic intents that would deliver the organisational strategy included the alignment to a customer-driven framework, optimising the production line efficiencies, build robust demand planning capabilities with systems integration, target different clusters of emerging consumers, drive the premium products into the markets and renovated its portfolio of brands, and finally, intensified its capital and operational efficiency.

In terms of external support, the engagement with management consultants specialising in Lean was sought to develop a strategic plan to effect the repositioning of the organisation, particularly in the context of end-to-end value chain performance, supportive of the on-shelf availability of products. The main key areas of focus were the review of technical capabilities and capacities at factories, planning methodologies, degrees of wastage, efficiencies on procurement and spend management, optimisation of the business mix to growing in the emerging lower consumer bracket or cluster, rationalisation of SKUs and product mix, driving growth in the bottom end of the consumer pyramid, building a high-performance team through governance structures and institutionalising a genuine customer-driven mind-set.

#### *Change management*

The execution of the vision to become a Lean enterprise, including the strategic plan needed to be fully supported by the appropriate change management processes. The vision formed the basis of the entire organisation, from chief executive officer to production shop floor level. Every employee knew what Lean value stream meant for each employee, customers, shoppers and consumers. Such degree of employee participation facilitated the transformation processes, leading individual employees to understand that it was critical for everyone to take full accountability and ownership of the strategic change programme.

In order to establish better understanding of the future direction, the group decided to do a deep-dive analysis as an attempt to create visibility of the company's performance and develop a sense of urgency that was necessary to effect drastic change on the ways in which things should be done in the future. This included the consideration to the continued decreased brand loyalty, loss in the market share but quantified in terms of lost revenue. After a number of integrated workshops throughout the organisation to establish the previous uncompetitive position within the market, project and determine the desired future market position, the process

migrated to the development of a new strategy particularly focusing on Lean, applicable through the entire value chain.

Given the progressive approach that was adopted for the roll-out process, starting with a number of selected functional areas and product categories, including selected factories and a distribution centre, it was apparently well-understood that the move into Lean was due to the fact that strategic change was driven by the ever-changing markets with intensified competitions through the presence of products on shelf as stated earlier, and that this requirement resulted in an interaction of different types of relationships, rules and routines, structures and people. The consultants that were employees also played the role of coaches and mentors during the first roll out phase. The executive management team led the project teams and champions to develop a clear implementation master plan, agreed on time lines with a specific starting and finishing deadlines; all project members were held accountable to these timelines. All potential risks and issues were escalated frequently through the established performance and progress reviews, in order to obtain management interventions and different direction; and finally, the ground rules of engagement were also established and communicated to all.

#### **(IV) The adoption of Lean and its attributes to stimulate business performance**

The implementation of Lean was intended to change all employees' hearts and minds, more specifically in the context of adapting to better ways of working in eliminating wastage throughout the value chain, in order to delight consumers and customers as well as excelling in the organisation's journey of competitive repositioning. Essentially, it was about redefining new rules and routines of acting when performing any activities, irrespective of the functional department to increase the degree of on-shelf presence of the company's products through the decrease of out-of-stock levels and the overall better management of shelf at retail stores, institutional margins and profitability, and the need to regaining market share.

Some of the key attributes includes greater flexibility, which could be adopted during order change management or manufacturing and production processes with higher potential to the application of more change-overs predominantly driven by consumer demands, holding of the correct and lower inventories, improved efficiencies during production or logistical operations, smoother flows of both information and products within the inter-organisational value streams, and re-optimised productivities resulting in better cost performance.

Table 3.4 played a significant role, as the mechanisms for on-going performance measurement and sources of data or information in support of the above, depending on the characteristics of the reporting structures, irrespective of whether weekly or monthly, generally vary from service levels, to wastages, product availability at distribution centres and stores, frequency of product delivery and replenishment, extent and frequency of OOS, sales and supply chain visibility and extent of responsiveness, as well as the movements in the market shares gained or lost within a specific period of time.

### **(V) Summary**

The key observations in MAN include the fact that Lean was adopted due to poor on-shelf availability, resulting in decreased market share, consequently dampening the relationships between the MAN and RET. The key attributes that supported the stimulation of business performance include some of the following: efficient and effective flows of both products and information throughout the value streams; autonomous and preventative productive maintenance, preventing technical failures of plants and manufacturing lines; shorter lead times with high productivities; improved operating costs; optimised business processes and reduced wastage, all subsequently resulting in an optimised and improved presence of products on-shelf at RET stores.

## **Section II: Retailer (RET)**

### **(I) Organisational strategy prior to changes**

The growth and success of the retail is attributable to two fundamental rules, namely an unwavering belief in consumer sovereignty and the application of the four-legs-of-the-table principle. It predominantly strives for consumerism – the ability to interpret and satisfy the needs of consumers and customers, such as consistent product availability. This four-legs-of-the-table principle is considered as a simple analogy, to improve customer service, on-shelf availability being one of the key outputs. Through this principle, the business is seen a table supported by four legs on top of which the consumer sits. Each leg needs to be equally strong in order for the table to remain balanced and upright. These four legs include administration, merchandising, promotion and social responsibility, and people.

The retailer's mission is to serve consumers and shoppers, create a greater place to be through people's minds, while enabling an excellent place to shop through people's minds. Some of the key top priorities include the following: growing sales space ahead of the market, building

deeper customer relationships with better product offering, building cost effective stock replenishment mechanisms with the best in class lean efficiencies and revolutionising its franchise business model.

## **(II) The fierce urgency and needs for organisational change**

### *Collaborative supplier relationship*

The company places greater emphasis on forging good relationships with manufacturers in order to ensure that the partnership is mutually beneficial to both parties. An electronic data interchange solution has recently been put in place to improve delivery and communication levels between its suppliers and manufacturers. The centralisation of distribution centres has been embarked upon, starting with the Johannesburg region, to improve lead times and product availability and product quality. Product safety and quality is carefully scrutinised by its internal quality control and food safety technicians. Where any indications exist of a product flaw, the product is immediately uplifted and returned to the manufacturer. Merchandise is purchased from reputable manufacturers and house-brand's safety and quality is carefully scrutinised by food safety technicians. As such, the drive to regain lost market share, elimination of waste in the value chain, building a platform which would result in people taking more ownership and accountability across the organisation were some of the imperatives that motivated organisational changes through Lean.

### *Brand repositioning*

In terms of brand and reputational management, the retailer operates within a governance philosophy that seeks to protect and enhance its brands and reputation. A core to this philosophy is built upon the continued maintenance of ethical business practices and the highest level of integrity. Recent enhancements to the retailer's brand have been achieved through the new and fresh brand logos, the re-launch and repositioning of its private label brands, the continuous improvement of the quality of fresh foods and the long-life grocery stores initiative. It continues to differentiate the brands from its competitors in terms of service offering, availability and product range and this remains a key focus area.

### *Competitive intensity*

Given the severity of competitive aggressiveness within the market, the retailer continuously monitors market trends and sets its strategy accordingly to ensure that it remains the market leader. The ever-growing pressure from consumers expecting better value for money, resulting

in decreased profitability, which intensifies product pricing are other key drivers on the company's competitive position. Furthermore, the entrance of global retailers, such as Wal-Mart and potential Tesco, along with the emerging complexities within the distribution networks does not make it any simpler. The main pillars of the retailer's strategy are to defend and grow the consumers classified under the Living Standard Measure (LSM) of between 8 & 10 and recruit or extend its focus to LSM 4-7. The former has been achieved by listening to its customers and providing quality products and services at affordable prices. The latter has been achieved by the conversion of certain stores into black-owned franchise stores and the opening of further stores in that target market, both of which have allowed it to increase our share of the LSM 4-7 market.

Despite the many forces arrayed against consumers and the retailers who serve them, sales remain fair for the major retail groups. Accordingly, wholesale has come under pressure with the threat posed to its customer base in independent retail by the majors and the rise of hybrid formats. It remains a tough trading climate for the retailer and will remain so for the near future with pressure on retail turnover and margins resulting from consumers' ongoing demand for value and an increasingly competitive trading environment. Some inflation has always been good for retailers, allowing them to buy forward on a price increase and either maintain market share by passing the saving onto customers or by growing the margin. However, too much inflation inevitably forces down demand to such an extent that turnover declines. Retailers with a compelling value proposition are winning market shares in these inflationary times, while the upper-end retailers tend to lose footfall for the duration. In terms of economic growth, all of South Africa's major retailers survived the hard, brief years of the recent recession; two actually achieved lasting success, which they have carried through to the recovery. The retailer's primary competitor continued to drive its aggressive value proposition across the economic spectrum and won upper-end consumers

### **(III) The formulation of the new strategic approach and change management**

#### *Order management*

The supply chain environment managed by RET revealed clear areas for significant improvements both within the store operations as well in the upstream logistics. For example, the reordering processes were not standardised, whereby order and delivery schedules appeared to be awkward for stores, and the deliver frequency was not sufficiently used, and this was identified through significant errors in inventory data. This was compounded by very long lead times in data processing from order capturing to delivery. In terms of picking at warehouse,

it was evident that goods were being shipped with mixed pallets, with poor labelling and insufficient signage on cases or delivery units, resulting in more complexity being created upon arrival at stores. Also, there was little or no matching of delivery frequency days to actual demand.

The stocking processes were inconsistent, resulting in issues such as delayed restocking of shelves, mixed pallets with limited pre-sorting of merchandises, time-consuming removals of packaging materials, limited space for stock buffering, compounded by enormously suboptimal allocation of shelf space to merchandises. Furthermore, the restocking processes were similarly not standardised, with backrooms generally disorganised. The merchandising presentation dealt with insufficient housekeeping, leading to severe improvements needs. This has a direct relationship with significant markdowns in individual categories, leading to potentially high unavailability of products.

Furthermore, DMAIC analysis provided clear evidence that up to 70% of OOS were caused by the stores themselves, particularly through store-ordering errors in stock data, inconsistent system parameters by product categories, poorly misaligned staff scheduling against actual demand, shelf restocking was taking place too late with incorrect stock facing as well as price labelling, store forecasting generally had low buffer stock whilst in other occasions they were overstocked, and suboptimal shelf layout for in-store processes. The remaining 30% was driven by waste or operational inefficiencies outside RET stores, more specifically through unreliable forecasting by both RET head office and MAN demand and supply planning and replenishment teams, factory production issues or poor production line performance, as well as poor synchronisation and operational inefficiencies from the warehouses and logistics teams such as picking inaccuracy and poor delivery intervals, from MAN and RET physical logistics facilities.

### *Collaboration*

In terms of driving better collaboration with the manufacturer, there were a number of areas that drove improvements. Some of these include the use of EDI for ordering and billing, integrated measurement of manufacturer's performance, including the piloting of certain initiatives in logistics, planning and replenishment, as well as merchandising at stores. This was based on the principles that ePOS data should be shared extensively, using joint scorecards, joint optimising shelf-ready packaging, where appropriately cost-effective, and actively managing the manufacturer's performance as an integrated part of the trade terms negotiations, with potential

financial penalties, where feasible. One of the key examples include the aggressive approach on shelf-ready packaging, which resulted in many benefits as improvement in brand communication, more efficient in-store logistics, high sales due to more attractive and informative presentation of the merchandises, less damages and waste, high sales due to greater shelf availability, and faster turnover time and product availability.

#### *Customer experience*

Some of the shortcomings and positive experiences from a customer's point of view, discovered through observations, customer complaint and mystery shopping were various. These include the disorderly impressions when entering some stores, poor signage when searching for a particular product, compounded by an unsatisfactory information desk. When choosing a product, product unavailability was frequently experienced, especially during the evenings or week-end. Merchandise presentation was seen with poor labelling, while unstaffed service till-points and long lines at checkouts multiplied the shoppers' frustrations. While the above make reference to specific major stores, other store formats, those that are well-managed, ensured that most products (irrespective of whether these are groceries, fresh or chilled) were available until closing times as well as during the entire week-end. Correct and easy-to-find price tickets at shelf was also a positive point; including the availability of staffing for flexible support on peak times, as well as full support by permanent employees at the information desk to attend to customers' enquiries.

#### **(IV) The adoption of Lean and its attributes to stimulate business performance**

One of the Lean practices with particular focus to the measurement of the progress made by the supply chain division was related to the time it took the retailer between the store's replenishment order time and the actual delivery time to stores. This long lead time was largely longer than expected, leading to OOS on shelves, resulting in increased overall operating costs.

Lean brought new practices that empowered people to work in a different way, changing their minds and behaviours, leading to an acceleration of performance and efficiency across the organisation. Traditionally, inventories were often used as the security blanket to manage multiplicative effects of process failures, uncertainties, manufacturer's production inefficiencies, and so forth. By adopting a consumer-driven product pull system, through ePOS data sharing for example, both the retailer and manufacturer were able to plan, produce and deliver what is required for consumers, yet with fewer inventories at the retailer's distribution centre and stores'

backrooms. These Lean practices enabled the organisation to assess and determine the extent to which a product could be pushed into stores, pulled through consumer demands, or a mixture of both, depending on the product category. This resulted in better efficiencies, improved customer service in terms of the health of the shelves, lower operating costs, reduced working average net trade working capitals, and competitiveness.

The engagement between RET and MAN appeared to pose extreme challenges. RET has thousands of suppliers to deal with and it discovered the impossibility to develop sustainable relationships with all suppliers. Given Lean's focus on removing waste and variability, with manufacturers and suppliers in this particular case, the retailer sought to optimise its supply base, with specific emphasis to enhancing its focus on the best manufacturers of key commodities. The key elements that formed part of this alignment journey with MAN included the creation of key metrics, maximisation of visibility, joint strategic plans, clarity of responsibilities and roles, optimisation of co-managed inventories, and development of integrated management teams. Therefore, Lean created an infrastructure for RET to identify and apply a three-step continuous improvement approach on the manner in which it engaged with MAN; starting with reactive engagement, to proactive engagement, and finally, to commodity engagement approach; with the last being driven by long-term commitment after the first two.

RET had traditionally been driven by building categories and increasing the basket size, with less consideration to MAN's brands. As such, MAN needed to bring valued brands to RET through promotions despite the fact that this may reduce the brand's equity in favour of RET. Some of the key aspects that competitively differentiated MAN in the eyes of RET from all other manufacturers and suppliers, include but are not limited to the fact that MAN appeared to be well-aligned with its marketing plans and strategies; it could deliver powerful insights on shoppers and consumers; it had a highly productive relationship with RET; it constantly possessed advanced shopper and marketing intelligence and competence; it had developed unique and exclusive programmes, and MAN had the ability to treat consumers and shoppers as individuals and used the opportunity to appeal to their intelligence and their emotional scale.

Given the extent of consumer and shopper behaviour that seemed to drive shipping decisions, as for instance, up to 58% of customers leave the aisle empty-handed because they can't find what they are looking for and 73% of customers shop in five or more retail channels, and that up

to 68% of customers are essentially brand switchers, both RET and MAN jointly developed the ability to deliver innovation at retail points, in the context of discovering new ways to inspire shoppers and consumers' needs and desires to satisfy them. This also entailed the process of creating consistent and ongoing shopper dialogues, in support of the shopper and consumer marketing, as an intersection of product branding and retailing, to ultimately develop holistic brand experiences in a sustainable manner.

## **(V) Summary**

There are some consistencies on the primary drivers that motivated RET to roll out Lean in an integrated fashion with RET. Some of these include poor performance as seen with OSA of merchandise, deteriorating and declining growth in product categories, dampened relationships between MAN and RET, inadequate replenishment and planning processes, poorly managed stores logistical activities, increasing operating costs and the associated impact on organisational profitability and return to shareholders, as well as market positioning. The elements that seemed to support the stimulation of business performance, during and post Lean, range from increased efficient and effective flows of both products and information throughout the value streams derived from robustly revitalised replenishment and planning mechanisms, synchronised production and logistical operations with MAN, shorter lead times with high productivities, optimised business processes and reduction of wastes, resulting in substantial improvement in OSA and collaborative partnership with MAN.

## **4.4 Inter-organisational cross-case analysis**

### **4.4.1 The application of the Lean techniques to support OSA and stimulate business performance**

The new strategic direction was jointly developed and adopted by both RET and MAN. Whilst RET's primary focus areas of its value streams included the supply chain division and stores operations; MAN considered involving a broader spectrum of its value streams namely, the supply chain division, production, sales and the strategy office. Both MAN and RET jointly focused on driving wastage out of the value streams, creating lower costs of operations, logistical efficiencies through the centralisation of both the distribution infrastructures as well as planning and replenishment, creating collaborative partnerships between the two organisations, ensuring end-to-end supply chain integration and alignment to optimise the level of case fill rates from MAN to RET, streamlining and synchronising all merchandising processes to

intensify flawless execution and deliver better on-shelf availability performance at stores, resulting in the achievement of their competitive imperatives such as increased market share and growth, margins and profitability, delighted consumers and customers.

The process for developing the inter-organisational competitive strategies was not based on setting a completely new strategic direction. It was a series of strategic changes that were designed, planned, coordinated and executed by business units to produce a fundamental shift in the business, resulting in a transformation. They redesigned the strategy development processes in a context that would reduce inefficiencies and creating value as viewed by the consumers and customers, and more importantly minimising wastages such as stock-outs from shelves, quality issues, waiting times, poor store personnel services, corrections, over-processing, and so forth. These were attempts to becoming a customer-centric organisation, established through rapid deployment of capacity, while developing an extended enterprise and recreating an integrated business and supply chain model. Lean established an environment that enabled strategic initiatives to be coordinated by its respective departmental business units to meet expectations of customers and employees.

Lean also supported the development of new ways of managing shelf space at stores. The requirement to have full clarity on transactional costs generated from waste, in line with the optimisation of product mix was driven by merchandising the right products on the right shelf, at the right time, for the right store, in the right markets. This also highlighted the dilemma of whether or not to continue supplying products in a process that was not cost-effective and not delivering to the customers' expectations. Therefore, there was better understanding on the key root causes of OOS, with clear visibility of the associated non-value-adding wastes within the inter-organisational value stream as well as how to improve performance through the Lean methodologies.

The decision to implement Lean was driven by both heads of the supply chain divisions from MAN and RET. This was because of Lean's credibility in providing visibility of waste in the value streams and the subsequent consequential negative implications on organisations, leading to effective management decision-making on business improvement needs. This saw the launch of Lean as an official project to take full accountability improving OSA and business performance, through value creation as expected by consumers and shoppers. The level of competency and

leadership skills seen in both supply chain divisions formed the basis for the appointment of an integrated and joint project task force to lead the initiative.

The change to Lean was subject to satisfying criteria and to a mixture of random (such as selected merchandise categories, i.e. coffee, dairy creamers, and confectionery, for instance), systematic (such as changes to the planning and replenishment processes), and internal forces (such as the unionised staff members and labour federations). The extent of change was significantly influenced by organisational resistance in the roll-out of new procedural rules and routines. The early stages of operating under new Lean rules and routines were characterised by uncertainties, resulting in misunderstanding among other demand and supply planners and merchandisers who had initially thought that Lean was a replacement of certain jobs, leading to potential retrenchment; they now had to cope with various adjustments, adoptions, modifications and refined operating mechanisms and rules under the new operating model and working relationships.

It is important to stress that the visibility of the initial wins and benefits deriving from Lean has led senior management to a greater understanding and insight of the emerging opportunities. The use of Lean became crucial in replenishment and planning, stores operations and logistics because of the needed focus of attention on factors that determined the poor performance with OSA. This also assisted the executive teams to prioritise alternative product categories and stores by providing the right support and information relating to the strategic direction of the inter-organisations' collaborative partnership. One of the reasons behind the successful implementation of Lean was the fact that the correct people were appointed and took full accountability throughout the entire initiative, supplemented by the adopted approach of joint implementation between RET and MAN.

#### **4.4.2 Emerging trends from the Inter-organisational strategic alliance**

An in-depth analysis of the way in which Lean was applied within the inter-organisational cluster between RET and MAN revealed a significant improvement of up to 400 basis points in the MAN's case fill rate to RET from 93% to 97% (See List of Addendums, Annexure 4.3), reduced the working capital from 46 day to 39 day cover and 19 day to 15 day cover for MAN and RET, respectively (Annexure 4.4 & 4.5). It also revealed significant improvement in the OSA of 700 basis points from 86% to 92% (Annexure 4.2).

The visibility and understanding of waste within the joint inter-organisational value streams drove a different mind and enabled better ways of sharing data, working and creating value for consumers and customers. The fundamental platform enabling such value creation is based on the inter-organisational capability to optimise information flow from an end-to-end perspective, which results in operational excellence seen through improved flow of products and merchandises. Table 4.1 highlights the major benefits, opportunities and trends driving such a collaborative approach between MAN and RET.

Given the variability of demand and supply, these inter-organisational managers have the ability to use the latest information on the replenishment and planning process and to consider multiple alternatives to arrive at realistic and optimal operating plans with speed. Essentially, the traditional rule of thumb was to create a plan in one-tenth of the time it will take to execute, for example, a 30-day plan should take no more than three days to create, review and roll out. This was supported through proactive monitoring and analysis of any potential threats. In other words, as soon as a plan was rolled out, it was subject to threats. For example, if the plan was to sell 10 000 cases or units for the month at a particular rate per day, it was useful to check and validate the point-of-sale data to see if the expected sales are occurring. Each unit or case sold on each day was helpful to understand the root causes of any potential shortfall or surplus in order to take appropriate actions to recover. If sales are down due to supply issues, the corrective action would be different, for instance, than if a competitor's price discounts are causing the slowdown.

There was a strong focus on historical data and information as a platform to formulate future demand plans. This was, however, supplemented by an extended consideration of the dynamics associated to the market, thereby focusing on its trends, competitive position, customer collaboration and ePOS data analysis. This enabled better understanding of demand better than the competition. Rigorous demand planning did not only yield better understanding of what will be sold, but also a far superior understanding of the actions that are required to win in the market.

Based on these developments, the replenishment and planning managers were expected to take quick corrective actions to ensure that their commitment to the synchronised plan prevails. Preferred actions were those that could be taken unilaterally. These could selectively include actions such as where the sales community could possibly take pricing and promotion actions to reverse sales shortfalls. Although such actions minimised the associated elements of surprise as well as variability for the rest of the business, it was clear in certain circumstances that demand or supply plans had to change, taking into account the expected collaboration and communication with all stakeholders such as the procurement and production teams. Thus, visibility and daily analysis of sales data became critical. If there were more actual Sales than anticipated, this could have potentially been driven by competitors' inability to supply, possibly due to their production of line inefficiencies. MAN seemed to access such data and was able to capitalise on the revenue opportunity. As such, working closely between MAN and RET enabled organisational structures and management processes to quickly transfer the information that may be critical for analysis and drive proactive and competitive decision-making.

It was interesting to observe that Lean triggered the implementation of the new monthly business planning (MBP) processes as integral to D&SP. This was not traditionally part of the planning process and early consensus meetings proved difficult to manage. Varying assumptions about production capacities, product price changes and promotion schedules were a significant source of conflict, which strongly suggested that informational inefficiencies or the associated poor qualitative data were highly significant, hampering inter-organisational integration efforts. It was clear that these inefficiencies affected the quality of the functional demand and supply forecasting and plans.

The institutionalisation of incentive mechanisms, based on certain performance indicatives such as demand planning accuracy, supplemented by the retention of functional orientations requiring the functions to participate in a collaborative effort in which no particular function could keep relevant information to itself, motivating the participants to become fully engaged, was one of the resulting achievements. The new MBP meetings were observed to be transforming through constructive engagement in that all of the functions were actively involved in developing and assessing the product offering and promotions plan. Constructive engagement, in turn,

improved informational quality in two ways. First, constructive engagement led to more thorough information collection. As more functions became engaged in the MBP implementation, the document included more of the necessary information that had previously been available only to a particular functional area. The second way in which constructive engagement affected informational quality was by compelling the individual functions to make their information not merely available, but also accessible.

Through the MBP processes, the quality of the plans was not only determined by the quality of the information used in the planning process, but also by the procedural quality of the entire planning process, specifically focusing on the appropriateness of the perspectives and the soundness of the rules of conclusions and judgement used in developing and validating the plans. The mechanisms that promoted procedural quality in forecasting included the combination of multiple forecasts in the consensus forecasting process, a focus on sell-through shown via ePOS instead of sell-in, forecasting at an aggregate level, and the use of statistical forecasts to prompt and encourage intensive discussion about the assumptions behind the forecasting.

The resulting benefits of constructive engagement between RET and MAN were enormous. Some of these included the accessibility and reliability of information for the planning process, rules of inference that had been sharpened through various debates, more accurate and validated forecasts, efficient and coordinated functional plans, and organisational plans that reflected the interests of the multiple stakeholders in the organisation. Although the collaborative nature of the D&SP process sets the stage for inter-organisational alignment across the various functions, it is the collaborative engagement that enabled this alignment to materialise. Constructive engagement in validation required every function to focus on the product offering, potential competitor reaction, consumer response, promotions plan and stimulated increased alignment with it. The involvement of the individual functions in the validation of the product offering and promotions plan also resulted in a greater shared understanding of constraints, which translated into organisational plans that were easier for each function to execute and to align with. Also, such engagement encouraged participants to trust that the other participants would adhere to the plans, which promoted alignment.

The D&SP process became open, transparent, and participatory. It not only enabled all participants to influence outcomes, but motivated them to do so in order to have access to all the relevant information and agreed resolutions, and to serve their stakeholders' needs. It therefore explicitly confronted the conflicts between participants, rather than trying to smooth them over. Such alignment produced two important benefits: (i) As the action plans gained credibility, the organisation's reputation and trustworthiness grew among stakeholders (between RET and MAN), including MAN's suppliers. (ii) The ability to execute such plans was key to continuous improvement, given the extent of process predictability as the first requirement to reliably interpret historical data and making the necessary conclusions for learning and improvement.

As such, it is clearly evident that based on the emerging trends derived from the inter-organisational study in adopting Lean as a solution to improve OSA and the overall business performance that, the creation of Lean value streams focuses on connecting all the dots and elements of all entire value streams. The process of creating value and maximising the entire flow of information (ePOS data) from fork [dinner plate] to farm, while optimising the flow of products (merchandises) from farm to fork [dinner plate], entails the application of Lean toolkits or methodologies. Process value analysis and focused improvement (PVAFI), as some of the Lean toolkits or building blocks for instance, allowed the organisations to learn key lessons. For example, using PVAFI to focus on the customer and understand who exactly is the customer, analysing and acknowledging both product and information flows as key imperatives, crossing functional and corporate boundaries, proving future state of business practices to understand what steps truly add value and eliminating those that are non-value-adding to the customer, and finally creating process owners and governance as a critical aspect in delivering true value in an efficient and cost-effective manner. Finally, the use of Kanban as a tool to electronically degenerate electronic demand signal, through ePOS, created a pull-based rapid store replenishment, thereby defining the flow of merchandises, synchronised with fixed frequency of delivery to RET stores and this allowed an effective production frequency index with the MAN and its respective suppliers.

#### **4.5 The application and utility of the institutional theory**

This section articulates the usefulness of the institutional theory that was used in this research as an explanatory framework. It also deals with the manner in which Lean and organisational change created new rules and routines as well as the role played by the executive management teams during the Lean implementation process.

Such theoretical specification, along with the integrated framework that was developed in the literature, confirmed its output as a testable proposition and demonstrated the key attributes of Lean that support competitive strategy. However, the empirical study highlighted the fact that the relationship between the variables illustrated in the theory needed to be re-conceptualised and refined because of the dynamic nature of the retailer and manufacturer's operating environment and the relative influence of their respective strategies. With the researcher having adopted Keating's (1995) suggestion in attempting to refine the theory, it became clear that the model has substance in the tested research field. The utility of institutional theory was to a large extent viewed as the bridge that connected the literature and the empirical research. This was interpreted two-fold: the institutional theory as an explanatory framework explained the manner in which Lean could be adopted, implemented and applied within the inter-organisational arena, particular with MAN and RET. On the other hand, the institutional theory predicted some of the core benefits of Lean, which have been proven by the empirical results as presented in the case analysis.

Considering the fact that institutional change inevitably involves new ways of working; namely, rules, routines and processes, the theory enabled the researcher to identify different levels of anxieties, frustrations and uncertainties that became imminent due to the introduction of Lean, as well as the disturbed relationship between various levels of management. Due to the fact that the senior executive management team understood the competitive challenges, their support provided the political assistance that was needed to push aside some of the managers that created coalitions to resist the innovation. The institutional framework provided a lens to observe the manner in which the executives, whom the resisting managers reported to, were made accountable and assigned to take the role of executing the tasks of implementing Lean and at the same time influencing the lower managers to change their attitudes and gain their optimum support and participation. Using the theory, it became evident that the first indication of corporate acceptance of Lean became imminent as soon as there was visibility on the benefits

that were previously not seen nor experienced due to the inability of its traditional operating systems.

As evidenced quantitatively through the List of Addendums, the institutional framework, therefore provided the microscope to see these benefits, namely the ability to reduce production cost by 12% (shown in Annexure 4.12), increase productivity by 30% (shown in Annexure 4.11), increase customer case fill rate or service levels from 93% to 97% (see Annexure 4.3), increase on-shelf availability from 86% to 92% (shown in Annexure 4.2), increase in market share on average from 49% to 55% for a number of product categories (as shown from Annexure 4.6 to 4.10). The need to make these benefits visible throughout the value streams was then acknowledged, along with the standardised rules and routines within the Lean's arena. This, therefore, meant that the creation of corporate routinisation was a significant strategy that the adoption and acceptance of Lean relied upon.

The move to Lean is generally seen as innovative techniques that incorporate sociological routines, rules, regulations, behaviours, norms and values that provoke different responses, ranging from resistance to institutionalisation. This was manifested through actions driven by ethical and emotive criteria linked to social consensus. Therefore, the theory helped the researcher to conclude that an evolutionary perspective was necessary for the institution's strategic intent to adopt innovative management accounting techniques such as Lean. Furthermore, the theory led the researcher to confirm that senior leadership did to a large extent matter in the adoption, acceptance and a successful implementation of such transformation technique, name Lean Value Streams.

This theoretical framework demonstrated its potential to unmask and unravel the issues that were associated to inefficiencies, internal political conflicts, self-interests within MAN and RET, particularly with its manager, labour federations such as unionised employees; and then, enabling the researcher to discover the problems caused by actors and group dynamics, more specifically, in the context of other managers attempting to discredit Lean, which was driven from the highest level of the organisations.

As an attempt to develop organisational integration and learning, the theory facilitated the identification of the link between the use of power by senior management and the appropriation of enforcing its value systems to enhance their relationships with other executives and

managers in order to inevitably influence change. Due to the fact that the key attribute of institutional ownership is the authority to run the organisation and maintain consistent revenues generated by it, the institutional theory confirmed the fact that senior executives of both MAN and RET were the leaders that determine its working rules. The theory therefore helped to see the use of authority in that, in addition to maintaining order and resolving conflict, the sovereign power was also used on working rules in order to enforce collaboration in the production and exchange of new business processes and to resolve the problems created by the pursuit of self-interest.

The theoretical framework also helped interpret the missed opportunities by the studied organisation in developing new competitive advantages, through the intensive approach of learning-by-doing, and these new routines and rules encapsulate internal skills and optimise organisational capability. It was also seen that these routines may not only have been specific to the job at hand, but instead, also developing integrated knowledge, speeding decision-making, improve coordination and more specifically, leading to dynamic level of increased product availability and consumer satisfaction.

In summary, this theoretical framework created a framework to explore the conceptualisation of change within the organisation that was investigated. As advocated by Burns and Scapens (2000), the model provided a useful point of departure for the analysis of this case in investigating the adoption of Lean along with challenges associated to emergent functional dimensions. Therefore, the change was depicted as a consequence of the behaviours of employees in the company's traditional operating models that were involved in the change processes. The framework also highlighted the importance of considering the challenges associated with organisational politics and power struggles in influencing decision-making to drive institutional changes.

#### **4.6 Conclusion**

The key highlights of the case analysis include the fact that cultural shift and internal policies played a significant role in the implementation process. Given the visibility of waste throughout the value streams, along with the consequential business negative implications, demonstrated through Lean, senior management was empowered to make informed decisions.

It is worth stressing through the evident empirical findings that the implementation of Lean as part of the inter-organisational improvement programme was implemented successfully. This research revealed a combination of contributing factors and challenges to this effect. Some of these included the facts that the institutions studied are operating in an ever-growing competitive environment and faced significant reputational risks with its shareholders, shoppers and customers, due to poorly declining financial performance results, poor customer services, poor shelf presence of the merchandises desired by the shopping communities. This developed a great sense of urgency with senior management for reviewing its strategies, modus operandi or ways of working, which then motivated the need for improved product practices to eliminate waste and create sustainable value as viewed by consumers.

In conclusion, there was a consistency in the context of benefits that emerged from the application of Lean for both RET and MAN; these generally included drastic reduction of waste in the value streams, better presence of merchandise on shelves, optimised operations, reduction in costs, customer delights, release of compressed funds through improved working capital, increases in market share, improved efficiencies and productivities, better flexibility, mindset changes, intensified collaboration, jointly synchronised planning, optimised production rescheduling processes, increased customer focus, as well as better restocking, reordering, merchandising, picking, and delivery processes. However, the commonly seen benefits for both organisations included the increases in on-shelf availability, increases in product category growth and market share and improved financial performance through the reduction in the working capital.

**Table 4.01: Major areas of improvements from RET & MAN collaborative partnerships**

<b>MARKET TRENDS</b>	
<ul style="list-style-type: none"> <li>• Globalised supply chains/Growing inter-market supply networks</li> <li>• Highly sophisticated customers</li> <li>• Web-enabled collaboration</li> <li>• Inventory visibility tools for complex supply chains</li> <li>• Minimised total supply chain costs</li> <li>• Order-centric supply chains become customer-centric e-chains</li> <li>• Challenging joint performance measures</li> <li>• Product options proliferation</li> </ul>	
<b>OPPORTUNITIES</b>	<b>EMERGING BENEFITS</b>
<ul style="list-style-type: none"> <li>• Provide visibility of information (inventories, forecasts, orders, plans, and performance measures)</li> <li>• Promote responsiveness (reduce time to detect demand, commit, produce and fulfil)</li> <li>• Achieve process simplification</li> <li>• Leverage market mechanisms (selling via trade exchanges)</li> <li>• Improve synchronisation (by generating feasible, optimised plans and schedules, replenishment when conditions change)</li> <li>• Replace inventory with information (central inventory visibility, forecast consumer demand, collaborate with channel/customer)</li> <li>• Real-time sharing of information</li> <li>• Improved visibility of sale forecasts, material requirements, promotional plans and inventory data</li> <li>• Supply chain responsiveness to changes in demand and supply</li> <li>• Information replaces inventory</li> <li>• Processes simplification and task assignment based on total cost</li> <li>• Synchronisation between retailer and supplies and functional areas</li> <li>• Formalised measurement of process efficiency and effectiveness</li> <li>• Streamlined logistics</li> </ul>	<ul style="list-style-type: none"> <li>• Improved forecast accuracy and demand visibility</li> <li>• Increased sales</li> <li>• Improved replenishment cycles</li> <li>• Improved level of service and order fulfilment</li> <li>• Reduced production cycle times</li> <li>• Reduced inventory levels</li> <li>• Increase on-shelf availability</li> <li>• Reduced returns</li> <li>• Enhanced communication and resolution with all related parties</li> <li>• Reduce packaging and finished goods</li> <li>• Increased sales volume and revenue</li> <li>• Reduced replenishment time</li> <li>• Reduced order lead time</li> <li>• Increased sales due-to improved in-stock/on-shelf position</li> <li>• Reduced inventory levels</li> <li>• Reduced safety stocks</li> <li>• Decreased mark-downs</li> <li>• Reduced obsolescence and unsalable</li> <li>• Reduced supply chain costs</li> <li>• Increased effectiveness of new product introductions and promotions</li> <li>• Improved sales and order or demand forecast accuracy</li> <li>• Improved production and manufacturing planning</li> <li>• Improved merchandise planning</li> <li>• Smoother flow of products</li> </ul>

## CHAPTER FIVE: SUMMARY AND MAIN CONCLUSIONS

### 5.1 Introduction

This chapter provides the research summary and main conclusions drawn from the study. The chapter begins by recalling the problem statement and the purpose of the research and moves on by highlighting the used methodology to collect the empirical evidence in response to the research question and later links the research question to the actual conclusions.

### 5.2 Problem statement

The SA manufacturing and retail environment has experienced extremely high levels of waste in their value chains, such as out-of-stock (OOS) products in the past few years, leading to poor business performance, lost market share, increased operating costs, customer dissatisfaction and uncompetitive market positioning. The research aimed at analysing, investigating and describing the manner in which Lean methodologies can be applied to support consistent availability of products on shelf at retail stores [therefore minimising OOS], ready for consumers and shoppers, and ultimately drive the acceleration of business performance. Retail success can be defined as achieving high gross margins and customer service levels in the context of stock availability at stores. Forecast accuracy, process lead times, different procurement and sourcing models and replenishment strategies can have a significant impact on its profitability. Forecasting errors often lead to significant inventories or lack of sufficient stock, and the latest results in loss of sales. A typical retailer's performance measures key performance areas such as customer service levels, product availability, lost sales, product substitute percentage, gross margins, gross margin return on inventory, sell-through percentage, but the mark-down rate masks the source of the problem - namely poor stock availability.

More specifically, this research has investigated the adoption of Lean techniques throughout the manufacturing and retailing value stream, in order to assist business leaders to drive and sustain business growth, given today's economic challenges. In particular, this research addressed the question of "***How can Lean techniques stimulate business performance in an integrated supply chain environment?***" The main areas of investigation included (i) the examination of the use of Lean tools in today's manufacturing-retail integrated supply chains, (ii) investigation of the potential benefits and contributions made by these Lean techniques, with specific emphasis to the reduction of OOS and driving better on-shelf presence and availability of products and merchandises at the retailer's store shelf for shoppers, (iii) attempt to

understand Lean's capabilities to support business performance and growth; and finally, (iv) to explore the manner in which the joint adoption of Lean techniques could lead into a collaborative partnership for a manufacturer-retailer relationship.

This investigation was pertinent to the South African (SA) manufacturing and retailing sector. The extent of interconnectivity and interdependence between the two chosen companies, led the researcher to consolidate them as one inter-organisational cluster, and it was thus important to consider both organisations interchangeably in the research process. A case study method was seen as appropriate to collect data on the inter-organisational determinants of the Lean techniques. Given the researcher's active involvement with the inter-organisational set up, the use of action research methodology formed an integral part of the chosen case study framework in collecting information and observing trends.

### **5.3 Research findings and main conclusions**

The following section gives a consolidated overview of the adoption and implementation of Lean in supporting the aspiration of improving on-shelf availability and driving business performance, by discussing the following: (i) strategic inter-organisational change management and (ii) the overall stimulation of business performance.

#### **5.3.1 Strategic inter-organisational change management**

- ◆ There is evidence to suggest that the application of Lean tool to reengineer the value streams was a more reactive approach in response to internal pressures to improve product availability on shelf and business performance.
- ◆ This study also revealed that Lean was chosen because it was perceived to be the most efficient technique in meeting the inter-organisational needs for better visibility of management information. Lean was thus viewed as a broader management transformational system incorporating activity analysis, analysis of business processes, identification of value-adding and non-value-adding activities, as defined and expected by the consumers.
- ◆ The case study provided sufficient empirical evidence to state that the sustainability of a Lean supply chain, as a journey, must be based on a concrete platform built on three foundational elements, namely: (i) Leadership development [with emphasis on leadership

management principles, coaching, people empowerment, competence and capability-building, a single unit for all SC functions, intensive know-how development, increasing supply chain capabilities, integrated SC organisation]; (ii) Goal alignment [dealing with operational master plan, key measures, integrated reviews, problem-solving methods]; and (iii) Compliance: [with particular focus on policies, guidelines, standard routines, internal controls, best practices, integrated management quality systems]. The integration of these three strategic pillars, reviewed regularly and considered for any Lean initiative selected for a particular value stream, maintains the sustainability of mindset change and business transformation.

- ◆ It was discovered during the field study that inter-organisational decision-making and information-processing needs were sometimes or occasionally influenced by uncertainties and equivocations. Such uncertainties reflected an absence of information, while equivocations reflected an absence of clarity even when there is information. In both situations, the quality of information and the quality of decision-making could not be taken for granted. The drive to intervene and improve planning and business performance was the creation of a new Monthly Business Planning (MBP) process. In-depth analysis also revealed that the key functionality of the planning process were based on monthly and weekly sales performance reviews, monthly forecasts and bias reviews, deviations between consensus demand plans and actual orders, and the gap review. These elements were significantly dependent on three inter-organisational constructs, namely informational quality, procedural quality, and alignment quality, as briefly explained below.

### **5.3.2 Stimulation of business performance**

- ◆ The empirical results demonstrated that Lean generates valuable information that supports business strategy performance in areas such as (i) visibility of waste [such as OOS] and the associated root causes, (ii) activity analysis, (iii) understanding the voice of the customer, (iv) business process reengineering, (v) availability of accurate and reliable cost information, (vi) improved and reduced process variability, (vii) reliable management reporting for proactive decision-making, (viii) understanding of performance management systems, and (ix) product growth and profitability; which then enhanced the management's capability in strategic planning resulting in proactive decision-making.

- ◆ The use of institutional and/or organisational theory facilitated the interpretation of the role of Lean in supporting MAN's strategic change management, by highlighting the broader institutional dimensions that formed part of the cumulative institutional context. When MAN was faced with a strategic change imperative resulting in a severe operating cost, product replenishment and production management crisis, its first inclination was to rely on scientific management technologies, such as mass production and planning tools that were inherently focused on operations and a disintegrated management approach. This necessitated the introduction of more sophisticated management and business evaluation techniques in the form of Lean tools. As such, the use of Lean provided the capacity to get an accurate picture of the wastages caused by different processes, which in turn extended management's capability to make informed decisions.
  
- ◆ This study reported that RET had always attached great value to customer satisfaction, but one of the prerequisites was to enhance performance. The objectives were to drive stores sales growth, reduce inventory and increase employee's productivity, defined as clear opportunity for improvement. However, Lean revealed a number of areas for improvement both in various stores and in the upstream logistics, in that, there were inconsistent and poor standardisation of daily store processes, and the backrooms were generally unstructured. Also, a suboptimal planning and replenishment process was causing delayed deliveries and creating fluctuations and volatility in stock availability at stores. Consequently, the following was applied: (i) All store processes were standardised to reduce the labour cost of critical store processes such as, stocking and restocking. (ii) Backrooms, stock-receiving processes and inventories or stock-on-hand processes were reorganised and redesigned so that employees can check physical inventories at a glance and immediately find products to be restocked on shelf. (iii) Revisiting the shelf space allocation in such a manner that the various allocated shelf facings were rearranged so that fast-moving products were in a more convenient location. (iv) Introducing tailored logistics to store processes through more granular pre-sorting at the distribution centre, which then increased delivery reliability and reduced the restocking time in stores; including the fact that promotional products are labelled as such, to help employees to recognise priority products faster and ensure shelf presence. And finally, (v) intensive training, education, continuous performance control mechanisms as well as policies for the management shelf space was also carried with the stores' merchandisers.

- ◆ The research also found that it is important to constantly focus on customers' total perceived value proposition. If the management forgets to focus on customers and adapt the products to their needs, the customers would ultimately be unsatisfied and turn to competitors. To ensure sustainability, it was clear for Lean practices to be seen as a journey and not as a destination or a project. As such, there must be full support from the executive team and top management to influence all value streams and ensure bottom-up buy-ins and execution. Organisational and cultural challenges must be taken into consideration in the context of the management and operational team being convinced to see Lean as practices that should be adopted and disseminated throughout the value streams to remove waste and focus on the consumer value creation.
- The empirical results have also indicated that informational quality improves the degree to which a particular process enables the information used for decision-making to be appropriate, both in content and in form, for the decision-maker and the decision. However, the quality of the input data is not the only threat to the quality of decision-making and of the resulting plans. Inconsistent decision-making standards, including the procedures subject to the cognitive and social limitations, influences, and idiosyncrasies of individuals and groups also pose a threat to the quality of decision-making and of the resulting effects. On the other hand, procedural quality makes specific reference to the extent to which a process continuously ensures that the rules of inference, used to assess and validate information to ensure that decisions made within, are sound.
- The study further revealed that the cross-functional nature of planning and execution implies that functional decisions and actions need to support institutional objectives and synchronisation, resulting in organisational alignment. Such alignment quality refers to the degree to which a process ensures that organisational and functional goals are fully supported, and that the resulting actions are well synchronised.
- With the exacerbated complexities observed during the course of the study, both MAN and RET began selecting a number of product categories, shifting from a push business model [one that is premised upon planning, developing and marketing products pushed into the marketplace] to a pull business model [one that relies upon forecasted and actual demand signals to generate production plans, material plans and supply requirements]. The desire to become demand-driven was expanding gradually and progressively on selected product

categories, while considering the level of sophistication in the market, compounded by the need for agile solutions at every juncture along the supply chain.

- It was realised during the research that future requirements of responsive supply chains were enabling market conditioning through trend analysis, and supply and demand synchronisation, using order trends and actual demand to provide early warnings of constraints and excesses, identifying key forecasting events and order events that provide advanced insight for demand conditioning. The processes and systems could correlate and analyse the information, and detect likely supply constraints and excesses, to then alert the appropriate parties of exceptions and recommend actions. These early warnings allowed the inter-organisational cluster to position itself to condition demand for existing and planned supply.
- During this action research, it became clear that responding rapidly to changes in market conditions with demand and supply planning and synchronisation with the maximum speed was a clear competitive advantage. Through the DMAIC framework, Lean facilitated the process for developing a smart supply chain model that delivered game-changing standards of service at competitive cost, integrating the end-to-end supply chain with differentiating approaches based on product categories, resulting in optimising variable logistics and production costs in alignment with revenues. Behind this trend is the imperative not only to seek unit cost advantage but also to secure best market capabilities.
- The use of PVAFI enabled real-time supply chain information visibility inside and outside the enterprise. For instance, the shift to customer-driven supply networks can realise this goal, with demand and supply management driven in real-time by critical demand and supply events supported by a customer's self-service visibility and decision-making. This led to the enactment of collaborative demand planning, forecasting and replenishment programmes between RET and MAN. With collaborative demand planning they both developed a single forecast and updated it regularly based on data exchanged dynamically, designed to increase in stock customer stock while cutting inventory.
- It became clear during the study that there is cognisance of today's highly competitive supply chain environment with an increasing pressure for better service, reduced lead times, reduction of inventory levels, increased on-shelf availability, product freshness, elimination of waste and streamlined business value chains. To achieve this objective, RET and MAN

had no choice but to work closely and collaboratively. Developing a strategic collaborative plan was a key element to ensure alignment and to work more effectively and efficiently using a collaborative approach. This meant that partners would openly share their success and failure in order to reach the intimate goals together. This drove a number of advantages in terms of forecast accuracy, on-shelf availability, decreasing inventory levels through to smoothing the flow of products to the consumer. Collaborative planning was one of the bases for minimising the cost-to-serve framework, while maintaining optimal service though the benefits across all areas took some time to be fully realised.

- This action case study research also showed that MAN structured its supply chain resulting in a dedicated customer-facing supply chain teams [also called implants or customer-based coordinators] to ensure a more collaborative process with RET to determine how best to capture, interpret and act on the data available. Agreeing on the right approach and defining objective that were critical for the collaboration to be mutually satisfying, was very important. MAN now has cross-functional teams based in the RET offices and distribution centres to ensure, in part, that the right data is captured and also to facilitate information flow throughout the value chain. These teams generally consist of personnel from demand planning, regional sales and supply chain analytics. MAN see their co-located customer service teams as an investment in analytics, enabling better decisions on a range of demand side decisions, including assortment and promotion strategies, new product development and introduction and event management. In addition, the implant role is also responsible for providing transparency, operational replenishment, vendor inventory management, co-managed inventories, and maximising product availability.
- The research further discovered that, through Lean, the need to create the on-site-based customer-facing supply chain teams ensured better collaboration. Subsequently, this was MAN's investment in the development of an internal demand-driven command centre, where consumer and sales data started to be synthesised, analysed and disseminated as an imperative function. Such a command centre that oversees the management of demand data and effectively syndicates the output of the analytics and information to RET and MAN's suppliers improved everything from new product development to life cycle and exception management. It was an essential ingredient for each of the building blocks of high-performance business, particularly in developing the kind of performance anatomy strong enough to withstand the vagaries of economic cycles.

- The field work submits to the fact that one of the key mutually critical elements was the need for a shared commitment to realising the vision of a demand-driven operating framework, therefore yielding a greater return on investment. MAN needed to rely on RET to capture and report shelf level data and consumer information so that MAN could design a fulfilment approach and supply chain that satisfies customers, shoppers and consumers. RET wanted to be sure that if they invest in generating and making this granular information available, MAN will use it to its best advantage. That goes beyond minimising OOS to increasing the success of products and merchandises with truly differentiated products and better management of product life cycles. However, in certain instances, product proliferation seemed to hamper the best demand management efforts, and MAN needed to rein in SKUs before they undercut both profitability and customer service. It was clearly evident that given the fact that they both serve the end consumer, their roles and responsibilities were to blur or even merge them to become a truly demand-driven in-organisation set-up.
- The empirical evidence shows that Lean has the core competencies to generate substantial benefits, both quantitative and qualitative, even if it is not rolled in every single part of the organisation's value chain. For instance, RET's primary focus areas where Lean was being applied were store logistics through the restocking processes and demand-based staffing, distribution and warehousing logistics by maximising its cross-docking efficiencies, picking and packing operations, transport capacity management, as well as reconfiguring the manner in which it could capitalise on MAN's factory direct deliveries. Collaboration and replenishment were predominantly supported by strong operational cooperation, joint performance management, information sharing, automated and systematic replenishment, maximising the development of EDI as a systems platform, promotions and event management. On the other hand, Lean's implementation with MAN was limited to functional areas such as collaborative demand and supply planning and replenishment, sales, production, customer service, customer-facing supply chain, warehousing and distribution. All other departments, namely procurement, marketing, human resources (with the exception of RET's stores people-planning, which was transformed to demand-based staffing), engineering, as well as finance, were not included into the initial journey of Lean.
- There is evidence to suggest that through Lean, the need to develop rigorous control for all inbound and outbound processes of products in the distribution centres, with consolidated

factory-direct deliveries to stores through an integrated EDI mechanism, supplemented by a detailed optimal planning of distribution capabilities, cross-docking and transshipment capacities became apparent during the case study. Such transformation also enabled the streamlining and error-free receiving at stores, supported by automated confirmation of stock receipt. It must also be stressed that the ability to ensure optimal shelf layout for the in-store processes, with a highly efficient replenishment infrastructure inter-organisationally, along with the permanent transparency of shelf availability for restocking, including the automated ordering system based high demand planning accuracy, and systematic promotion and event management were some of the emerging transformational effects.

#### **5.4 The link to the research question**

The majority of the key findings seem to suggest that Lean has the ability to support the stimulation of business performance through improvements in the OSA of products, whilst streamlining the inter-organisational supply chain set up, on behalf of customers. The proclaimed Lean's tools have the capability and capacity to improve the level of customer service through the consistent presence of products at shelf level, but this must be seen in the context of developing an infrastructure that delivers sustainable value creation through collaborative partnerships, with practices that eliminate waste within the value streams. Its ability to capture customer needs, craft the best process to streamline the flow of information and optimise the flow of products throughout the value chains is enormous and legendary for minimising waste, leading to substantial business transformation and sustainable developmental results.

#### **5.5 Contribution of the research**

The greatest contributions made by this research have emerged from the empirical results. The case study research on the application of Lean was carried out by investigating a set of two interdependent organisational project management teams involved in the development and implementation of the waste management technique of the value streams (that is the process owner), as well as the end users of Lean, which are both the operations teams (manufacturer and retailer's supply chain operations units) and the respective heads of divisions involved in establishing the direction of the inter-organisational cluster in its entirety. This study enriches the literature on the successful implementation of Lean, which has had limited application in the SA food manufacturing and retailing sector and has elevated the diffusion process for innovative

management practices in association with the development of business improvement practices and implementation of competitive strategies.

This research has also made a contribution in the context of highlighting Lean's core characteristics that have the potential to improve the shelf presence through product availability by up to 700 basis points within six months and reengineered the product replenishment and demand planning processes resulting in a 500 basis-point improvement in demand forecasting and planning accuracy.

Furthermore, organisations using mechanical characteristics to facilitate the adoption and implementation of administrative and technical innovations, as a dual-core framework, mainly focus on either activity analysis, process analysis or activity cost analysis. On the other hand, institutions with an organic model have a broader view of Lean from recognizing the problems, to generating the concept, gathering information, assessing changes of attitudes, evaluating forces of resistance, securing and attaining sufficient resources and commitment to implement Lean. As such, the empirical evidence supports the proposal of Geels (2004) of the socio-technical system (ST-system), which encompasses production, diffusion and use of technology; defining ST-systems as an abstract, functional sense, and linking all the elements necessary to satisfy society, such as information, operations and logistics, as well as the suggested explicit incorporation of the user in the analysis, whilst widening the focus on analytics. One can thus conclude that institutions that are driven by both mechanical and organic characteristics respectively, can successfully introduce, adopt, implement, and benefit from Lean, as in the case of the studied inter-organisational cluster.

Few empirical studies have been conducted on Lean in the SA production and manufacturing environment. More specifically, studies and investigations also generated an opportunity to determine the extent that Lean is being used within the SA Food manufacturing and retailing sector, with an integrated perspective, as an attempt to deliver a better OSA, is yet to be seen elsewhere. As such, the research makes a contribution, by helping gain greater insights on Lean's attributes to the retail management, inter-organisational supply chain, and operational excellence literature, through the application of qualitative investigative methods in order to study the manner in which Lean could stimulate the performance of business through improved OSA.

Furthermore, the use of the institutional theoretical framework contributed by facilitating a better understanding on the level of variability within the studied sector, on the inconsistencies of product availability. Extending the usefulness of the organisational theory, senior management specifically took a strong stand with a top-down approach due to such variability and poor performance. The framework enabled the visibility on the strength and assertiveness of leadership to influence the adoption and implementation of Lean to change traditional practices and accept the new realities in today's business. The theory also helped the researcher to see the hector requirement of more advanced improvement practices and performance measurement systems. The contributions made by the institutional theory were seen in the context of providing an explanatory framework that was useful in investigating, evaluating and gaining greater insights into the formulation of the desired strategic response to the organisational challenges and the new strategic focus areas for competitive strategy, which involved organisational change. As such, the processes used in the change management for the adoption and implementation of innovative problem solving techniques to support the supply chain strategies were then identified and understood.

## **5.6 Research conclusions and limitations**

The main conclusions and research limitations drawn from this field study are as follows:

- ◆ The empirical evidence demonstrates that Lean influences the development and implementation of new business optimisation strategies, in that the type of strategic response to consistent product availability has largely become dependent on the elimination of wastes. Therefore, the empirical results presented here confirm and support the predictions made in the literature that the adoption and implementation of Lean supported the delivery of a stimulated business and strategic performance levers, through the OSA and a number of other variables.
- ◆ The operational aspects of the Lean link to ongoing and continuous improvements have staff complement implications. This was illustrated by some of the store operations, production lines and support services staff at the operating level becoming redundant and redeployed through process improvements, which resulted in fewer people being required for certain functions. Lean is a strategic initiative that encompasses actions that eliminate waste, increase efficiency, lower costs and enhance asset utilisation and it strives to create value for consumers, increase capacity and lower spending, so that fewer physical, human and working capital resources are required to generate competitive products.

- ◆ The emerging benefits of Lean that were investigated in this action-driven research case study should only be viewed in the context of the inter-organisational set-up that was studied within the food manufacturing and retailing environment. In this regard, the results can indeed be generalised within this specific industry, but more specifically in the context of an integrated cluster between a food manufacturer and a food retailer. Generalisation to other industries should, therefore, be discouraged. However, given the fact that this was the first time that such research was done in SA, and the desire to form an in-depth understanding of the subject matter, it was necessary to limit the scope of the study to specific functional departments and the selected product categories as well as the few stores types or format that were applicable in this study (as shown in Figures 3.4 & 3.6 and Table 3.3). As such, even though the above limitation is noted, it does not limit the usefulness of the study.

### **5.7 Suggested areas for further research**

- ◆ Given the fact that a Lean value chain is achieved through the practical utilisation of Lean's tools and techniques [such as DMAIC, DFSS, Kanban, GSTD, AM, PM, PVAFI and TQM], an explorative research study is necessary to examine and quantify the real value of each tool in the context of the financial contribution to the bottom-line, within the food manufacturing and retailing arena.

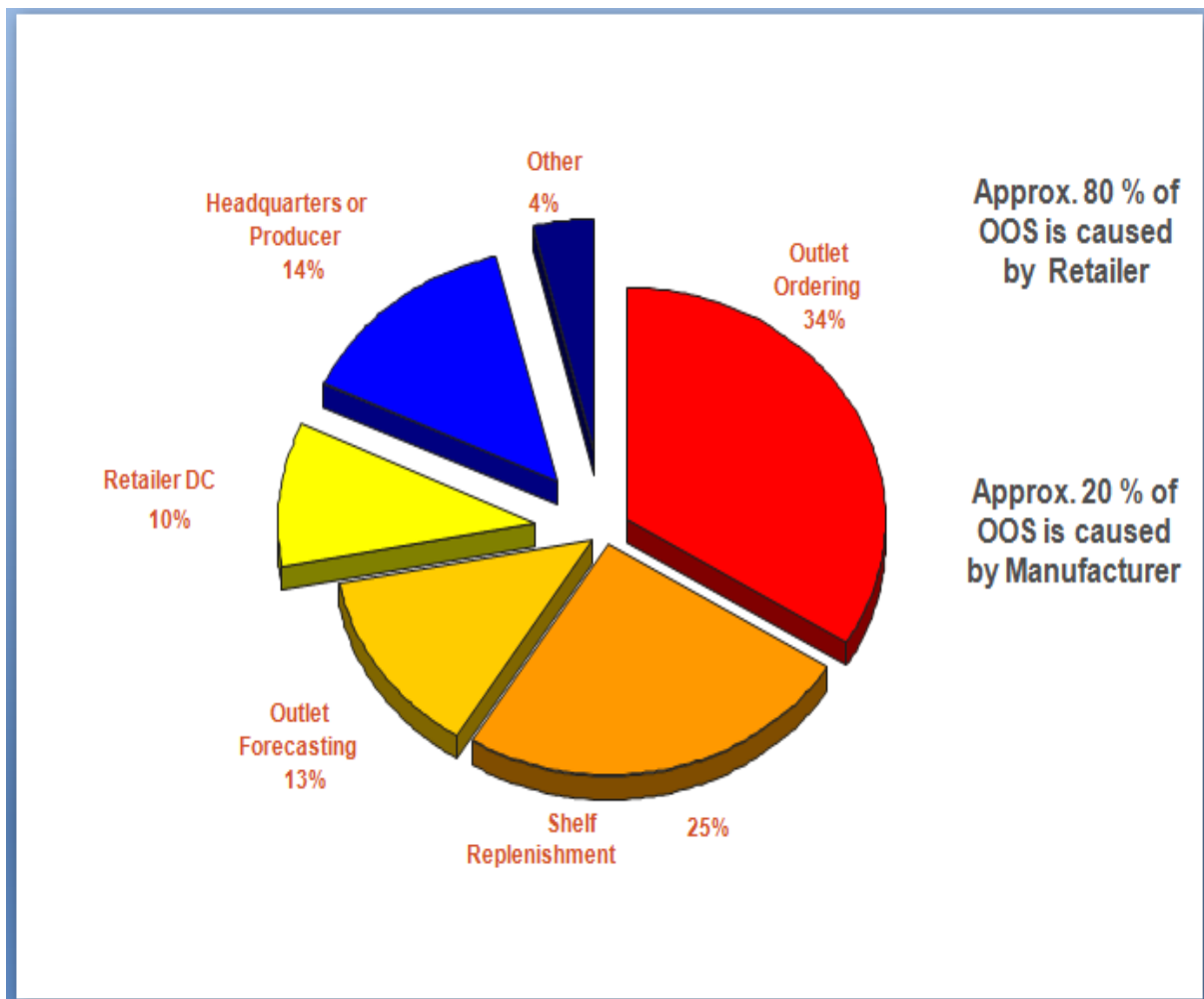
### **5.8 Conclusion**

It is evidently conclusive that Lean has the core capabilities, competence and capacity to address business issues and challenge process gaps, and create a robust infrastructure through: (i) the optimisation of the Information Flow, (ii) ensuring end-to-end improvement on the Products Flow, and (iii) resulting in the Elimination of Wastage throughout the value streams. The use of institutional theory facilitated a detailed investigation and exploration into the nature of the inter-organisational set-up, and the manner in which Lean was applied to business transformation. This then led the researcher to gain deeper understanding of the reasons that motivated the need to have a more relevant set of management practices such as Lean, in order to stimulate business performance. The framework also led the evaluation of process used in the primary introduction and adoption of the Lean value stream into the inter-organisational strategic alliance that was established between the manufacturer and retailer's supply chains. More specifically it clarified the manner in which Lean was brought into the organisation, highlighting the challenges, tensions and influence of internal politics employed by the key players in the implementation process.

**ADDENDUMS: FIGURES, EXHIBITS, TABLES & ANNEXURES.**

**LIST OF FIGURES**

**Figure 1.1 Root causes of out-of-stocks (OOS) at retail outlets**



Source: Nestle supply chain strategy office, South Africa, 2011

Figure 1.2 Landscape of the South African retailer environment, consumer population and potential opportunity.



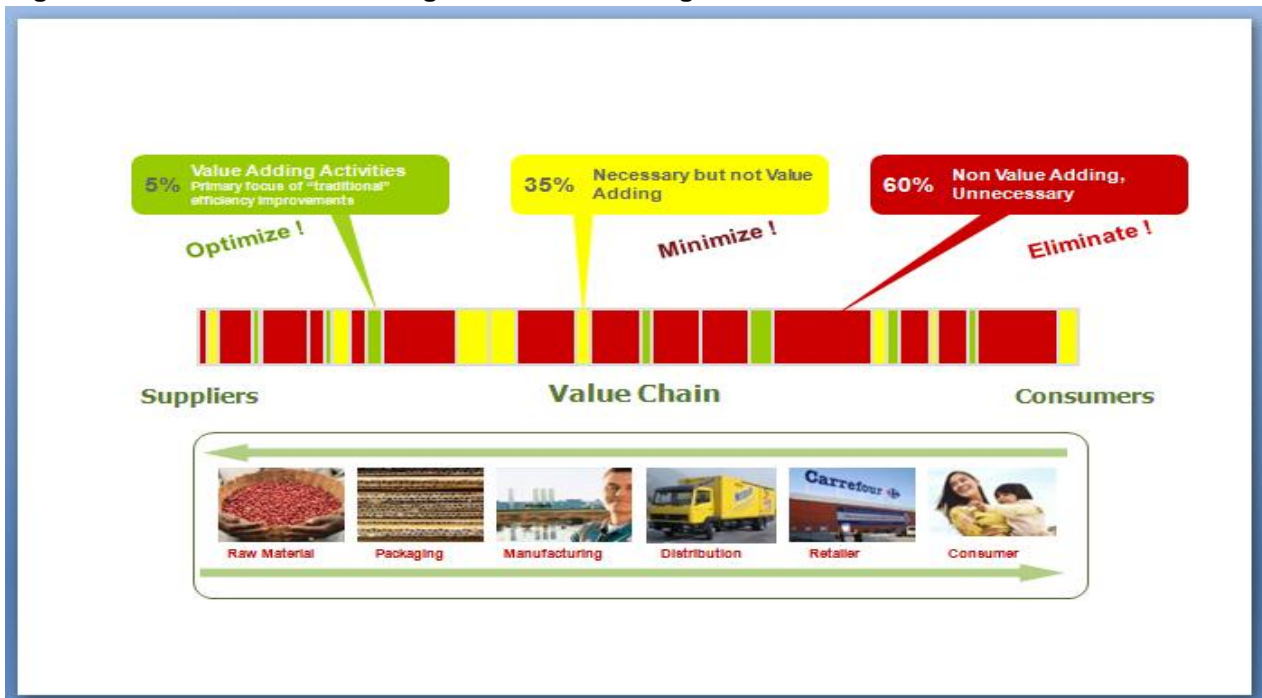
Source: Nestle supply chain strategy office, South Africa, 2011

Figure 2.1: Types of waste and non-value-adding activities for the manufacturer



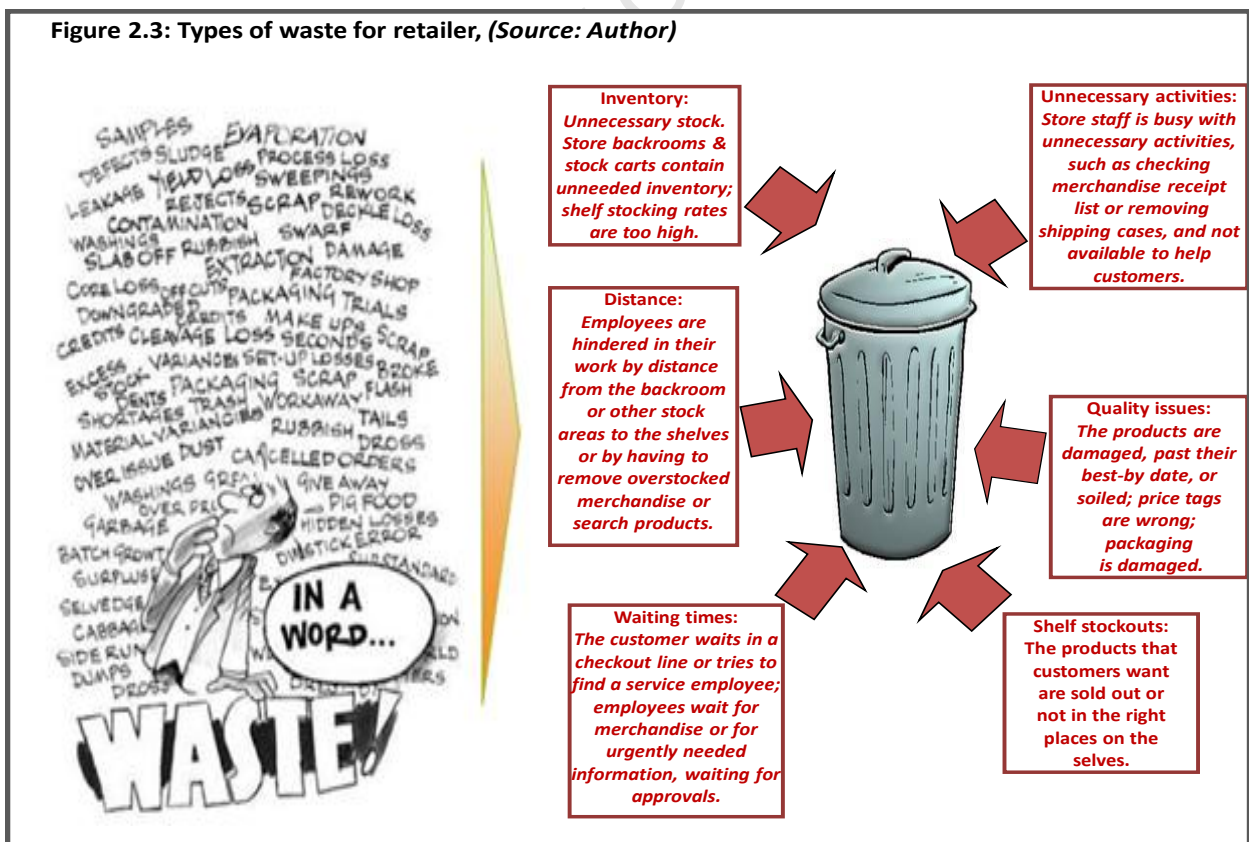
Source: Womack and Jones (2006), Beischel (1990), Womack and Jones (2005) – Modified.

Figure 2.2: Levels of value-adding & non-value-adding activities.



Source: Womack and Jones (1996a) – Restructured and modified

Figure 2.3: Types of waste for retailer, (Source: Author)



**Figure 2.4: DMAIC framework/model & the associated actions.**

DEFINE	MEASURE	ANALYSE	IMPROVE	CONTROL
<ol style="list-style-type: none"> <li>1. Review project charter</li> <li>2. validate problem statement &amp; goals</li> <li>3. Validate the voice of the customer</li> <li>4. Validate financial benefits</li> <li>5. Validate high level value stream map &amp; scope</li> <li>6. Create communication plan</li> <li>7. Develop the project schedule</li> <li>8. Complete the Define Gate</li> </ol>	<ol style="list-style-type: none"> <li>1. Assess the value stream map for deeper understanding &amp; focus</li> <li>2. Identify key inputs, process &amp; output metrics</li> <li>3. Develop operational definitions</li> <li>4. Develop data collection plan</li> <li>5. Validate measurement systems</li> <li>6. Collect baseline data</li> <li>7. Determine process capability</li> <li>8. Complete the Measure Gate</li> </ol>	<ol style="list-style-type: none"> <li>1. Determine critical inputs</li> <li>2. Identify potential root causes</li> <li>3. Reduce the list of potential root causes</li> <li>4. Confirm the effect of root causes on output or results</li> <li>5. Estimate impact of root causes on key outputs</li> <li>6. Prioritise the root</li> <li>7. Complete Analysis Gate</li> </ol>	<ol style="list-style-type: none"> <li>1. Develop potential solutions</li> <li>2. Evaluate, select &amp; optimise best solutions</li> <li>3. Develop the "to-be or future value stream map(s)"</li> <li>4. Develop &amp; implement pilot solutions</li> <li>5. Confirm attainment of project goals &amp; objectives</li> <li>6. Develop full scale implementation plan</li> <li>7. Complete Improve Gate</li> </ol>	<ol style="list-style-type: none"> <li>1. Implement mistake proofing</li> <li>2. Develop standard operating procedures, training plans &amp; process controls</li> <li>3. Implement solutions &amp; on-going process measurement</li> <li>4. Identify opportunities to apply project lessons</li> <li>5. Transition monitoring &amp; control to process owners.</li> </ol>

Source: George et al. (2005).

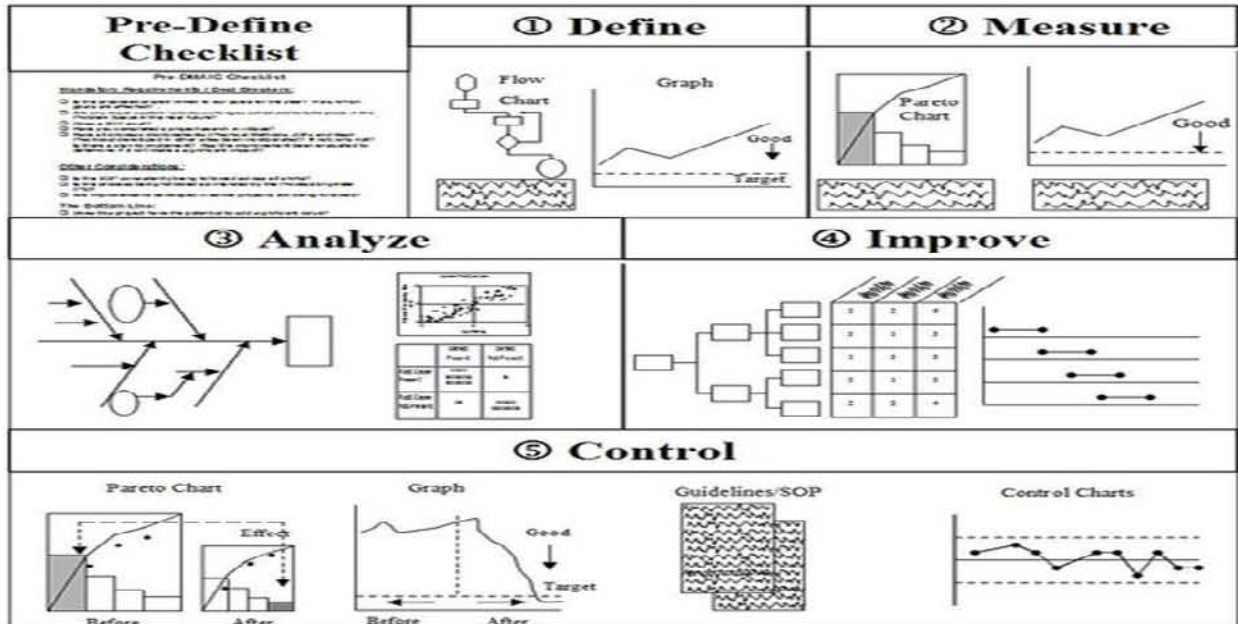
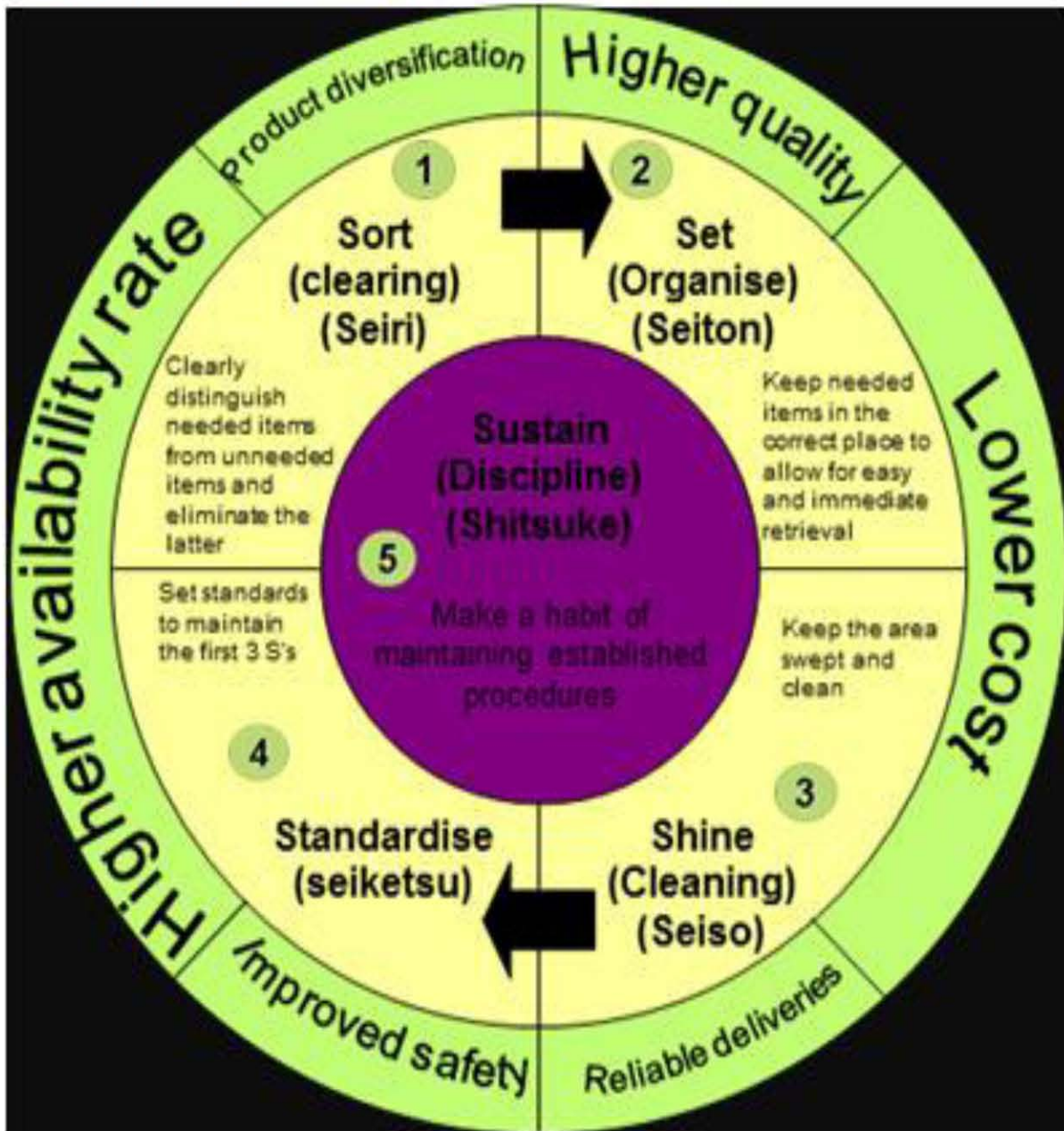


Figure 2.5: The Five Ss and Six Sigma approach



Source: Studied Manufacturer – modified during the Action-based case research (2011).

Figure 2.6: Autonomous Maintenance (AM) framework/model.

The 7 steps of the methodology.	The 4 steps of learnings.
7 – Practice full self-management	Being able to manage the equipment
6 – Systematize autonomous maintenance	Know the relation between process adjustments & quality
5 – General process inspection	
4 – General equipment inspection	Know the equipment functions & structure
3 – Establish provisional standards for cleaning, inspection, lubrication	Being able to differ the normal from abnormal
2 – Eliminate contamination sources and hard to reach places	
1 – Perform initial cleaning	



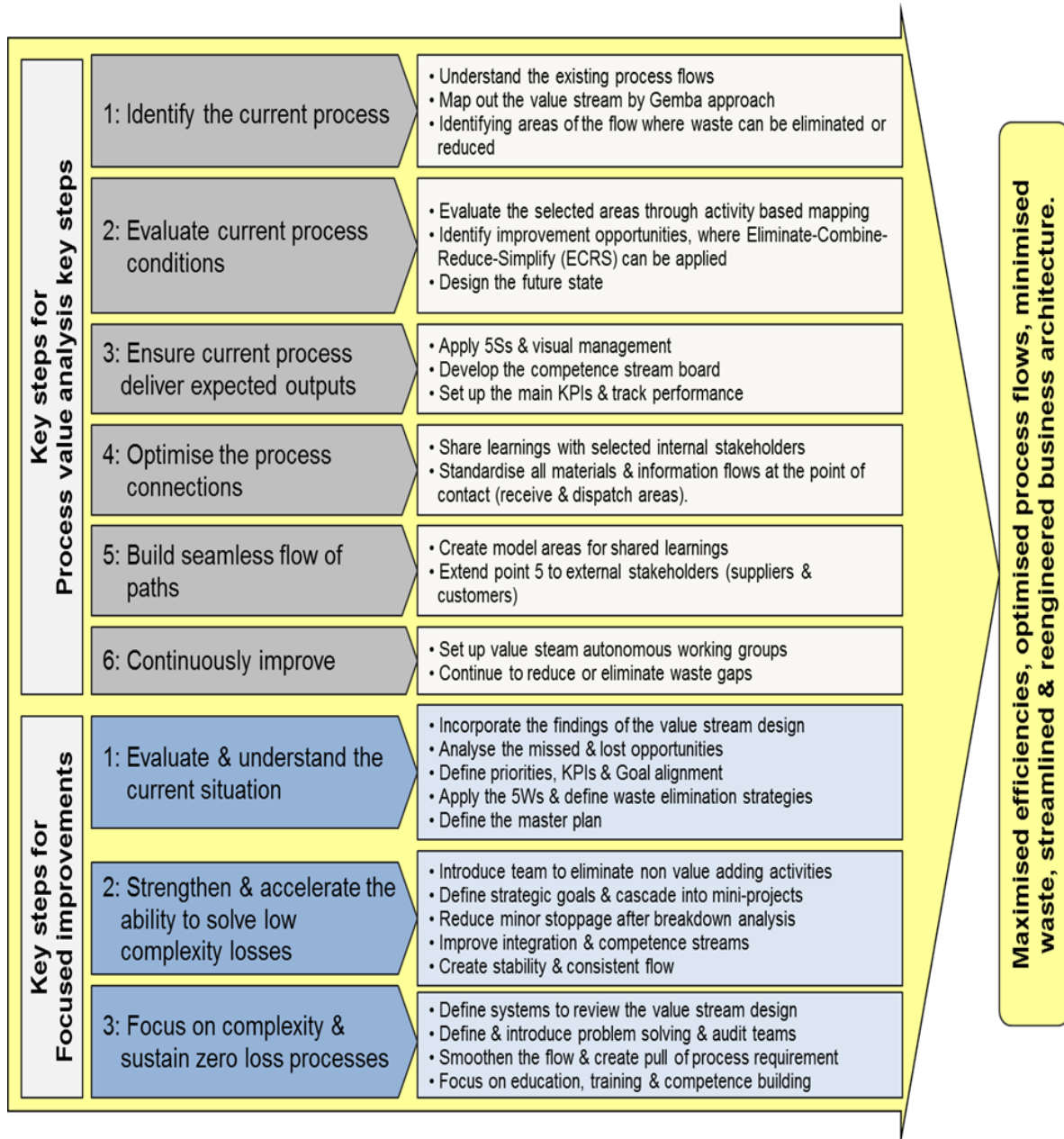
Source: Studied Manufacturer & Author – developed & refined during the Action-based case research (2011).

Figure 2.7: Planned Maintenance (PM) framework/model.

Steps	Objectives
<b>6</b> Evaluate the planned maintenance system	<ul style="list-style-type: none"> <li>› Run the maintenance budget on-line</li> <li>› Evaluate the maintenance concerning reliability</li> <li>› Availability and maintenance of assets</li> </ul>
<b>5</b> Create or review the predictive maintenance system (CBM)	<ul style="list-style-type: none"> <li>› Introduce technologies for predictive maintenance (diagnose methods)</li> <li>› Define and execute maintenance plans based on condition</li> </ul>
<b>4</b> Create or review the periodic maintenance system (TBM)	<ul style="list-style-type: none"> <li>› Define/revise the Maintenance Plan based on time (inspection and periodical changes)</li> <li>› Establish inspection procedure standards</li> <li>› Balance Maintenance Plans execution</li> <li>› Assure "vertical start-up" after preventive maintenance</li> </ul>
<b>3</b> Create or review the information management system	<ul style="list-style-type: none"> <li>› Define an automatized maintenance system</li> <li>› Establish the technical information register</li> <li>› Control schematic drawings and diagrams</li> <li>› Consolidate the register of the "Component Tree"</li> <li>› Manage/reduce spare parts stock levels</li> </ul>
<b>2</b> Restore basic conditions and correct weaknesses	<ul style="list-style-type: none"> <li>› Restore machine basic conditions</li> <li>› Correct weaknesses (strengthen weak aspects)</li> <li>› Enhance improvements</li> <li>› Identify and eliminate breakage causes</li> <li>› Eliminate repetitive breakages</li> <li>› Consolidate the survey on "Component Tree"</li> </ul>
<b>1</b> Evaluate equipment and understand current conditions	<ul style="list-style-type: none"> <li>› Consolidate the Maintenance concepts</li> <li>› Validate/check assets</li> <li>› Define asset priorities</li> <li>› Understand the current situation (survey data base)</li> <li>› Build indicators and establish objectives</li> </ul>

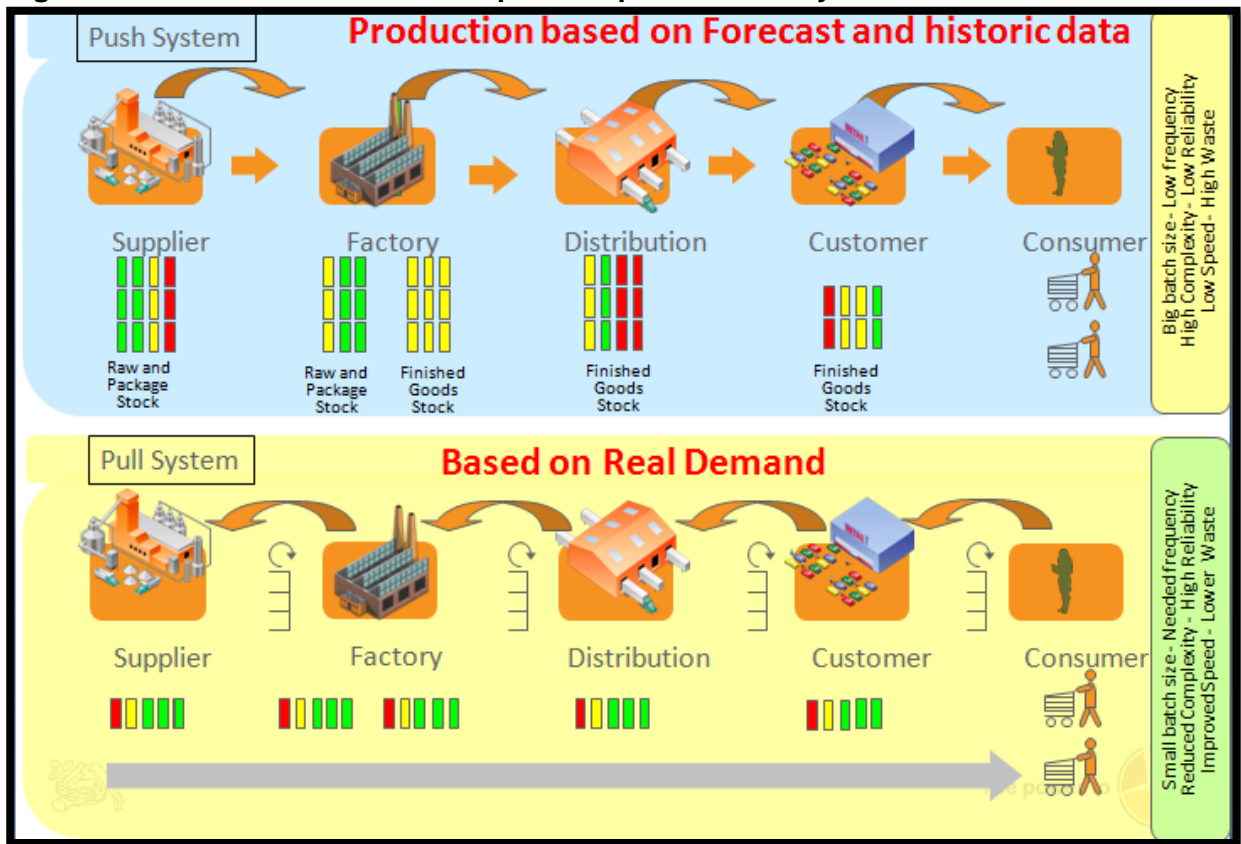
Note: Time-based maintenance (TBM), Condition-based maintenance (TBM). Source: Studied Manufacturer & Author – refined during the Action-based case research (2011).

**Figure 2.8: Process Value Analysis & Focused Improvement (PVAFI) framework/model.**



Source: Studied Manufacturer & Author – developed & refined during the Action-based case research (2011).

Figure 3.1: The difference between pull and pull-demand system.



Source: Nestle Brazil, 2011

University of

**Figure 3.2: Event flowchart for demand planning and sales forecasting. (Sources: Manufacturer's DMAIC project - 2011)**

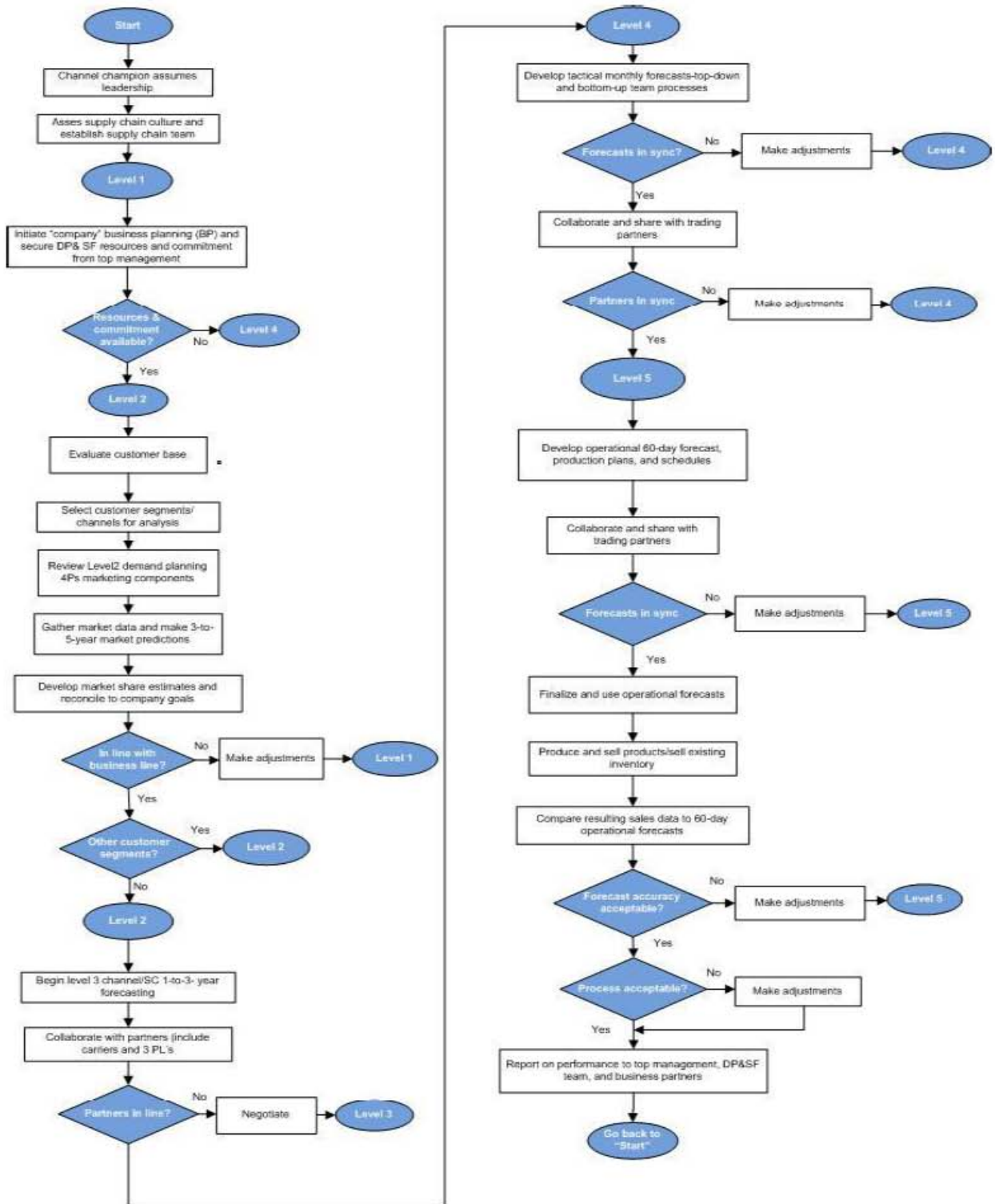
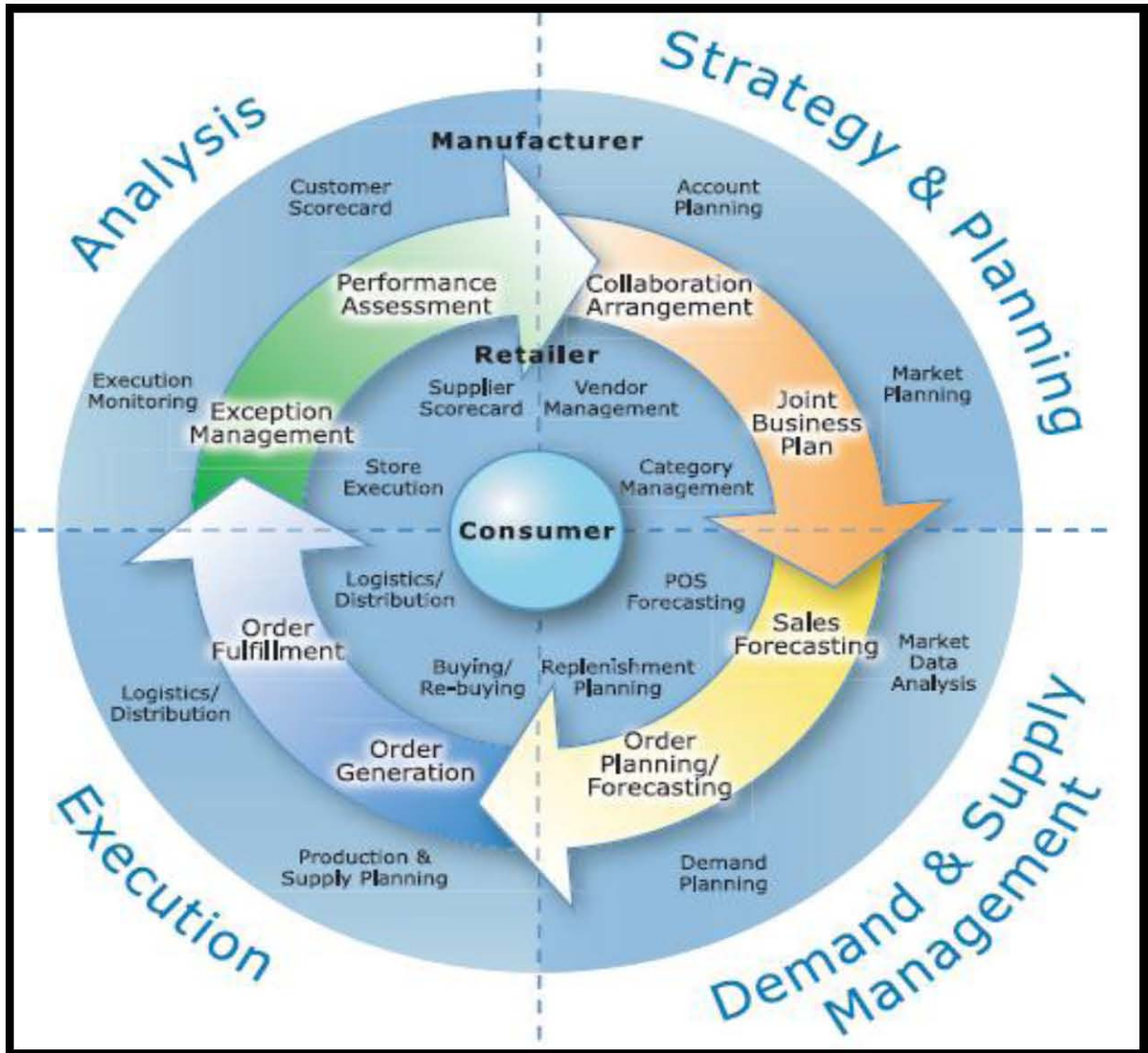


Figure 3.3: Retailer-Manufacturer's integrated replenishment process to manage OOS.



Retailer Tasks	Collaboration Tasks	Manufacturer Tasks
<b>Strategy &amp; Planning</b>		
Vendor Management	Collaboration Arrangement	Account Planning
Category Management	Joint Business Plan	Market Planning
<b>Demand &amp; Supply Management</b>		
POS Forecasting	Sales Forecasting	Market Data Analysis
Replenishment Planning	Order Planning/Forecasting	Demand Planning
<b>Execution</b>		
Buying/Re-buying	Order Generation	Production & Supply Planning
Logistics/Distribution	Order Fulfillment	Logistics/Distribution
<b>Analysis</b>		
Store Execution	Exception Management	Execution Monitoring
Supplier Scorecard	Performance Assessment	Customer Scorecard

Source: Studied Manufacturer – Barrat & Oliveira, 2001), Modified

Figure 3.4: Inter-organisational Lean Project team. (Source: Author, Action Research project)

	Position	Responsibility
<p>Manufacturer "MAN"</p>	1) Supply Chain Director	1) Co-Sponsor
	2) Customer Facing Supply Chain Manager	2) Project lead & coordinator
	3) Customer Service Operations Manager	3) Order capturing & fulfilment
	4) Supply Chain Analyst/Planner	4) Stock analytics & replenishment
	5) Customer Business Manager	5) Commercial planning
	6) Logistics Manager	6) Distribution & transport
<p>Retailer "RET"</p>	1) Supply Chain Director	1) Co-Sponsor
	2) Commercial Executive	2) Project lead & coordinator
	3) Chief Buyer	3) Order planning
	4) Group Planning Manager	4) Stock replenishment
	5) Logistics Manager	5) Distribution & transport
	6) Stores Operations Manager	6) Stores operations & shelf management

Figure 3.5: RET's structural design (modified) & product segments

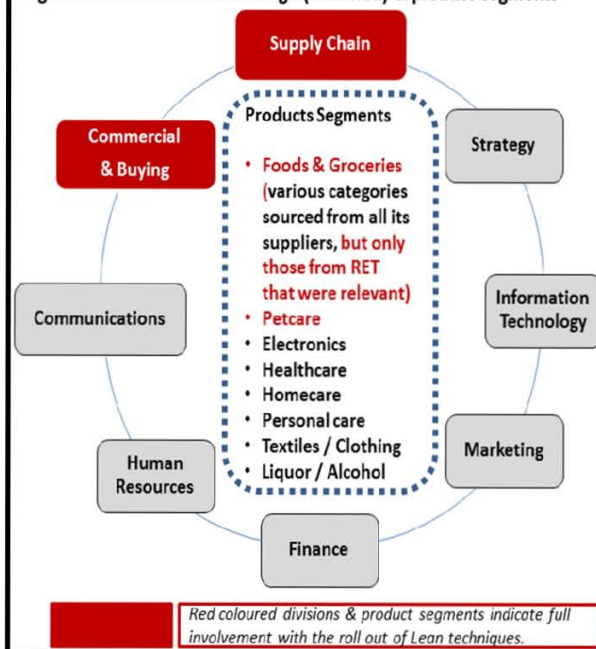
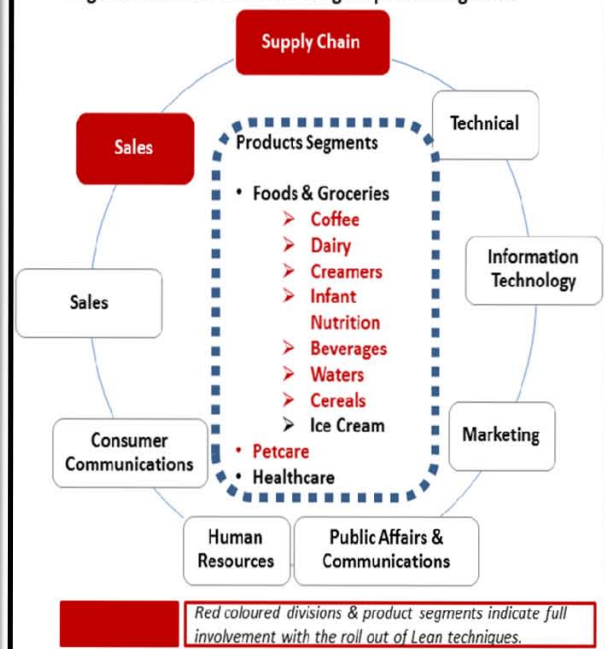
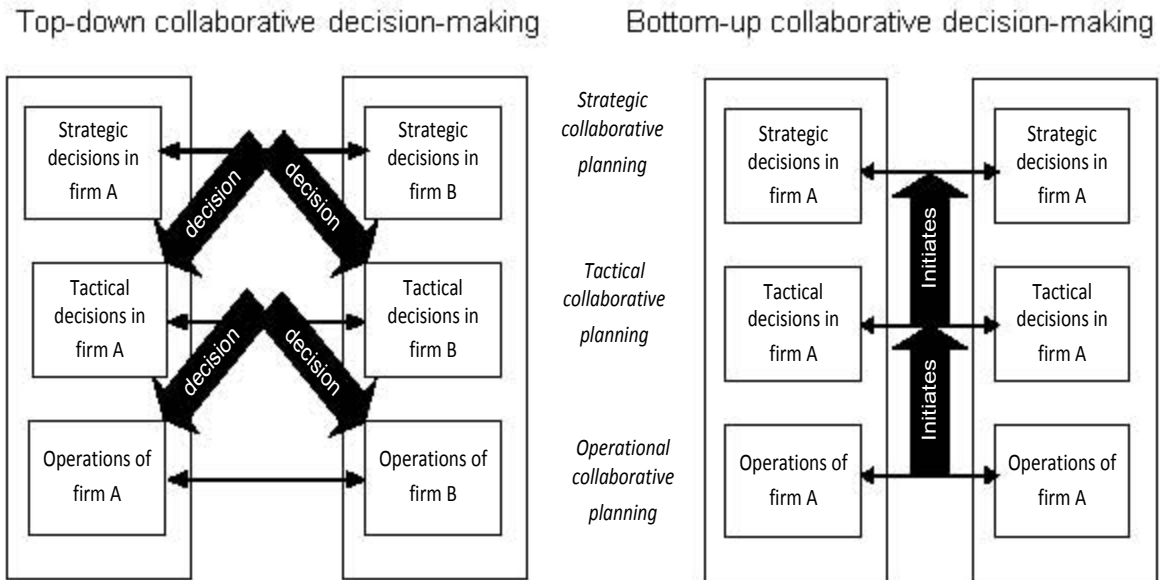


Figure 3.6: MAN's structural design & product segments



**Figure 5.1: Inter-organisational interaction of collaborative and decision-making.**  
 Source: Lee, et al. (1997).



**Figure 5.2: Types of integration intensities to realize collaboration (Source: Muckstadt et al., 2001)**

		N/A	<p><b>Type 1 Collaborators</b></p> <ul style="list-style-type: none"> <li>Same as Type2, except that we are routinely involved in each other's strategic, tactical and operational decisions</li> </ul>	High
<p>Level Of Information Systems Integration</p> <p>High</p> <p>Low</p>	<p><b>Type 1 Collaborators</b></p> <ul style="list-style-type: none"> <li>In the extreme, we see their demand, know their current inventory levels and inventory policies, but otherwise deal at arms-length</li> </ul>	<p><b>Type 1 Collaborators</b></p> <ul style="list-style-type: none"> <li>Same as Type3, except that we are routinely appraised of upcoming changes by of highly integrated business processes</li> </ul>		<p>Level Of Decision Systems Integration</p> <p>Low</p>
	<p><b>Type 1 Collaborators</b></p> <ul style="list-style-type: none"> <li>They place orders, we do our best to forecast their needs</li> <li>Some large customers may be unwilling or unable to do otherwise.</li> </ul>	N/A		
	<p>Low</p> <p>High</p>	<p>Level Of Business Process Integration</p>		

**Figure 6.1: Integrated Institutional Theoretical Model for Manufacturer & Retailers.**

*(Source: Author, 2011)*



## LIST OF TABLES

Table 2.1: Revolutionary stages of supply chain

Up to 1960s Stage 1	1970s - 1980s Stage 2	1980s - 1990s Stage 3	1990s - 1999 Stage 4	2000 - 2010 Stage 5	2011 - Beyond Stage 6
Warehousing & Transportation	Total Cost Management	Integrated Logistics Management	Supply Chain Management	Lean Supply Chain Management	<b>Lean VALUE Chain Management</b>
<i>Management Focus:</i> Operations Performance Efficiencies.	<i>Management Focus:</i> Optimizing Operations Cost & Customer Service.	<i>Management Focus:</i> Tactics/Strategies Logistics Planning.	<i>Management Focus:</i> Supply Chain Strategies, Channel Co-evolution, Goals.	<i>Management Focus:</i> Internet, e-Business, e-Marketing, SCM Synchronization, Value for money.	<i>Management Focus:</i> <b>Demand economy, Shared resources/assets, Green economy, End2end value chain, Network reconfiguration.</b>
<i>Organization Design:</i> Decentralized Functions.	<i>Organization Design:</i> Centralized Functions.	<i>Organization Design:</i> Integration of Logistics Functions.	<i>Organization Design:</i> Partnering Virtual Organization, Market co-evolution.	<i>Organization Design:</i> Networked Channel .coms Exchange, Agility/Scalability.	<i>Organization Design:</i> <b>Inter-organisational, Customer facing, Global alignment.</b>

Sources: Ventana Research (2007)

Table 3.1: Demand Planning, Supply Planning and Sales Forecasting Levels

<b>Decision Levels</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>
<b>Selection Factors</b>	Strategic Planning	Macro or Market	Channels specific	Tactical & VMI	Operational Demand
<b>Forecast &amp; Planning Time Horizon</b>	from 36 months to 60 months	from 24 months to 36 months	from 3 months to 24 months	from 1 month to 3 months	from 1 week to 1 months
<b>Business Purpose and Context for Forecasting</b>	<ul style="list-style-type: none"> <li>Corporate vision and mission</li> <li>Growth target trend</li> <li>Enterprisewide</li> <li>Top-level management is ultimately responsible</li> </ul>	<ul style="list-style-type: none"> <li>Market share and penetration</li> <li>Country and/or global markets analyses</li> <li>Product and marketing managers responsible</li> </ul>	<ul style="list-style-type: none"> <li>SCM mission &amp; vision</li> <li>Focus on each channel and channel partners responsibilities</li> <li>Take into account environmental changes</li> </ul>	<ul style="list-style-type: none"> <li>Short-term objectives by product line and division</li> <li>Channel member cooperation critical</li> </ul>	<ul style="list-style-type: none"> <li>SKU projections</li> <li>Focus on actual demand</li> <li>Need to be reactive and flexible</li> </ul>
<b>Forecast Measures</b>	<ul style="list-style-type: none"> <li>Sale-gross and net</li> <li>No. of customers, suppliers (increase/decrease)</li> <li>Overall customer satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>Dollars</li> <li>Pounds, gallons, etc</li> <li>Units</li> <li>Variance analysis of actual to forecast</li> </ul>	<ul style="list-style-type: none"> <li>Sales</li> <li>ROI</li> <li>Profit contribution</li> <li>Service levels</li> <li>Inventory turns</li> <li>Operating costs</li> </ul>	<ul style="list-style-type: none"> <li>Units</li> <li>Sales dollars</li> <li>Pounds</li> <li>Inventory levels/turns</li> <li>Ton-mile, unit miles</li> </ul>	<ul style="list-style-type: none"> <li>Units</li> <li>SKUs</li> <li>Shipments</li> <li>Variance analysis of actual to forecast</li> </ul>
<b>Customer Considerations</b>	<ul style="list-style-type: none"> <li>Broad look at changing customer base</li> <li>Technology used with major customers</li> <li>What can be done to improve relationships?</li> </ul>	<ul style="list-style-type: none"> <li>Broad/generic levels of forecasts</li> <li>Marketing channels</li> <li>Customer segments</li> </ul>	<ul style="list-style-type: none"> <li>Analysis of relationships with customers</li> <li>Contract stipulations with customers</li> </ul>	<ul style="list-style-type: none"> <li>Pareto analysis of customers and business relationships</li> <li>VMI/SMI?</li> </ul>	<ul style="list-style-type: none"> <li>Individual customers levels of interactions</li> <li>Transactional shipment/sales analysis</li> </ul>
<b>Product or Market</b>	<ul style="list-style-type: none"> <li>Decisions about entering new markets or leaving current ones</li> <li>Life cycle-new products intros, discontinuations, modifications</li> </ul>	<ul style="list-style-type: none"> <li>Introduce product worldwide (if global)</li> </ul>	<ul style="list-style-type: none"> <li>Changes to channel structure to enhance individual market presence and category profitability</li> </ul>	<ul style="list-style-type: none"> <li>Focus on specific market areas</li> <li>Promotions, unique market characteristics</li> <li>Forecast demand at DC levels</li> </ul>	<ul style="list-style-type: none"> <li>Within markets-focus on individual customer and product line changes</li> </ul>
<b>Competition influences</b>	<ul style="list-style-type: none"> <li>Organizations in any industry that compete for same sales dollar</li> </ul>	<ul style="list-style-type: none"> <li>Organization within the same markets</li> </ul>	<ul style="list-style-type: none"> <li>“System” of companies, i.e., entire supply chains</li> <li>Category management positions</li> </ul>	<ul style="list-style-type: none"> <li>Direct competitors by product line</li> <li>Impact of other divisions of same company</li> </ul>	<ul style="list-style-type: none"> <li>SKU competition</li> </ul>
<b>Analytical Tools and Database Considerations</b>	<ul style="list-style-type: none"> <li>Category sales trends</li> <li>Enterprisewide historical data</li> <li>Econometric analysis</li> <li>GIS analysis</li> <li>Decision-support simulation</li> </ul>	<ul style="list-style-type: none"> <li>Macro information</li> <li>Consumer and economic indices</li> <li>Gap analysis</li> <li>Judgment surveys</li> <li>Correlation analysis</li> </ul>	<ul style="list-style-type: none"> <li>Customer and product level historical data</li> <li>Regression analysis</li> <li>Supply chain management software</li> <li>Simulation optimization</li> </ul>	<ul style="list-style-type: none"> <li>Strategic demand data</li> <li>Recent historical data</li> <li>Carrier information</li> <li>POS/POU data</li> <li>Forecasting tools</li> <li>Optimization</li> </ul>	<ul style="list-style-type: none"> <li>Short-term forecasting tools</li> <li>Operating schedules</li> <li>DRP/MRP outputs</li> <li>POS/POU data</li> <li>ASNs and other EDI</li> </ul>
<b>IT Systems Support</b>	<ul style="list-style-type: none"> <li>Understand current system and future needs</li> <li>Use business planning information</li> </ul>	<ul style="list-style-type: none"> <li>Level of information sharing among business units, impact of forecast accuracy</li> </ul>	<ul style="list-style-type: none"> <li>Determine integrity of channel partners’ data</li> <li>Reconcile forecasting methods</li> </ul>	<ul style="list-style-type: none"> <li>Implement specific systems improvements</li> <li>Determine integrity of detailed forecasting data</li> </ul>	<ul style="list-style-type: none"> <li>Appropriate forecasting software</li> <li>Partner feedback regarding system effectiveness</li> </ul>
<b>Champion</b>	<ul style="list-style-type: none"> <li>Lead executive available?</li> <li>Executive as committee chair</li> </ul>	<ul style="list-style-type: none"> <li>Consensus team leader for marketing and sales</li> <li>Product line managers</li> </ul>	<ul style="list-style-type: none"> <li>Channel leader-supplier, customer, your company</li> </ul>	<ul style="list-style-type: none"> <li>Consensus team leader</li> <li>Functional leaders</li> </ul>	<ul style="list-style-type: none"> <li>Consensus team leader</li> <li>Plant-level leaders</li> <li>Functional leaders</li> </ul>
<b>Team Representation</b>	<ul style="list-style-type: none"> <li>Top management executive committee</li> <li>Outside consultants</li> </ul>	<ul style="list-style-type: none"> <li>Cross-functional team including major customers and channel partners</li> <li>In-house consensus team</li> <li>Industry experts</li> </ul>	<ul style="list-style-type: none"> <li>Cross functional consensus team</li> <li>Inter-organizational teams</li> </ul>	<ul style="list-style-type: none"> <li>Cross-functional consensus team</li> <li>Functional teams</li> </ul>	<ul style="list-style-type: none"> <li>Cross-functional consensus team</li> <li>Inter-organizational teams</li> </ul>

Sources: Manufacturer’s Demand & Supply planning department’s DMAIC Project (2011)

Table 3.2: South Africa's Retail Territory; Source: RET's Supply Chain strategy office.

Province Name	Capital	Contribution to country's GDP	% Languages Spoken by consumers
Western Cape	Cape Town	14.0%	Afrikaans 49,7% / isiXhosa 24,7%
Eastern Cape	Bhisho	7.6%	isiXhosa 78,8% / Afrikaans 12,7%
Northern Cape	Kimberley	2.3%	Afrikaans 53,8% / Setswana 33,1%
Free State	Bloemfontein	5.5%	Sesotho 64,2% / Afrikaans 12,7%
KwaZulu-Natal	Pietermaritzburg / Durban	16.1%	isiZulu 77,8% / English 13,2%
North West	Mafikeng	6.5%	Setswana 63,4% / Afrikaans 9%
Gauteng	Johannesburg	33.9%	Multilingual
Mpumalanga	Nelspruit	7.1%	Multilingual
Limpopo	Polokwane	7.0%	Multilingual

Table 3.3: Number of RET's outlets.

Number of Stores by format	
<b>Total Group</b>	<b>1326</b>
<b>Total Corporate Stores</b>	<b>774</b>
<b>Hyper Markets</b>	<b>176</b>
<b>Super Markets</b>	<b>386</b>
Pharmacy	25
Liquor Stores	119
Clothing	68
<b>Total Franchise Stores</b>	<b>552</b>
<b>Super Markets</b>	<b>279</b>
Express Stores	43
Liquor Stores	78
Stores in the rest of Africa (excluding South Africa)	152

Source: RET's supply chain strategy office

*Red coloured store format & number of stores indicate number & types of retail outlets that formed part of the Lean techniques' roll out*

Table 3.4: Source of Data/Information & Portfolio of evidence. (Source: Author, Action Research project)

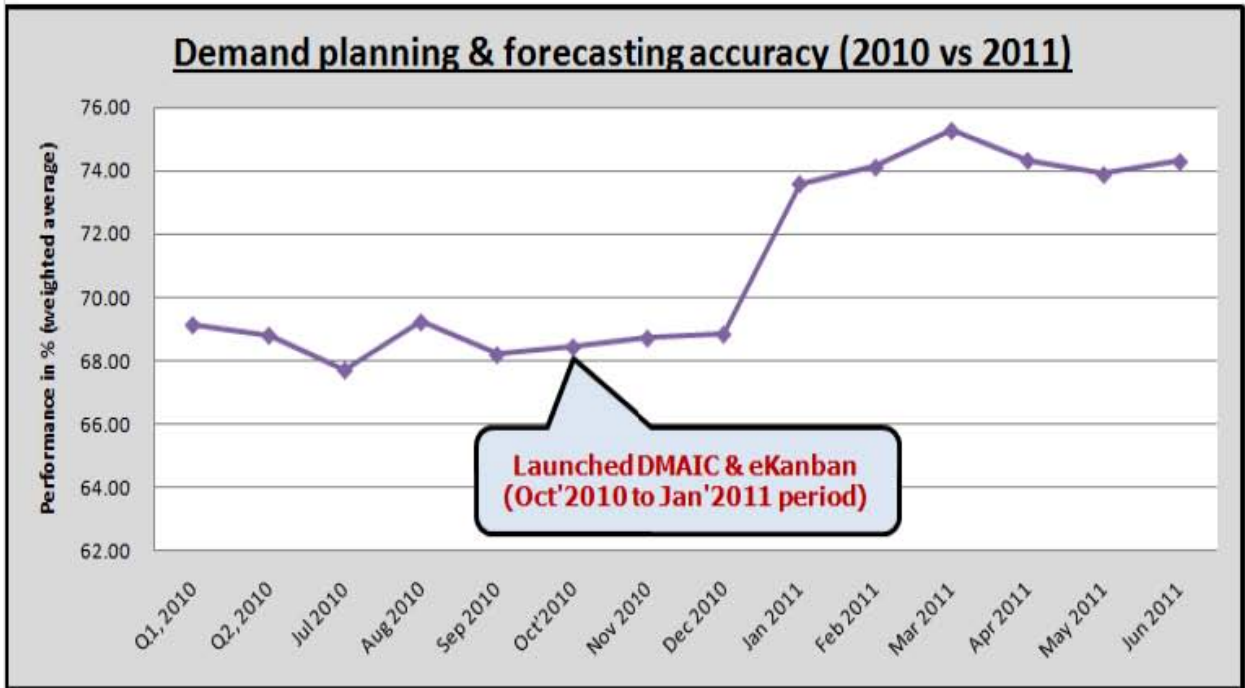
Integrated supply chain segments	Required type of data or information	Source of data (departments)	Data collection method
<b>Manufacturer</b>  "MAN"	Production costs (as a % of turnover)	Supply chain KPI dashboard	Factory visit & monthly reviews
	Productivity (throughput per man hour)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	Market share (by product category or segment)	Marketing insights	Monthly product category reviews
	Retail ready product working capital (total inventory in days & value)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	Case fill rate (% of fulfilled orders)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	0-90 days supply & promotions planning accuracy (in %)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	>90 days Planning & forecasting horizons	Supply chain KPI dashboard	Future supply risk meetings
	Root causes of OOS	Supply chain strategy office	Strategy meetings & observations
<b>Retailer</b>  "RET"	Retail ready product working capital (total inventory in days & value)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	On-shelf availability (in %)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	0-90 days demand & promotions planning accuracy (in %)	Supply chain KPI dashboard	Forecasting review,
	>90 days Planning & forecasting horizons	Supply chain KPI dashboard	Future supply risk meetings
	Case fill rate (% of fulfilled replenishment to stores)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	In-distribution centre stock availability (in %)	Supply chain KPI dashboard	Weekly & monthly operations reviews
	Operating efficiencies at stores & distribution centres	Logistics	Visits to stores & distribution centres
	Transport reliabilities & on time deliveries	Logistics	Observations
	Root causes of OOS	Supply chain strategy office	Strategy meetings & observations
Order execution performance	Buying & planning	Weekly order fulfilment meetings	
<b>Key Questions asked by the Researcher during the interactions &amp; as part of Observations</b>	<ul style="list-style-type: none"> <li>• How is what you're doing working for you?</li> <li>• What assumptions are you making and what's their validity?</li> <li>• What issues are we avoiding?</li> <li>• What options do you see for the challenge?</li> <li>• What ideas do you have to making this project even more successful?</li> <li>• What are the measures &amp; KPIs telling us?</li> <li>• What else can we do differently?</li> <li>• How would the root causes affect the process output? What's the greatest impact on business?</li> </ul>	<ul style="list-style-type: none"> <li>• What are the resource requirements?</li> <li>• What's the source of data &amp; how frequently is it collected? What's the communication plan?</li> <li>• Which solutions are most likely to work?</li> <li>• How will we control the process to sustain the improvements?</li> <li>• What are opportunities for us to apply the learnings to other areas or product categories?</li> <li>• What's the scope of the problem, how often does it happen &amp; which other areas are affected?</li> <li>• How sustainable are the solutions &amp; results?</li> </ul>	

**Table 4.1: Major areas of improvements from RET & MAN collaborative partnerships**

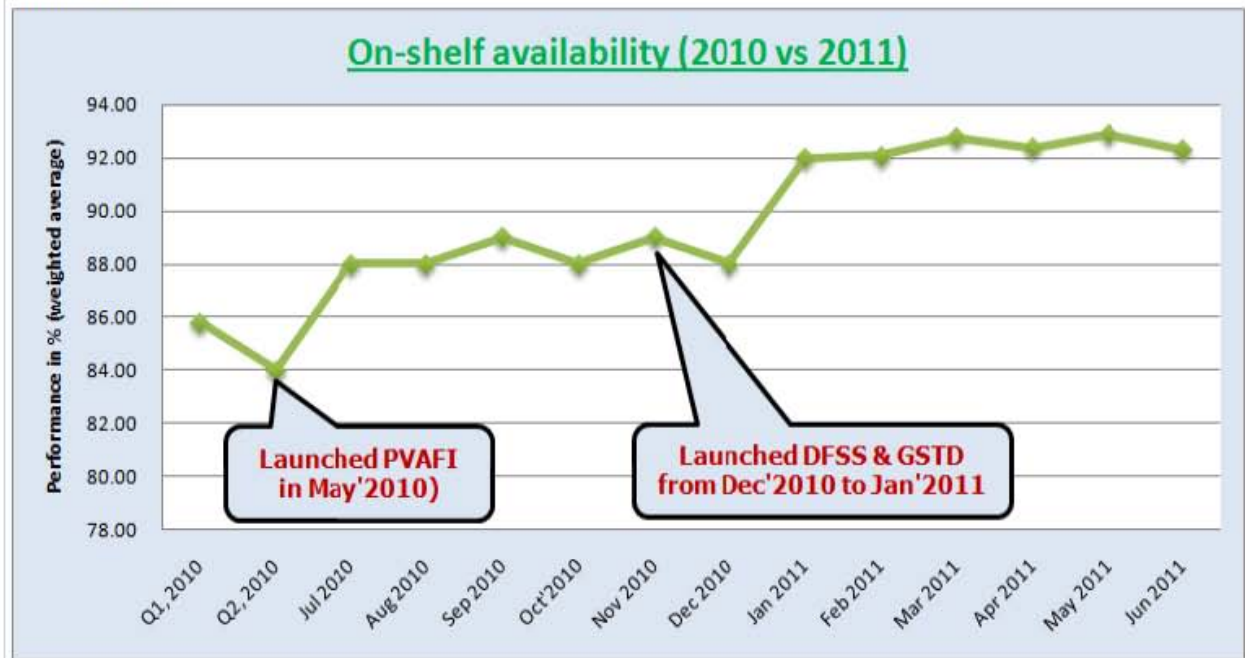
<b>MARKET TRENDS</b>	
<ul style="list-style-type: none"> <li>• Globalised supply chains/Growing inter-market supply networks</li> <li>• Highly sophisticated customers</li> <li>• Web-enabled collaboration</li> <li>• Inventory visibility tools for complex supply chains</li> <li>• Minimised total supply chain costs</li> <li>• Order-centric supply chains become customer-centric e-chains</li> <li>• Challenging joint performance measures</li> <li>• Product options proliferation</li> </ul>	
<b>OPPORTUNITIES</b>	<b>EMERGING BENEFITS</b>
<ul style="list-style-type: none"> <li>• Provide visibility of information (inventories, forecasts, orders, plans, and performance measures)</li> <li>• Promote responsiveness (reduce time to detect demand, commit, produce and fulfil)</li> <li>• Achieve process simplification</li> <li>• Leverage market mechanisms (selling via trade exchanges)</li> <li>• Improve synchronisation (by generating feasible, optimised plans and schedules, replenishment when conditions change)</li> <li>• Replace inventory with information (central inventory visibility, forecast consumer demand, collaborate with channel/customer)</li> <li>• Real-time sharing of information</li> <li>• Improved visibility of sale forecasts, material requirements, promotional plans and inventory data</li> <li>• Supply chain responsiveness to changes in demand and supply</li> <li>• Information replaces inventory</li> <li>• Processes simplification and task assignment based on total cost</li> <li>• Synchronisation between retailer and supplies and functional areas</li> <li>• Formalised measurement of process efficiency and effectiveness</li> <li>• Streamlined logistics</li> </ul>	<ul style="list-style-type: none"> <li>• Improved forecast accuracy and demand visibility</li> <li>• Increased sales</li> <li>• Improved replenishment cycles</li> <li>• Improved level of service and order fulfilment</li> <li>• Reduced production cycle times</li> <li>• Reduced inventory levels</li> <li>• Increase on-shelf availability</li> <li>• Reduced returns</li> <li>• Enhanced communication and resolution with all related parties</li> <li>• Reduce packaging and finished goods</li> <li>• Increased sales volume and revenue</li> <li>• Reduced replenishment time</li> <li>• Reduced order lead time</li> <li>• Increased sales due-to improved in-stock/on-shelf position</li> <li>• Reduced inventory levels</li> <li>• Reduced safety stocks</li> <li>• Decreased mark-downs</li> <li>• Reduced obsolescence and unsaleable</li> <li>• Reduced supply chain costs</li> <li>• Increased effectiveness of new product introductions and promotions</li> <li>• Improved sales and order or demand forecast accuracy</li> <li>• Improved production and manufacturing planning</li> <li>• Improved merchandise planning</li> <li>• Smoother flow of products</li> </ul>

**LIST OF ANNEXURES – Sourced and extracted from the management reports during the Action-based Research Case Study, 2010/2011.**

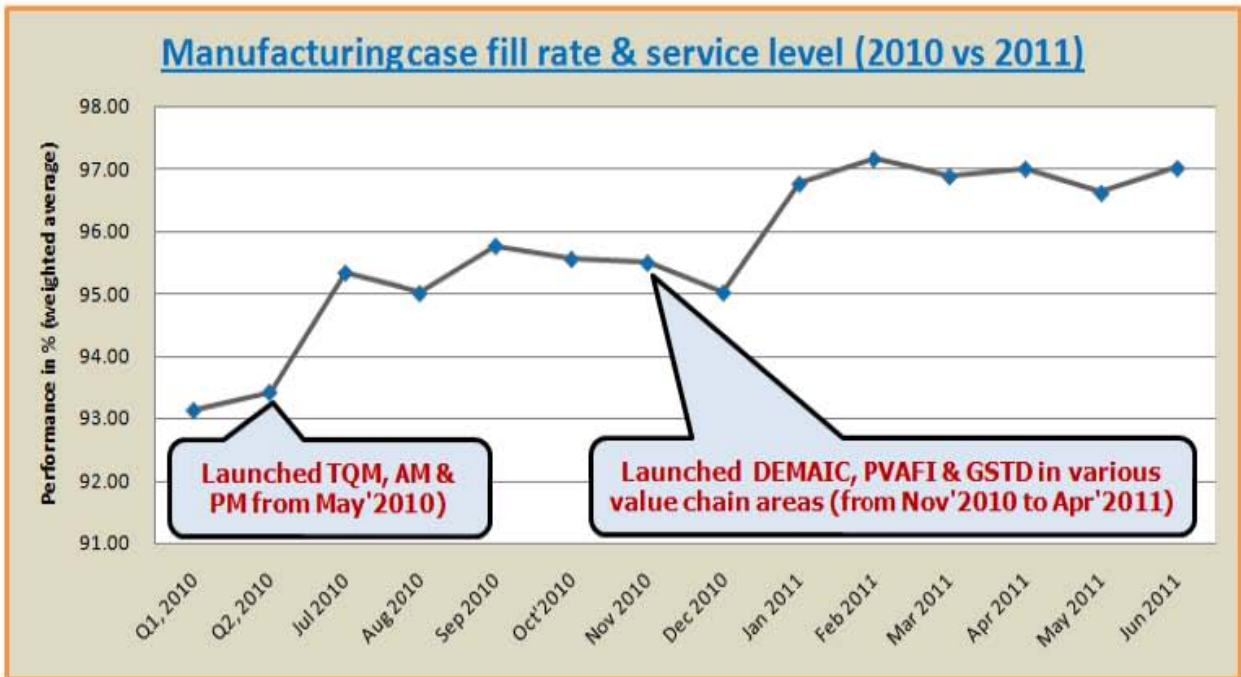
**Annexure 4.1.**



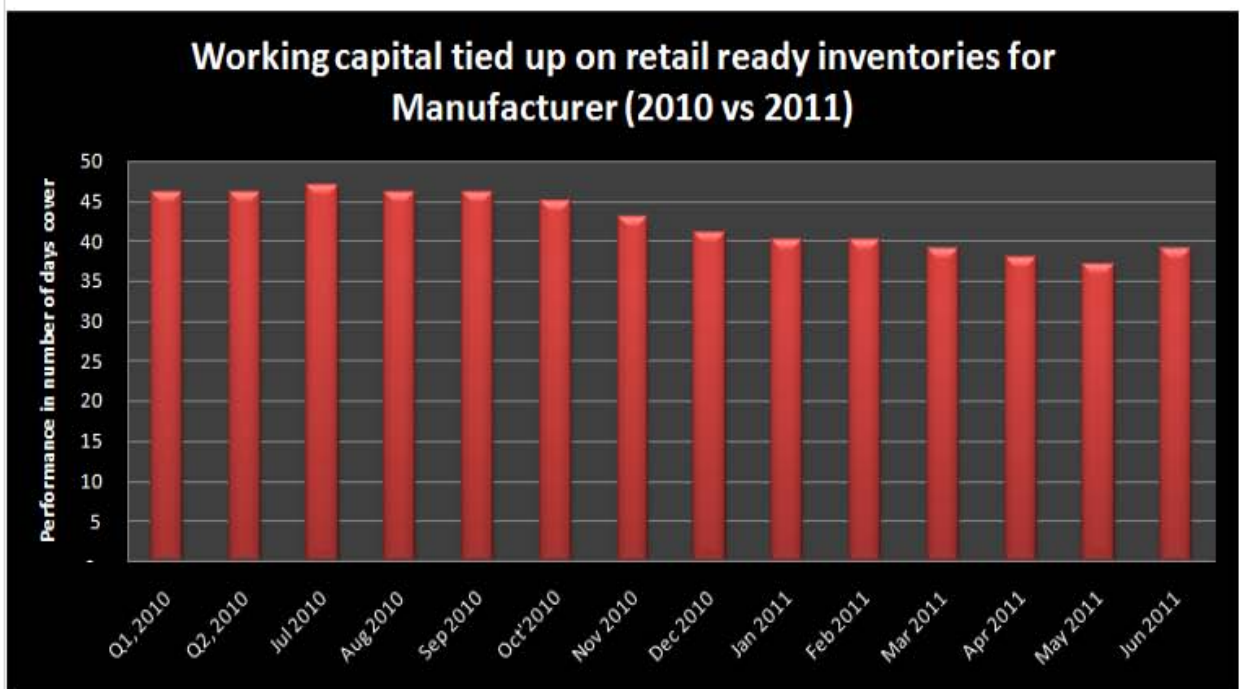
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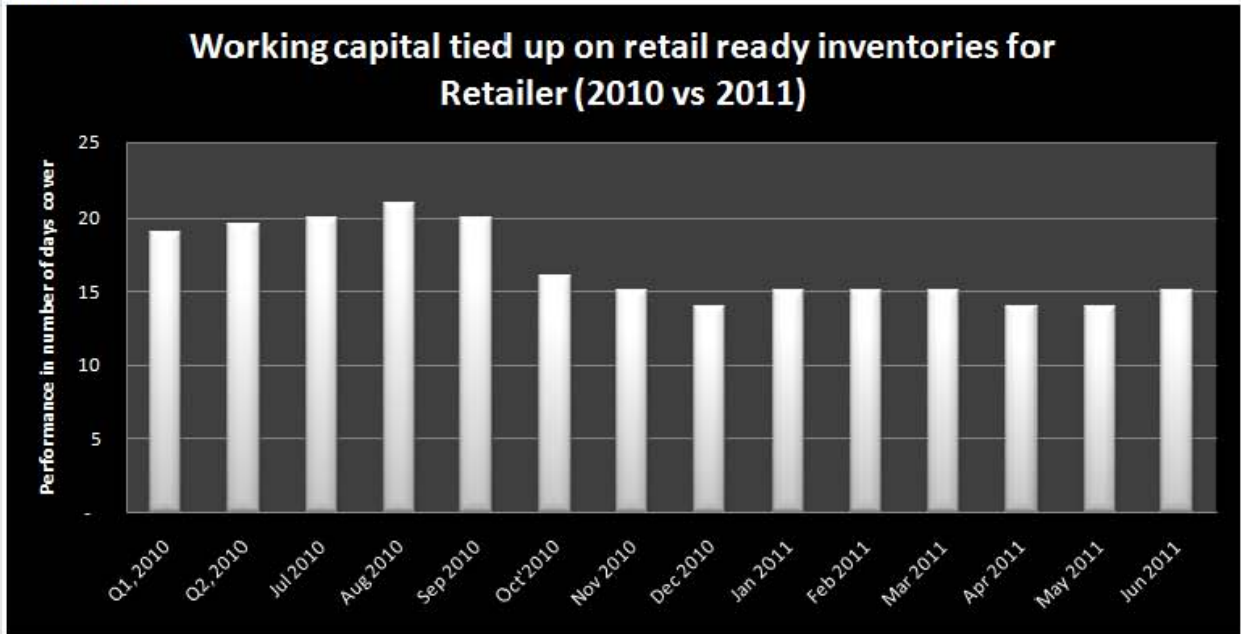
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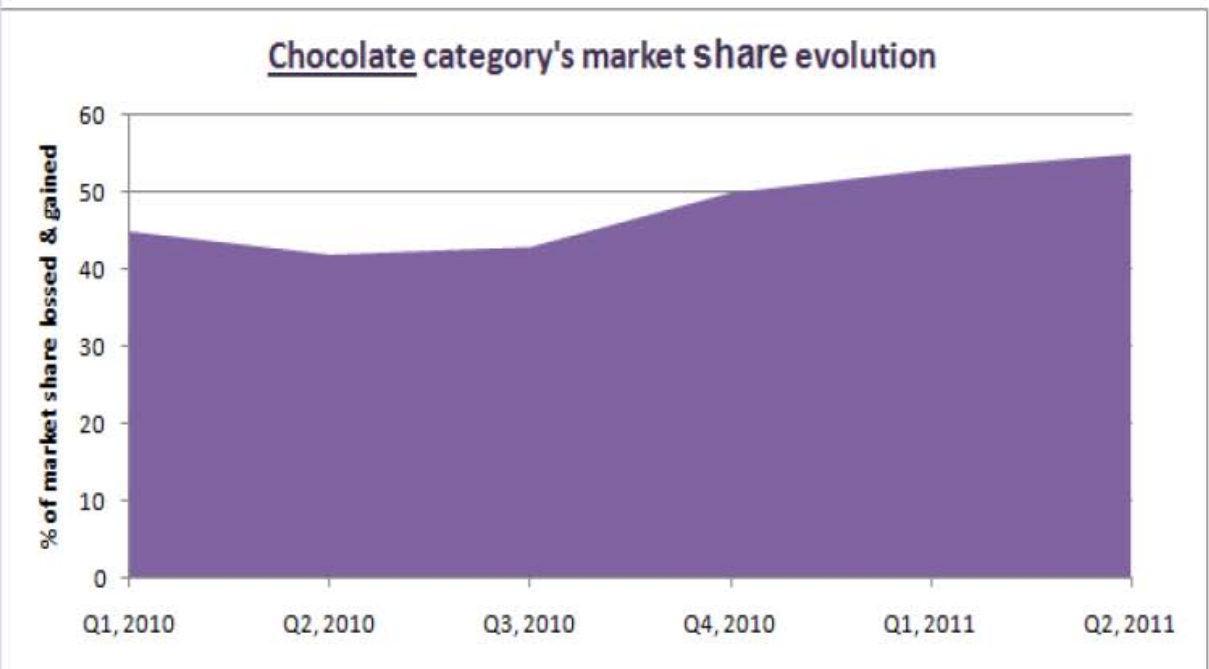
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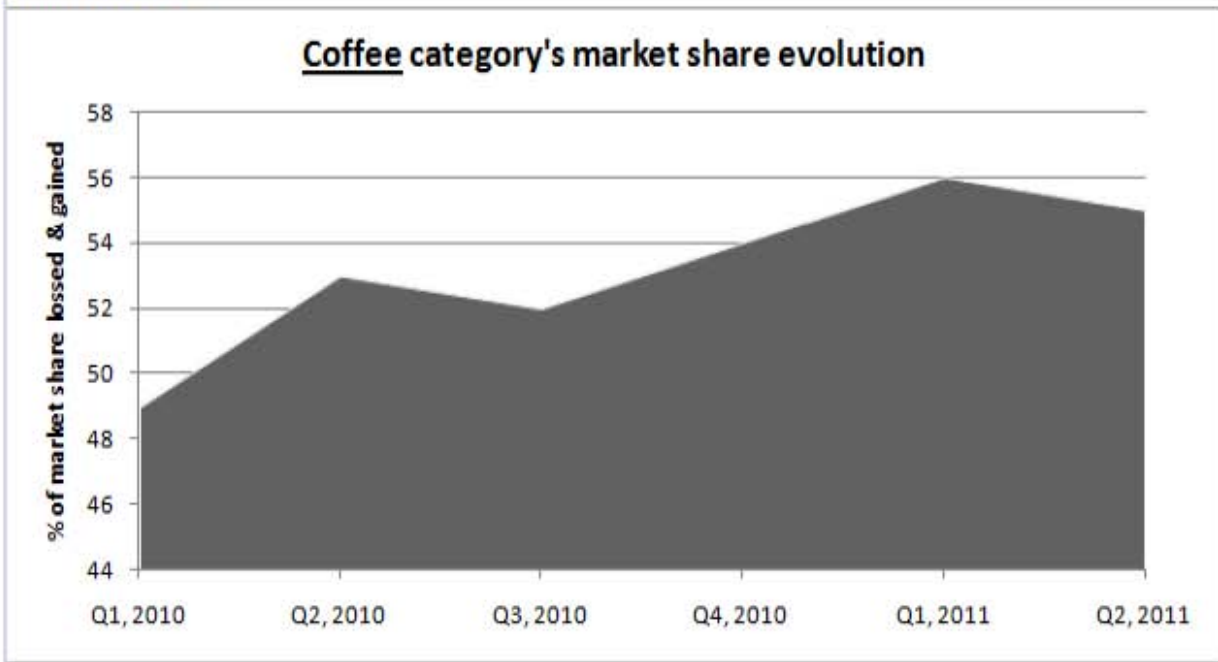
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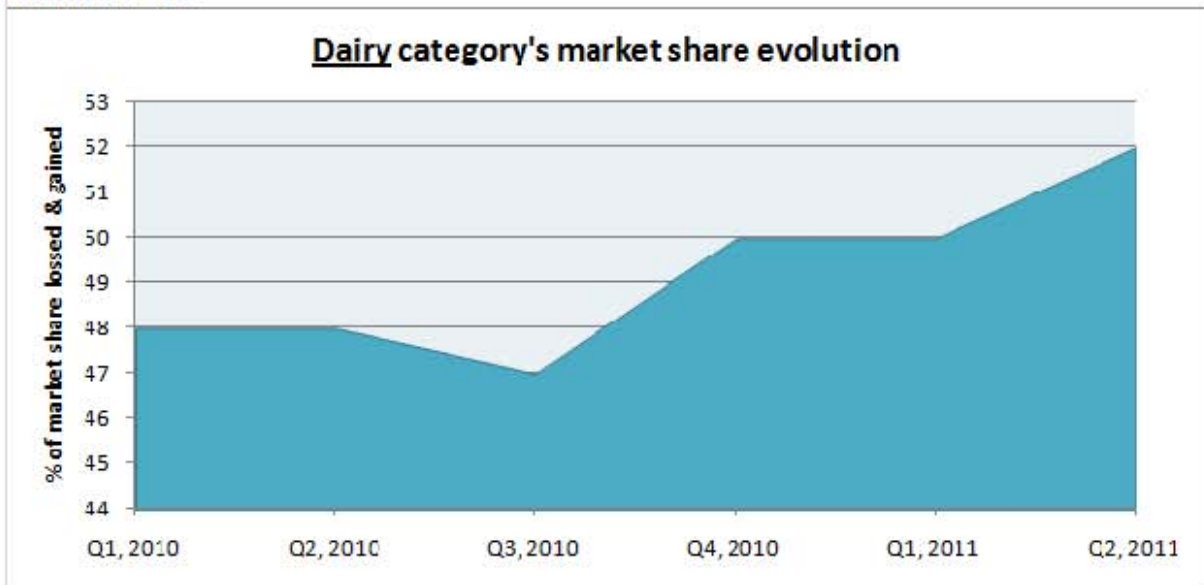
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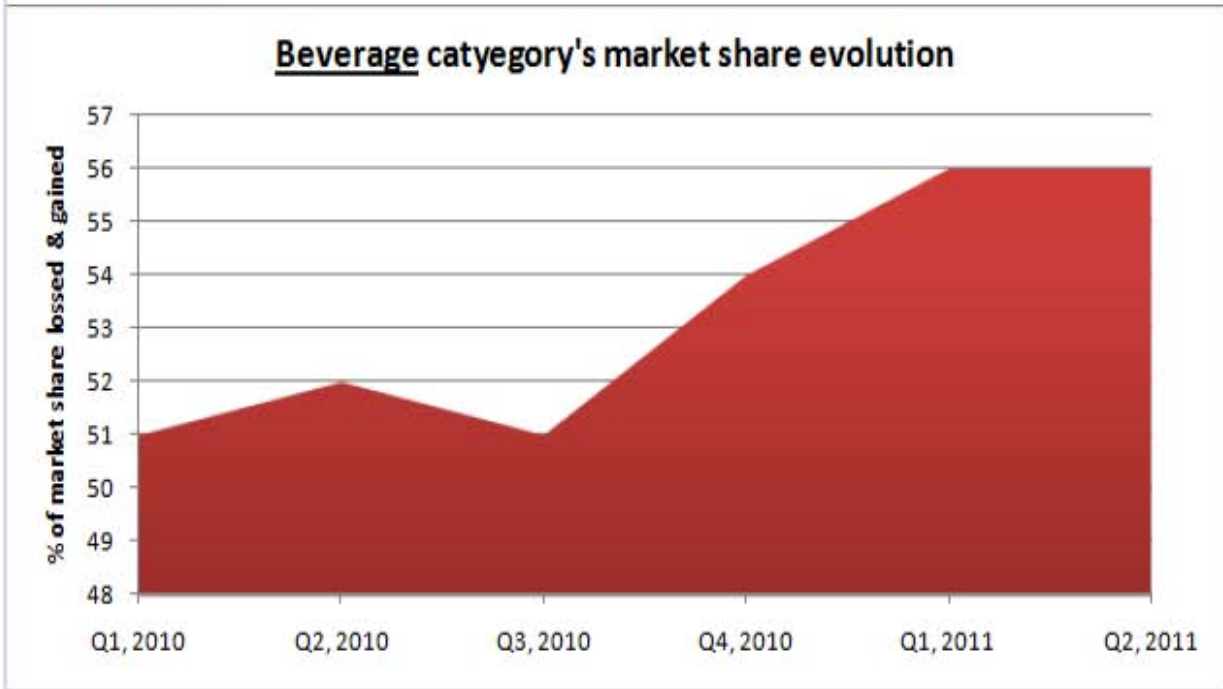
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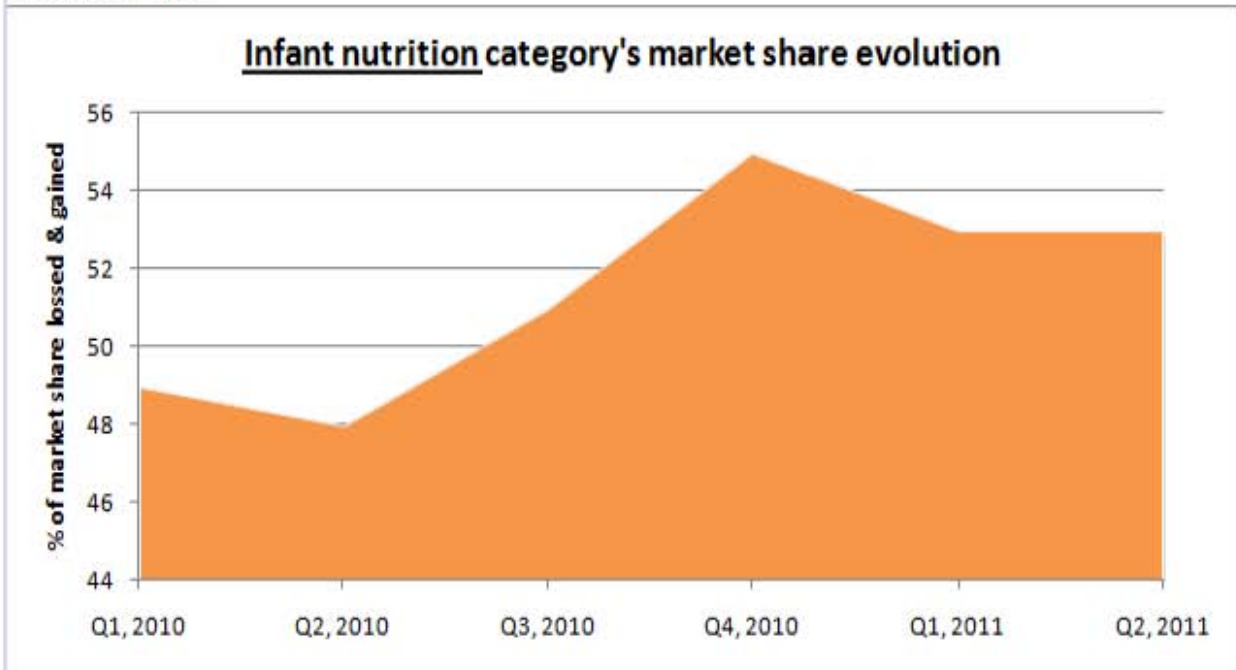
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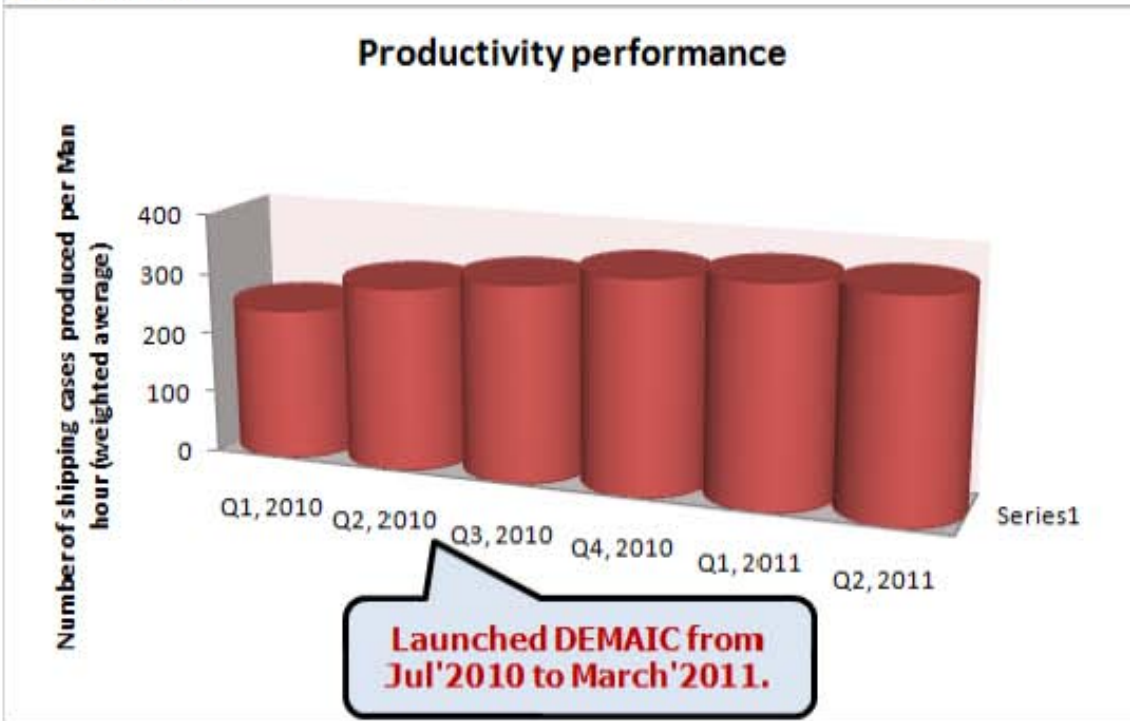
**Annexure 4.9.**



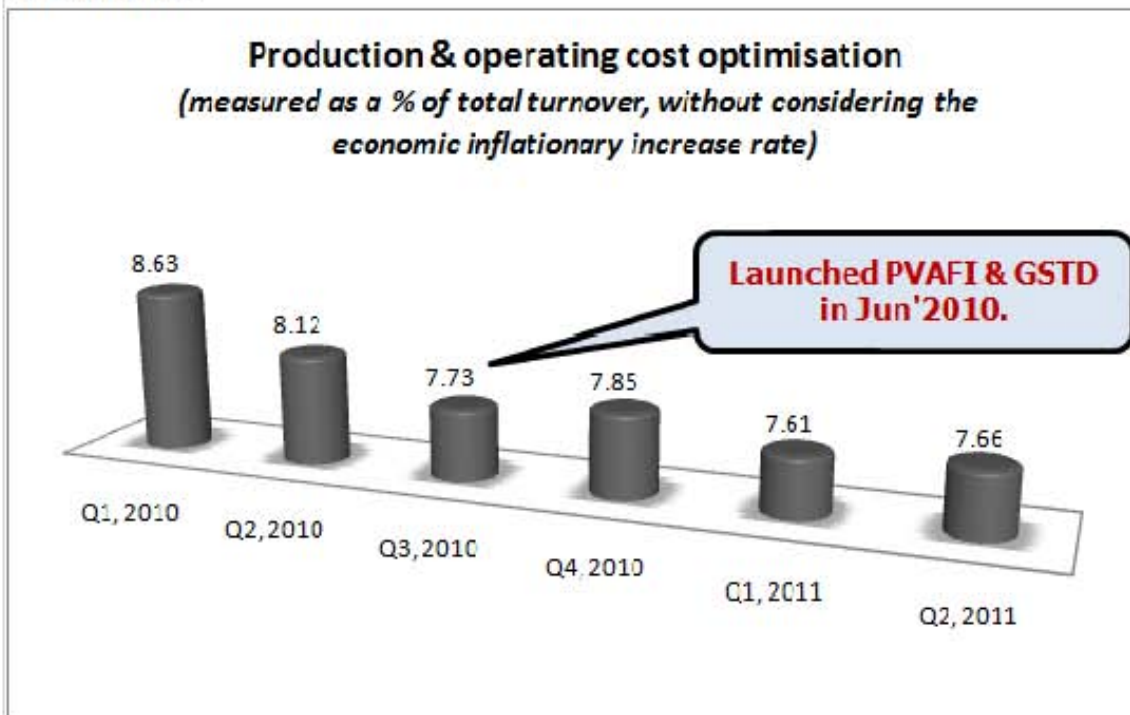
**Annexure 4.10.**



Annexure 4.11.



Annexure 4.12.



Annexure 4.13: Minutes from one of the working group's top-to-top reviews, 2011

9/10 March 2011

# ANNEXURE 4.13

## Top 2 Top Review

- Cape Town Actions

Audience: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

### Key Challenges

- Non Compliance to the 0 to 90 days plans for promotions of stock.
- Poor visibility of potential COS / uncompetitive CFR.
- No sell-out data from stores.
- Suboptimal forecasting accuracy, increasing working capital / inventories.
- No joint Conferences on customer demand plans btwn cross functional teams for both Companies (Ret & New).
- 50/50 Cost efficiency sharing
- limited view of top driving SKUs.

### opportunities/Consequences

- Resulting in poor stock reservations, Early buying, and overstocking the DC's.
- Implement 13 weeks COS reports for all SKUs, publish weekly.
- Panic & emotional buy
- Roll out COS to drive replenishment.
- Measure promotional effectiveness & Growth.
- weekly operations reviews as key.
- Set clear targets through a JBP
- Segment SKUs through A-B-C Classification fast / medium / slow moving SKUs.
- Realign Production Plans
- REVIEW Regional Stock balancing.

→ Review every 6 weeks - (task team)

→ Streamline order to cash processes.

## LIST OF ACRONYMS

- AM: autonomous maintenance - a tool that develops and empowers people to manage their production and manufacturing lines and processes in an autonomous manner.
- AR: action research methodology
- ASN: advanced shipping notice.
- BPM: business process management.
- *CMI: co-managed inventory.*
- CPFR: collaborative planning, forecasting and replenishment.
- CRM: customer relationship management.
- DC: distribution centre.
- D&SP: demand and supply planning.
- DFSS: Design For Six Sigma: this is a structured approach, efficiently commercialising technology that results in new products or services.
- DMAIC: Define-Measure-Analyse-Improve-Control; a structured lean tool with five key steps.
- *ECR: efficient consumer response*
- *EDI: electronic data interchange.*
- EDI: electronic data interchange.
- eKanban: electronic signals in the form of data sent electronically from the point of sales to replenish inventory in a pull mechanism.
- EPOS: electronic point-of-sale, generally expressed as ePOS information.
- ERP: enterprise resource planning.
- EVA: economic value added.
- FMCG: fast moving consumer goods.
- GDP: Gross Domestic Product
- GMROI: gross margin return on inventory.
- GMROI-R: gross margin return on inventory by retail.
- GMROI-S: gross margin return on investment-lost sales.
- GSTD: Go-See-Think-Do, which also incorporates the "5Ws" [meaning: Why, Why, Why, Why & Why?] - a methodology that leads people to go to the place where things or actions are happening.
- Kanban: signal in the form of data or requirements sent from the point of sales or production to replenish inventory in a pull mechanism.
- KRM: key results measures.
- Lean: do and achieve more with less.
- LSC: lean supply chain.
- LVC: lean value chain.
- LVS: lean value stream.
- LVS: lean value stream.
- MAN: manufacturer.

- MBP: month business planning.
- MRP: materials requirement planning.
- MDS: multidimensional scaling.
- NNVA: necessary but non-value-adding activities.
- NVA: non-value-adding activities.
- NWWT: new ways of working together.
- OEE: overall equipment effectiveness.
- OOS: out of stocks.
- OSA: on-shelf availability.
- PLM: product lifecycle management.
- PM: planned maintenance.
- POS: point of sales.
- PVAFI: Process Value Analysis and Focused Improvement.
- QR: quick response.
- RET: retailer.
- ROI: return on investment.
- SA: South African or South African.
- SCM: supply chain management.
- SCOR: supply chain
- SCP: supply chain planning.
- SKU: stock keeping unit.
- SMI: supplier managed inventory.
- ST-systems: socio-technical systems.
- TMS: transportation management system.
- TPM: total production management.
- TQM: total quality management.
- VA: value-adding activities.
- VMI: vendor managed inventories.

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