Gordon Institute of Business Science
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Building lean and agile supply chains for food fast moving consumer goods manufacturers and food retailers in South Africa

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ABSTRACT

Supply chain is one of the important pillars driving business competitiveness, and its performance is critical for the success of the organisation. This research aimed to investigate the applicability of the sand cone model with regard to improving supply chain performance to being more lean (efficient) and agile (effective), within South African food fast moving consumer goods manufacturers (FMCGs) and food retailers. The sand cone model says one must implement and embed agile initiatives first before implementing lean initiatives to create high performing supply chains.

The research was conducted using a qualitative research methodology. Eight supply chain managers from six FMCGs and two retailers, with a total sample size of eight, were interviewed to find out what initiatives their companies have implemented. The Interviews and the inductive thematic data analysis that followed thereafter, aimed to find what initiatives companies have implemented, and also to test if those initiatives have decreased or increased the effectiveness (agility) and/or efficiency (lean) of the value chains.

The results indicated that for a company to build an effective and efficient supply chain it does not necessarily need to embed agile initiatives before implementing lean initiatives. Companies can implement initiatives that primarily drive both agility and leanness, and thereafter (or concurrently) initiatives that drive only agility or lean. Key initiatives that drive both effectiveness and efficiency are: collaboration with suppliers and customers, standardisation of products and processes, supply network redesign, and improving visibility and sharing of information through enterprise resource planning (ERP) systems. More importantly the study recommends that prior to implementing agile and lean initiatives companies should build strong foundation that supports those initiatives. The foundation should be made of: business and supply chain strategy alignment, strong safety and quality culture, sales and operational planning (S&OP) process or integrated business planning (IBP) process, and skills gap analysis to drive people development. Furthermore companies should inculcate the culture of doing continuous improvement to remain competitive.

KEY WORDS

Agile, Effective, Efficient, Lean, Leagile, Supply Chain

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Name: **Selepe Mpho Phetla**

Signature: _____

Date: 09 November 2015

DEDICATION

To my parents Nkoane Moses Phetla and Mapenene Dorcas Phetla. What more can a son ask for! You have given me all I needed for life – great upbringing, love, knowledge of God, and education.

To my siblings Julia Maamane Phetla, Morentho Cornelia Phetla, Chologi Rudolph Phetla, Ramogole Neo Sophia Phetla – it has been a pleasure growing up with you, you are awesome and I love you lots.

To Lesedi – I hope you will grow up to treasure education like your mom and grandparents and may grow to be the best you can be; uncle loves you.

To Molebogeng Lentsoane – you have been a great teacher and aunt to me – an ever-burning lighthouse for my path.

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3PL	3rd Party Logistics Partner
4PL	4th Party Logistics Partner
CAQDAS	Computer-Aided Qualitative Data Analysis Software
CEO	Chief Executive Officer
CEP	Continuous Excellence Programme
COGS	Cost of Goods Sold
CPFR	Collaborative Planning, Forecasting and Replenishment
CRM	Customer Relationship Management
DMAIC	Define, Measure, Analyse, Improve, Control
ERP	Enterprise Resource Planning
FMCG	Fast Moving Consumer Goods Company
GDP	Gross Domestic Product
GTR	Gemba-Think-Resolve (“Gemba” = go to see where the issue is taking place)
IBP	Integrated Business Planning
IR	Industrial Relations
IT	Information Technology
KPI	Key Performance Indicator
JIT	Just-in-Time
MMN	Multi-Mode Network
SC	Supply Chain
SCC	Supply Chain Council
SCM	Supply Chain Management
SCOR	Supply Chain Operating Reference Model
SKU	Stock Keeping Unit
TPM	Total Productive Maintenance
UK	United Kingdom
VSM	Value Stream Mapping
S&OP	Sales and Operational Planning
SDCA	Standard-Do-Check-Act
SLA	Service Level Agreement

CHAPTER 1: INTRODUCTION TO RESEARCH PROBLEM

1.1 Introduction

The business environment has become more competitive with increased globalisation, more complex and demanding customers, and companies are challenged to improve the performance of their supply chains. Various organisations implement different initiatives to improve their supply chains with a goal of being more effective in meeting customers' needs and/or being more efficient in supply chain costs and assets management. Lean supply chain initiatives as well as agile supply chain initiatives are perceived to be at the forefront of improving supply chain performance however the interaction between lean and agility is not fully understood by supply chain practitioners. South African packaged food fast moving consumer goods manufacturers (FMCGs) and food retailers operate some of the complex supply chains, and their environment is increasingly more and more competitive in part driven by ease of importing products into South Africa and entrance of globally competitive retailer in the form of Walmart through their acquisition of Massmart.

The purpose of this research is to explore which lean and& agile supply chain initiatives are being implemented by the FMCGs and food retailers. By exploring the supply chain initiatives through the sand cone theory the aim is to understand, when implemented together, if lean initiatives have similar positive impact as agile supply chain initiatives resulting in both effective and efficient supply chains within South African FMCGs and food retailers. The research also aims also consider if some of the lean and agile initiatives have opposing effects.

1.1.1 Research Background

The retail space has become one of the more competitive spaces with consumers searching for better service, better products and lower prices (Hübner, Kuhn & Sternbeck, 2013). Within the South African context the Supply Chain Foresight survey found that: 1) the need to increase margins (increase prices and/or reduce costs), 2) the need to increase supply chain competitiveness, and 3) the need to increase flexibility and responsiveness are in the top five priorities of business executives and supply chain managers (Barloworld Logistics, 2014). These priorities are linked to the outcomes of some of the lean and/or agile supply chain initiatives. It has been noted that South African FMCGs supply chains are less effective to deal with uncertainty and less efficient compared to FMCGs in the United Kingdom (UK) (Vasco & Potter, 2013). One of the glaring financial performance differences within the South

African retailers is the difference in profit margins and return on assets of the top five retailers with Shoprite Holdings having a profit margin averaging 3.6% at a higher end while Pick'nPay has been averaging 1.5% at the lower end in the last 5 years (Marketline, 2014). See Figure 1 and Figure 2 illustrating the differences in the profit margins and return on assets for the period 2009 to 2013. These glaring differences suggest that South African companies could benefit from knowing which supply chain initiatives can lead to being both lean and agile ("leagile").

Figure 1. Profit margin % of South African retailers, 2009-2013 (Marketline, 2014)

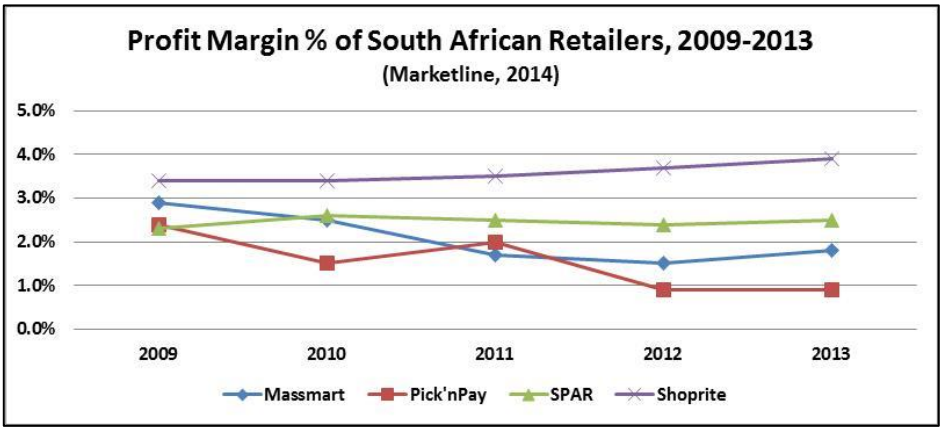
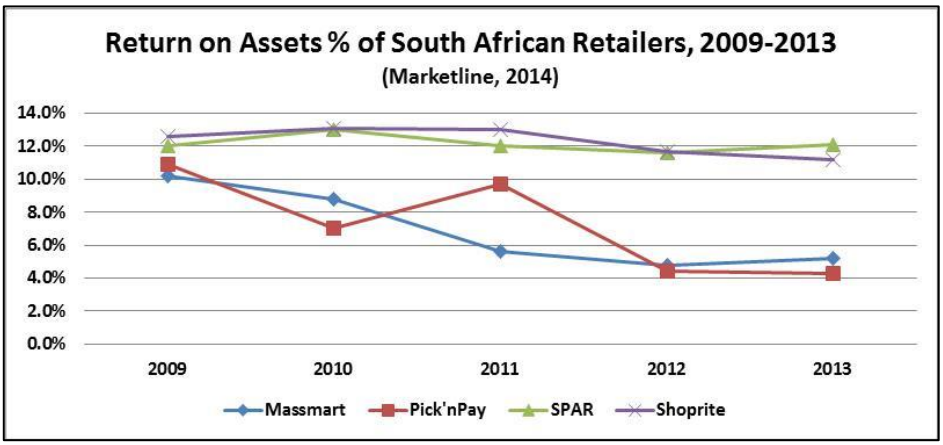


Figure 2. Return on assets % of South African retailers, 2009-2013 (Marketline, 2014)



Supply chain performance has become a critical factor to business success, and its improvement has become a focus for a number of firms (Huo, Qi, Wang, & Zhao, 2014). Lean and resilient (agile) supply chain practices are being implemented by various firms to improve supply chain performances as companies compete more through the effectiveness and efficiency of their supply chains (Cabral, Grilo & Cruz-Machado, 2012; Yusuf, Gunasekaran, Musa, Dauda, El-Berishy & Cang, 2014; Stock, Boyer, & Harmon, 2010). Supply chain agility is defined as the ability of the value chain to cope with unplanned

interruptions to demand and supply (Scholten, Scott & Fynes, 2014). Lean supply chain initiatives use the lean concepts of reduction of non-value adding activities to eliminate waste, reduce costs and shorten supply chain lead-times (Tang, 2006; Carvalho, Duarte & Machado, 2011).

Companies that operate on highly uncertain environments are said to need to have a high agile capability whereas those in low uncertain environment need to focus on being more efficient (Hallavo, 2015). And Yi, Ngai and Moon (2011) propose that companies should either focus on being more agile so as to be flexible or focus on being lean so as to be more efficient. An alternative view is the application of the sand cone theory in supply chain capability building, which suggests that a state could be reached whereby lean initiatives and agile initiatives can sequentially be implemented in a supply chain to meet supply chain goals stated in the Supply Chain Operating Reference (SCOR) model (Ferdows & Meyer, 1990; Bortolotti, Danese, Flynn & Romano, 2014; Supply Chain Council, 2010).

1.2 Research Problem

In lieu of the diverging views of Hallavo (2015) that a supply chain should strive to be either agile or lean depending on its environment, and that of Bortolotti *et al* (2014) in that a supply chain should seek to be both more effective and efficient; the question is what is being implemented in various organisations and are those organisations meeting intended goals. Of all the supply chain improvement initiatives that are there, could there be any specific ones that have positive effect on both leanness and agility, and on the other hand are there initiatives that have opposing effects on lean and agility. The goal of the research is ascertain and discover initiatives that have been adopted to drive both lean and agile (resilient) supply chains and what initiatives have been found to have correlating and/or opposing effects.

1.3 Research Title

The research is thus title: “Building lean and agile supply chains for food fast moving consumer goods manufacturers and food retailers in South Africa”.

1.4 Research Objectives

1.4.1 Primary Objective

The primary objective of the research is to identify supply chain initiatives that support the value chain to be both lean and resilient leading to more effective (agile) and efficient (lean) value chains; that is a leagile supply chain within FMCGs and food retailers.

1.4.2 Secondary Objective

The secondary objective of the research is to review the literature on agile supply chains and lean supply chains, and contrast it with what has been implemented in the South African retail and FMCG environment.

1.4.3 Empirical Objectives

In addition to the primary and secondary objectives above, the researcher has the following two empirical objectives:

- Identify if the implemented drivers of lean supply chains for FMCGs and food retailers could have an effect on the agility of the supply chain.
- Identify if the implemented drivers of agile supply chains for FMCGs and food retailers could have an effect on the leanness of the supply chain.

Throughout the report there is a continuous reference to initiatives. For the purpose of this research an initiative is defined as “an act or strategy intended to resolve a difficulty or improve a situation, (Oxford dictionaries online, 2015).

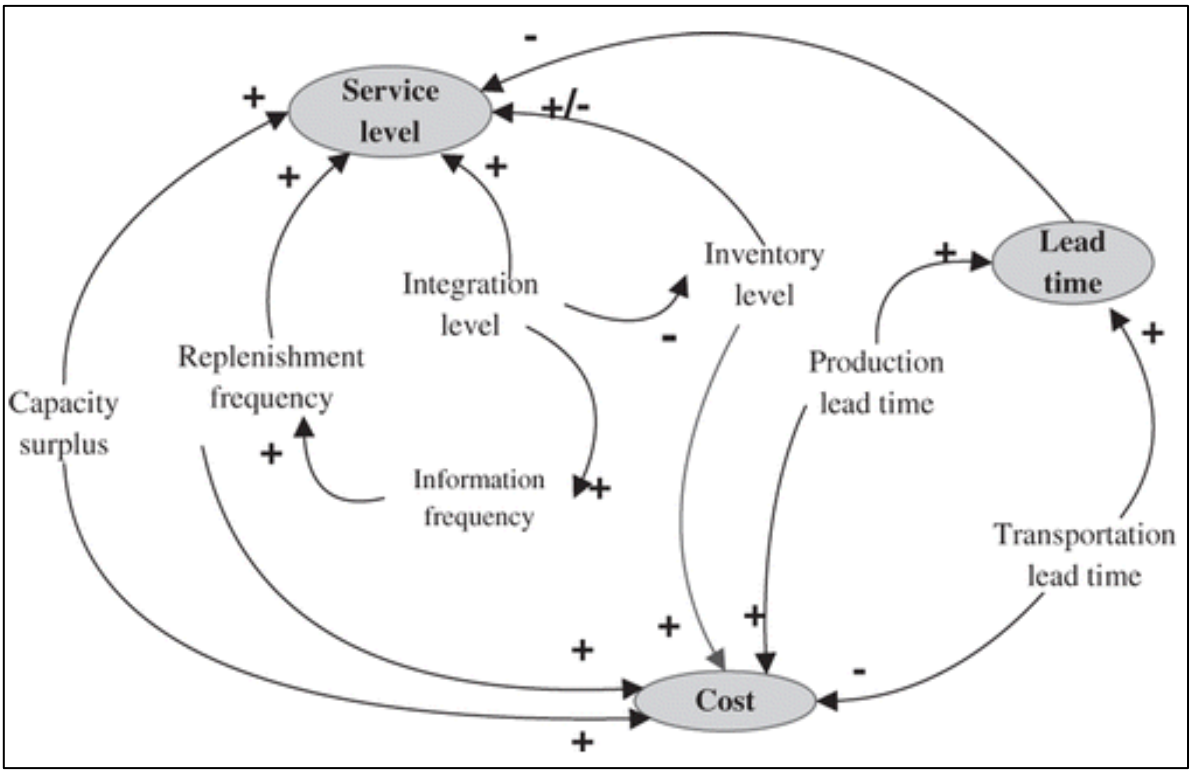
1.5 Research Motivation

The need to have more effective and efficient supply chain has increased due to the increased cost minimisation pressure in businesses, need for shorter lead times and higher flexibility to drive business competitiveness (Cabral *et al*., 2012; Patel, Azadegan & Ellram, 2013; Stock, Boyer, & Harmon, 2010). The challenges of supply chain disruptions has been heightened by the catastrophes such hurricane Katrina in the USA and the tsunami in Japan as well as increased terror activities (Thun, & Hoenig, 2011), these events are referred to as “black swans” (Aggarwal & Bohinc, 2012). Also supply chains disruptions can be caused by other minor disruptions such as unplanned extreme spikes and dips in demand or supply (Sting, & Huchzermeier, 2014). Toyota, one of the leading companies that have implemented lean supply chain, suffered severe revenue losses in the aftermath of the 2011 tsunami as production was disrupted for six months following the tsunami as Toyota was not able to respond speedily to the disruption caused to their supply chain system (Holweg, 2007; MacKenzie, Barker & Santos, 2014).

Increased globalisation has inflated the level of uncertainty in supply chains in that globalisation increases sources of demand thereby increasing demand variability and increases the length of the value chain thereby raising the potential for supply disruptions.

On the other hand globalisation is increasing the intensity of competition as local manufacturers now have to compete with imported products and so increasing the need for locally-made products to be price-competitive at a global level (Caniato, Golini & Kalchschmidt, 2013). On the other-hand it has been noted that some companies in a venture for globalisation and need to reduce costs have ended up with dispersed supply chains that result in overall higher costs than intended (Lorentz, Töyli, Solakivi, Hälinen & Ojala, 2012). As indicated by Figure 3 below, an improvement in one aspect of supply chain performance may be at an expense or compromise of another aspect due to the dependency of the drivers of the improvement initiatives (Cabral *et al*., 2012). These challenges raise the need for supply chains managers to deepen their understanding of what is required to be done to make their value chains both effective (that is agile) and also efficient (that is lean).

Figure 3. Supply chain performance indicators and relationships (Cabral *et al*., 2012)



1.6 Research Relevance

Given the need for supply chains to be both effective and efficient, and the gaps in the knowledge of the dynamics of co-existence of lean and agile initiatives in one supply chain, the aim of this research is to contribute to the closure of this knowledge gap between the interaction of lean initiatives and agile initiatives. Ferdows and Thurnheer (2011) highlighted the need to confirm which supply chain fitness and agile capabilities facilitate improving

which other ones. And on the completion of their study on complementarity of lean manufacturing initiatives Furlan, Vinelli and Dal Pont (2011) highlighted the need to study the coordination mechanisms that need to be put in place in order to manage the interdependencies between the lean initiatives. This research aims to increase further understanding of the interaction between lean supply chain initiatives and agile supply chain initiatives.

1.7 Research Scope

The research scope covers packaged food FMCGs and major food retailers within South Africa. There are more than twenty packaged food FMCGs in South Africa with the top eight of them accounting for 47% of the market share. The top eight FMCGs are: Tiger Brands, Clover, Pioneer, Nestlé, Lactalis (operating as Parmalat), AVI, Pioneer and PepsiCo (Passport, 2015). There are five major food retailers in South Africa, Shoprite Holdings (with food stores branded as Shoprite, Checkers and U-Save), Pick'nPay Holdings (with food stores banded as Pick'nPay and Boxer), Spar Group, Massmart Holdings (with food stores branded as Makro, Cambridge and Game) and Woolworths. The annual sales of the food retailers in 2013 were worth R142billion (Marketline, 2014).

The FMCGs and retailers face the supply chain uncertainty challenges of globalisation and the need to control or reduce costs in order to offer competitive prices to their customers (Passport, 2015; Marketline, 2014). The operating environment of these companies create an opportunity to study and understand what is been done to tackle these challenges.

1.8 Research Report Structure

The research report follow the following structure:

- **Chapter 1: Introduction to Research Problem**
  This section introduces the need for the research and relevance thereof to the business and academic world; and also outlines the research objectives.
- **Chapter 2: Literature Review**
  This section is the literature review of the supply chain, supply chain material flows for FMCGs and retailers, lean and agile initiatives as well as the sand cone theory.
- **Chapter 3: Research Questions**
  Based on literature review this section outlines the propositions to be tested.
- **Chapter 4: Research Methodology**
  This section describes the research methodology and design used. The section includes the data collection method, sampling method and data analysis used.

- **Chapter 5: Results**

  The results of the research are presented in chapter 5.
- **Chapter 6: Discussion of Results**

  This section covers detailed discussion and of the results from chapter 5.
- **Chapter 7: Conclusion**

  This section covers conclusions drawn from the research, key findings and recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction to Food FMCGs and Food Retailers Supply Chains

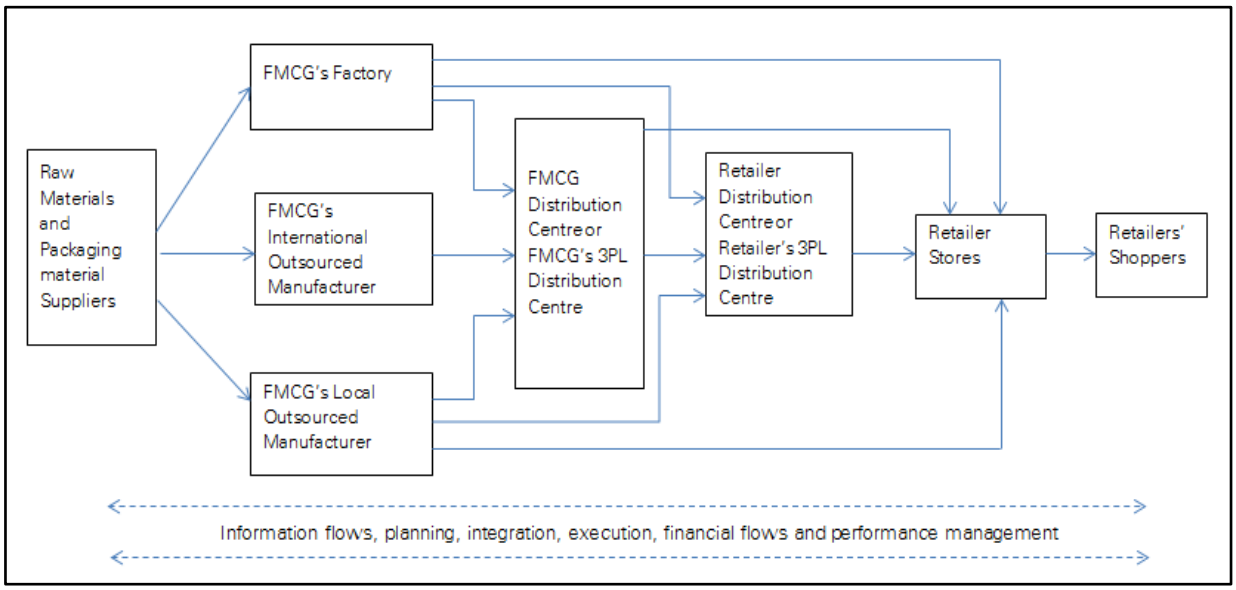
There are various definitions of supply chain management, and after an extensive review of various definitions and usage by Stock and Boyer (2009), the following definition for supply chain management is put forward:

> The management of a network of relationships within a firm and between interdependent organisations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction. (Stock & Boyer, 2009, p. 706)

There are various material flows for products within the FMCGs' and retailers' supply chains. These flows vary from product to product due to specific product's requirements and also may vary due to various strategies different companies adopt. For example the products that have short shelf-life may move directly from the FMCG's factory floor and directly to the food retailer's shop on a daily basis, examples of such products being bread and fresh milk. On the other hand a product that has long shelf-life; for example packaged coffee, can move through a higher number of stages and intermediaries in the value chain; from a factory to the FMCG's distribution centre (DC) to the retailer's DC and then to the retailer's shop. (Hübner, Kuhn & Sternbeck, 2013; Brandenburg, Kuhn, Schilling & Seuring, 2014; Serdarasan, 2013). See Figure 4 illustrating some of materials flows. The different materials flows within FMCGs and retailers can vary greatly for various products even within one FMCG and one retailer.

Another important factor to supply chain management is effective information flows for planning and control, integration and execution through the value chain. Also key is that at any given time or point of the value chain there is performance management to ensure that each part of supply chain achieves what it is meant to while ensuring that the entire supply chain is integrated to support the strategic financial objectives of the firm (Elgazzar, Tipi, Hubbard & Leach, 2012; Johnston & Clark, 2008; Taticchi, Tonelli & Cagnazzo, 2010). Dynamic customer requirements and specific business environments may require that certain supply chains, or some aspects of it, improve and be more effective and/or efficient, to be more fit to suit the environment by implementing various initiatives.

Figure 4. Various supply chain materials flows for FMCG's and retailers

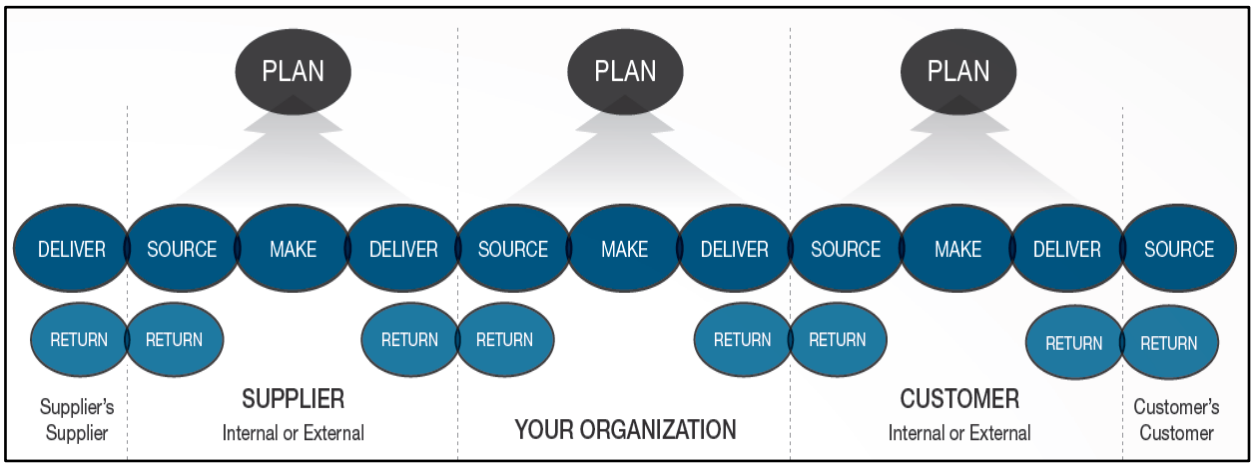


2.2 Supply Chain Management and SCOR Model

Performance measurement and improvement is critical to achieve supply chain goals; and supply chain professionals focus on developing measurement metrics and implementing various improvement initiatives to attain better performance (Hallavo, 2015; Johnston & Clark, 2008; Taticchi, Tonelli & Cagnazzo, 2010). Various supply chain management models have been explored however the most accepted standard model is the Supply Chain Operating Reference model (SCOR model). The model has been developed by various supply chain professionals with input from globally diverse companies under the guardianship of the Supply Chain Council (SCC).

The SCOR model simplifies the understanding of supply chain flows and management thereof by proposing that companies look at the supply chain through the key activities of plan, source, make, deliver and return as represented in the model in figure 5 below (Estampe, Lamouri, Paris & Brahim-Djelloul, 2013; Zhou, Benton, Schilling & Milligan, 2011, Supply Chain Council, 2010). The SCOR model supports supply chain design and review of materials and information flows such as the flows indicated for FMCG's and retailers illustrated in Figure 3 in the prior section.

Figure 5. Key SCOR model supply chain activities (Supply Chain Council, 2010)



The SCOR model intends to help supply chain practitioners to achieve the following: customer service levels improvement, improved flexibility/responsiveness, cost control, reduced working capital (inventory), planning and risk management, supply chain partners integration and talent management (Supply Chain Council, 2010). The SCOR model recommends the following primary performance measures for a supply chain split into five categories, that is;

- Supply Chain Reliability
- Supply Chain Responsiveness
- Supply Chain Agility
- Supply chain Cost Management
- Supply Chain Assets Management

Central to the SCOR model is the need to ensure that supply chain plans are continuously aligned and reviewed periodically as illustrated in Figure 5 above .

2.2.1 Supply Chain Reliability

System reliability is the inherent ability of the system to deliver outputs as expected or as per design. To that effect, supply chain reliability is the ability of the supply chain to deliver products as expected – on-time, at the specified quality and quantity (Supply Chain Council, 2010; Kisperska-Moron & De Haan, 2011). This is referred to as perfect order fulfilment and more generally referred to as customer service level by some of the practitioners. Some of the more specific key performance indicators (KPIs) for reliability are percentage of orders delivered in full, delivery against committed delivery date, and perfect condition of products/services. Within the FMCGs' and retailers' interactions and material flows, supply

chain reliability refers to perfect material movements between each stage of the chain. The more the number of movements and the higher the number of different products the more difficult it becomes to achieve perfect order at each stage. As such when supply chain becomes more global and consumer demands become more diverse and complex, the number of products in supply chain increases thereby creating more difficulty in achieving perfect order at each stage.

2.2.2 Supply Chain Responsiveness

Supply chain responsiveness describes the length of time which it takes to perform certain tasks; this can also be referred to as the lead-time or order fulfilment time (Supply Chain Council, 2010). For example with regard to materials flows between FMCGs and retailers the lead-time could refer to the length of time when a retailer orders a quantity of product from the FMCG until the time the retailer receive the ordered product at the specified location. A distinction should be made between supply chain responsiveness as defined within the SCOR context (Supply Chain Council, 2010) and also as defined by other literature.

Some practitioners in the industry refer to supply chain responsiveness as the inherent ability of the supply chain to be able to quickly adapt to changes in demand and supply drivers (Qrunfleh & Tarafdar, 2013). For the purpose of this research the ability to adapt to changes is discussed under the theme of supply chain agility, and the SCOR definition of responsiveness is used. The goal of the inter-linked supply chain partners should be to reduce the overall lead-time the product moves within various partners, for example the time it takes for raw materials to leave the FMCG supplier until the time the finished product is at the retailers' shelf (Cabral *et. al.*, 2012). KPIs used to measure supply chain responsiveness include procurement (source) lead-time, production (make) lead-time and delivery lead-time. The longer the lead-time is therein the supply chain the harder it becomes to manage as it becomes difficult to deal with changes in demand and supply, however at times higher costs associated with shorter lead times justifies the longer lead-times.

2.2.3 Supply Chain Cost Management

Supply chain costs management is the management of the costs of operating the supply chain processes end-to-end. The costs include labour costs, materials costs, storage and handling costs and transportation costs (Supply Chain Council, 2010; Elgazzar, Tipi, Hubbard & Leach, 2012). Within the SCOR model the costs performance indicators are grouped into two, namely; cost of goods sold (COGS) and supply chain management costs.

The COGS elements of the costs are direct material costs, direct labour costs and indirect costs of production. All other costs in the supply chain are under the umbrella of supply chain management costs.

2.2.4 Supply Chain Asset Management

Efficient supply chain assets management is the ability to efficiently utilise supply chain assets which include inventories, cash and fixed assets (Supply Chain Council, 2010; Elgazzar *et al*., 2012). Key performances indicators for asset management are: cash-to-cash cycle time, return on supply chain fixed assets and return on invested working capital. Key activities to drive asset management are inventory reduction, aligned acquisition and/or disposal of fixed assets; and efficient payables and receivables management.

2.2.5 Supply Chain Agility

Agility in supply chain is essentiality about the capability and capacity to respond to unplanned changes in demand and supply; and to overcome and respond effectively to unexpected problems and disturbances (Cabral *et al*., 2012; Jüttner & Maklan, 2011). Another concept linked to supply chain agility is supply chain resilience which is alternatively defined as the capability of the supply chain to cope with unplanned disruptions, and with the supply chain capacity to return to its ideal state or to an improved state following a disruption/disturbance (Scholten, Scott & Fynes, 2014; Tang, 2006). For the purpose of this research the two terms; agility and resilience, are considered to mean the same thing and can be inter-changed. Building supply chain agility can reduce negative impacts of disruptions to the business and reduce business risk through initiatives and capabilities that enable the supply chain to recover following disruptions (Jüttner & Maklan, 2011).

Factors that may lead to supply chain disruptions in FMCGs and retailers include transportation delays, globalisation, specialisation of factories, increased outsourcing/sub-contracting, usage of fewer suppliers (for example single source of group of materials), increased demand volatility and high rate of technology changes (Vasco & Potter, 2013; Yusuf *et al*., 2014; Pettit, Fiksel & Croxton, 2010). Generally, resilient supply chains are not low-cost value chains however they are better able to cope with uncertainties and disturbances (Cabral *et al*., 2012; Olson & Swenseth, 2014). This may raise conflicting priorities amongst supply chain managers as it appears as if in the journey to increase agility the costs of the supply chain will increase in conflict with the supply chain costs management objective.

2.2.6 Lean Supply Chains

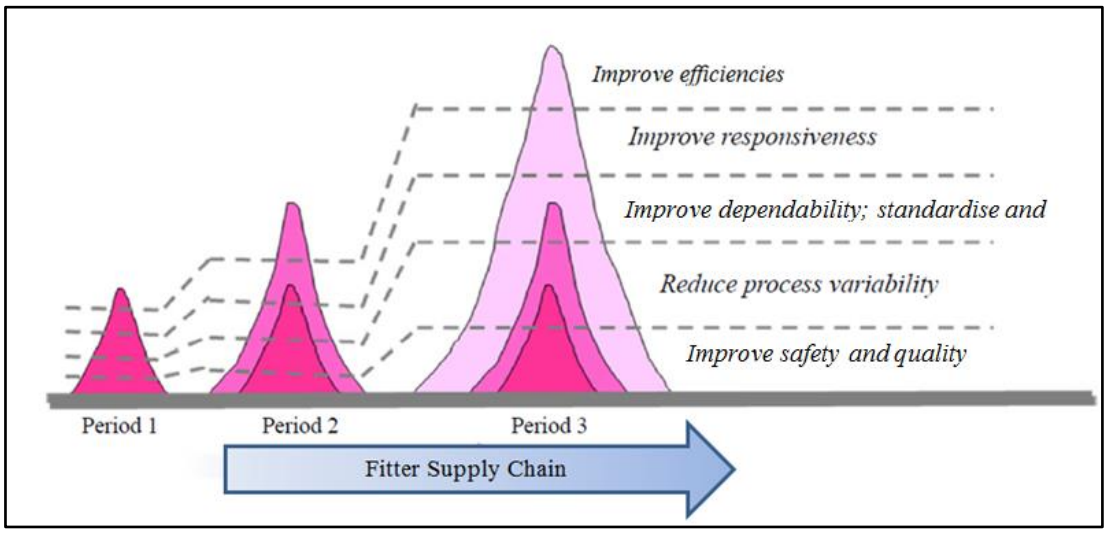
Although the SCOR model does not specifically advocate for lean supply chain adoption, the initiatives within the lean supply chain paradigm supports the objectives within the SCOR model. Specific to SCOR, lean supply chain initiatives are directly linked with supporting reliability, responsiveness, costs management and asset management (Kisperska-Moron & De Haan, 2011; Carvalho *et al*., 2011). Lean uses the concept of reduction of non-value adding activities to eliminate waste and reduce costs. Application of lean principles could lead to better operational performance including shorter manufacturing lead-times, reduced manufacturing costs, reduced delivery times to customers and improved quality of products (Cabral *et al*., 2012; Hajmohammad, Vachon, Klassen & Gavronski, 2013).

A number of companies have adopted lean practices and attained some success however as illustrated earlier some of those companies, such as Toyota, have found that in some instances being too lean has resulted in not being able to respond to disruptions to supply and demand factors (Holweg, 2007; MacKenzie, Barker & Santos, 2014). To that effect an argument can be made that the pursuit for a lean supply chain is in contrast with the goal of achieving supply chain agility as indicated by SCOR.

2.3 Supply Chain Fitness and Sand cone Theory

Ferdows and Meyer (1990) proposed a sand cone model for improving supply chain performance. While other practitioners suggest that there should be trade-offs between various supply chain initiatives aligned with the different environment and strategic goals of different firms, the sand cone model for supply chain suggests that there is way in which various capabilities can be developed over time cumulatively in way that overtime a supply chain is both effective and efficient (Bortolotti, Danese, Flynn & Romano, 2014; Takala, Leskinen, Sivusuo, Hirvelä & Kekäle, 2006). See Figure 6 below illustrating the sand cone model and the cumulative progression thereof. The cumulative model is based on the understanding that to build a bigger sand cone the subsequent layers of the cone are supported by the previous steadfast layer(s), and therefore for overall supply chain improvement various initiatives need to be layered and established first before subsequent initiatives are started. The base layers for superior supply chain performance are ensuring that there is strong safety and quality culture in the business.

Figure 6. Sand cone model for supply chain fitness (Bortolotti *et al.*, 2014)

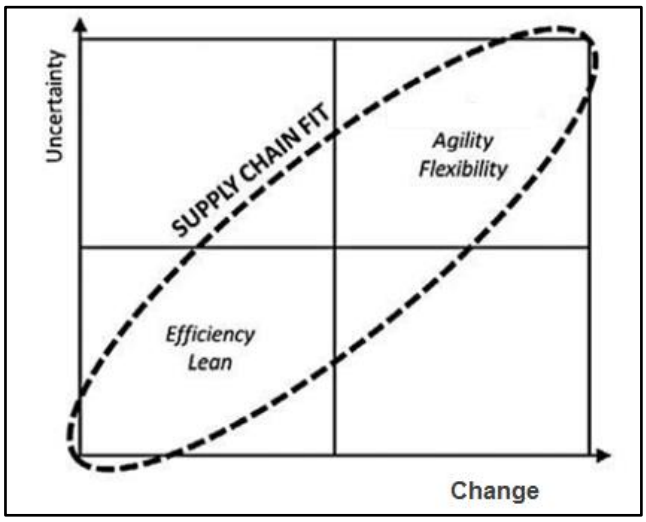


2.3.1 Sand cone Theory – Prioritising between Effectiveness and Efficiency

In its original form, the sand cone model suggests that improving efficiencies initiatives; reduction of costs and inventory, should be the last initiatives preceded by initiatives that drive effectiveness. This is supported by studies of Ferdows (2010); and Ferdows and Thurnheer (2011), in that they found that companies that were able to achieve leaner supply chains are those that initially implemented initiatives that drove effectiveness. On the other-hand Schroeder, Shah and Xiaosong-Peng (2011) found that firms can also achieve both superior supply chain effectiveness and efficiencies even if the sequence stipulated in the sand cone model is not followed. That is alternatively firms can achieve supply chain efficiency through lean initiatives at the lower layers of the sand cone and thereafter be able to implement initiatives that drive effectiveness seamlessly.

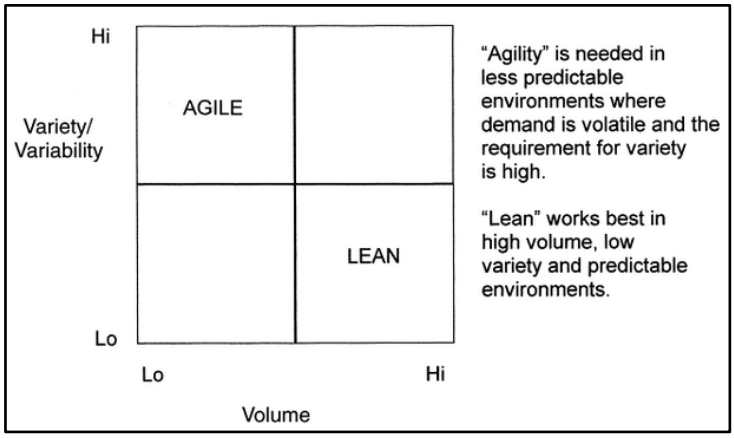
Kisperska-Moron and De Haan (2011) argue that firms should not exclusively pursue lean initiatives or agile initiatives, and could pursue both paradigms concurrently to achieve a "leagility" resulting in an effective and efficient supply chain. On the other hand Hallavo (2015) suggests that different operating environments in which firms operate require them to pursue either efficiency or effectiveness – with the view that firms operating in low uncertainty and low rate of change should pursue the lean paradigm while those operating in high uncertainty and high change environment should pursue agile paradigm, see Figure 7 below for illustration.

Figure 7. Supply chain fit for uncertainty or responsiveness (Hallavo, 2015)



Another view that has been presented is that companies that are operating in different variety and volume mix would pursue either an agile paradigm (low volume and high variety) or a lean paradigm (high volume and low variety) (Christopher, 2004). Figure 8 below illustrates that a retailer, as they have higher variety of products at lower volumes per product (lower volumes compared to the FMCG that supplies a number of retailers) would likely apply more agile practices compared to FMCG's. On the other hand FMCG's as they have lower variety of products (compared to a retailer that has products from a number of FMCG's) and higher volumes per product would likely implement more lean initiatives compared to retailers.

Figure 8. Supply chain fit for variety and volume (Christopher, 2004)



Carvalho, Duarte, and Machado (2011) conceptual model for lean, agile and green supply chain management suggests that some of the lean and agile initiatives such as visibility and lead-time reduction are complementary while initiatives such as surplus inventory and

capacity levels supports being more agile and oppose being more lean. On the other-hand the SCOR model supports Kisperska-Moron and De Haan (2011) in that the Supply Chain Council (2010) supports the view that firms should measure their effectiveness and efficiency and improve both. The South African retailers and FMCGs find themselves in an environment that requires them to be both more efficient and more effective, and potentially could find value by implementing some of the lean and agile initiatives, however knowing which ones to implement is key.

2.4 Building Supply Chain Agility

Various supply chain initiatives are implemented to make supply chains more agile and effective in meeting customers' changing demands. The following sub-sections review some of the initiatives that build agility in detail.

2.4.1 Supply Chain Visibility and Collaboration

Supply chain visibility is the ability of the key supply chain partners to have a clear view; that is information, regarding upstream and downstream inventories, supply signals and demand signals. Visibility initiatives are activities that increase the level, frequency and quality of information shared in the supply chain internally and externally. Improved sharing of information between supply chain partners increases the ability to pre-empt changes and also to recognise changes much earlier (Carvalho *et al*., 2011; Qrunfleh & Tarafdar, 2013). For example the sooner the supplier of packaging materials to an FMCG knows about a sudden spike in demand of the FMCG's products in the retailers the sooner they are able to make contingency plans to supply additional packaging materials.

One key aspect regarding supply chain visibility that has been developed is collaboration – driven mostly under the umbrella of collaborative planning, forecasting and replenishment (CPFR) (Hollmann, Scavarda & Thomé, 2015). Collaboration in supply chain has been proven to increase responsiveness, agility and reduction of inventories across the entire supply chain, that is overall lower inventories across linked suppliers (and their suppliers), manufacturers and customers (and their further customers). CPFR is concept whereby supply chain partners work together to jointly develop plans, share forecasts, schedule production and replenishment plans in order to increase end customer service levels, reduce costs and inventories (Raghunathan, 1999; Poler, Hernandez, Mula & Lario, 2008). While the concept and potential benefits of CPFR have been clearly defined and understood by many supply chain practitioners there has not been many adoption success stories, with

many supply chain partners having started on the CPFR journey only to abandon it later. The main cause of failure of CPFR has been that various partners of the supply chain do not see the benefits at the same time and also the partners may have varying priorities. For example the overall inventory of the supply chain my reduce quickly however for some of the partners may experience increased inventories in the initial stages and may then abandon the programme (Yao, Kohli, Sherer & Cederlund, 2013).

2.4.2 Increasing Supply Chain Speed

Supply chain speed is the ability of the supply chain to deliver products within the promised time or within the time expected by customers (Christopher, 2000; Gligor & Holcomb, 2012). At times a supply chain is not able to meet the required speed expected by customers and the goal of the supply chain managers is to increase the supply chain speed over time. Some of the activities that increase supply chain speed are value-stream mapping (discussed later under the lean section), make-to-stock strategy, and demand information transfer to downstream partners (supported by information visibility) (De Treville, Shapiro and Hameri, 2004). Another key aspect of increasing supply chain speed is to increase capacity of the resources, this could mean increasing machinery in the manufacturing units, increasing capacity of transportation or increase amount of employees so as to reduce processing times and waiting times (Wu & Lin, 2001). The challenge with increased supply chain speed is that it more often come with additional costs that at times cannot be justified.

2.4.3 Postponement

Postponement in supply chain refers to the practice of moving some of the operations on the product, for example specific differentiation such as size/colour/flavour within a common group of products to much later step in the value chain (Qrunfleh & Tarafdar, 2013; Tang, 2006). The benefit of postponement is that it allows the supply chain to react to changes in demand of the final product and also reduces the levels of overall inventories, by allowing the supply chain to configure the final product specifications much closer to the final customer in the chain. An example of postponement could be an FMCG manufacturer who makes body lotions of several flavours and instead of sourcing already labelled bottles for the lotions the FMCG could source common bottles for the lotions and only differentiate the lotions by flavour by applying different and cheaper labels later in the chain based on actual demand (Seth & Panigrahi, 2015).

2.4.4 Strategic Stocks

Strategic stock does not refer to the normal safety stock that is held to deal with standard deviations in demand and supply; however it is the stock that is held specifically to deal with potential major disruptions in supply (Carvalho *et al*., 2011; Tang, 2006). The strategic stock can at times be held at a separate location so as to be able to cover for demand in case of major disruptions such fire in the packaging materials supplier's factory or the retailer's distribution centre. Strategic stocks can also be held to deal with potential high spikes in demand which could be caused by severe changes in weather patterns. For example a period of severe temperature such as El Niño could result in much higher demand for items such as bottled water while unusually prolonged cold weather could result in a spike of demand for coffee and other hot beverages.

2.4.5 Flexible Sourcing

Flexible sourcing of materials involves developing a capability and capacity to source materials from a different number of sources, at varying quantities and varying lead-times (Purvis, Gosling & Naim, 2014; Masson, Iosif, MacKerron & Fernie, 2007). For example a firm can maintain two vendors for a single material with one off-shore supplier providing products at high quantities, at low cost and long lead-time while a local supplier is maintained to supply products during period of unplanned increased demand at higher costs, low volume and short lead-times. Flexible sourcing could also involve developing capability of an alternative supplier and maintaining continuous sourcing of lower volumes from that supplier so that if there is supply disruptions with the main supplier the production at the alternative supplier can be ramped-up with relative ease. An example of how flexible sourcing can enhance supply chain agility is illustrated by an incident in March 2000 in New Mexico whereby a lightning and a strike resulted in a shutdown of a microchips plant that supplied Nokia and Ericsson (Chopra & Sodhi, 2012). Nokia already had developed multiple suppliers of the microchips while Ericsson had a single supplier. The outcome was such that Nokia was able to adjust procurement of the microchips with little negative impact on their operations while Ericsson had disrupted operations for months.

One criticism regarding flexible sourcing could be that it may add additional costs that could be avoided, in that some of the materials could have little risk or impact on the overall supply chain and customer service such that it may be not necessary to have flexible sourcing for those materials. The danger for supply chain managers is not having the ability to calculate the costs of not having contingency plans, and managers need to develop various models to gauge the impact of having and not having contingency plans (Ruiz-Torres, Mahmoodi &

Zeng, 2013). To gain further confidence and deciding what materials should require flexible sourcing and which could do with such, supply chain managers and procurement managers must do risk analysis of the various materials the company procures. Oke and Gopalakrishnan (2009) propose a simplified analysis tool that could be used to classify risk posed by various procured materials and services in the business, based on the likelihood of an event causing that material/service supply to be disrupted and the impact on the shortage on the overall business, see figure 8.

Figure 9. Risk classification for procured materials (Oke & Gopalakrishnan, 2009)

Likelihood	High Likelihood, Low Impact	High Likelihood, Medium Impact	High Likelihood, High Impact
	Medium Likelihood, Low Impact	Medium Likelihood, Medium impact	Medium Likelihood, High Impact
	Low Likelihood, Low Impact	Low Likelihood, Medium Impact	Low Likelihood, High Impact
	Impact		

Once the risk classifications has been completed it is then that specific decisions of whether to apply, or not to, flexible sourcing on various materials is taken. For example materials that are of high likelihood and high impact would need much more application of flexible sourcing while materials that are of low likelihood and low impact could just be managed by other methods such as ensuring that the suppliers have contingency plans in plans and collaborative planning (Oke & Gopalakrishnan, 2009; Danese, 2011).

2.4.6 Flexible Transportation

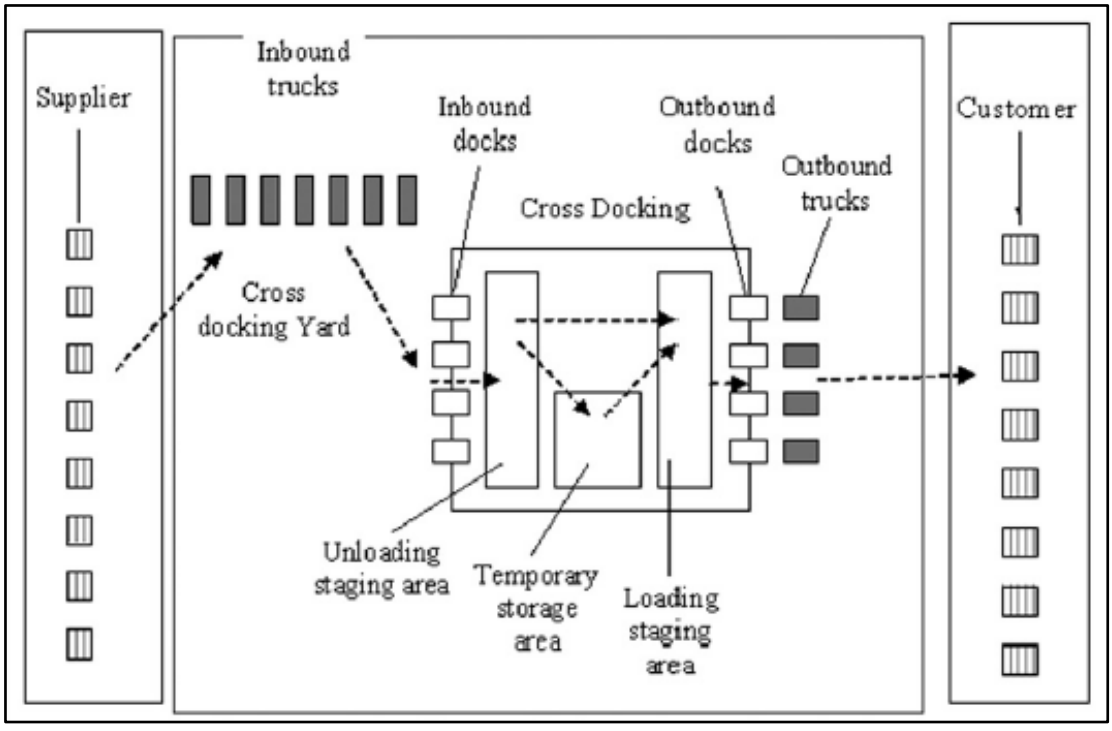
Flexible transportation is the ability of the supply chain to be able to transport varying levels of volumes over different times, and also the ability to still be able to transport products to where they are required when there is increased or new demand (Carvalho *et al*., 2011; Morlok & Chang, 2004). To drive higher flexible transportation firms do for example employ a large third-party logistics (3PL) or fourth-party logistics (4PL) provider to manage their transportation through non-dedicated resources and as the 3PL has high capacity of transportation as they service other customers they are able to deal with demand variability better. Also other firms do choose maintaining in-house transportation capability while also employing the services of a third-party logistics (3PL) provider to provide additional capacity and also to ensure that capability resides both internally and externally.

Other supply chains do allow other forms of flexibility in that capability in various modes of transportation; be it road, rail, water and/or air, is developed to deliver similar products so that when there is disruption in one mode of transportation an alternative mode can be used. The arguments of costs regarding developing and maintaining multiple methods of transportations comes forth, however as studied by Ishfaq (2012) developing capability in various modes has added benefits of allowing a company to continuously optimise and develop a multi-mode network (MMN) that is flexible and also has lower overall costs.

2.4.7 Cross-Docking

As supply chains move towards moving products faster through the value chain touch points, one of the ways that is being more and more implemented is cross-docking (Arora, Iqbal & Gidwani, 2014). In a cross docking warehouse/distribution centre products are not stored for extending per period, instead bulk products arrive from various suppliers (or locations) and they are then off-loaded, then the products are the split into small deliveries. Thereafter the smaller deliveries which are destined for a same customer/location are grouped together to create a bulkier delivery, (Agustina, Lee, & Piplani, 2014). See figure 10 below illustrating a cross-docking operation.

Figure 10. Illustration of a cross-docking operation, (Agustina *et al.*, 2014)



The benefits of cross docking is that since the products are not stored for long at a cross-docking facility, and that consolidation of various products ensures that final delivery trucks are filled up much quicker the lead-time to the final customer can be shorter and also inventory levels can be reduced.

2.4.8 Supply Chain Redundancy

Supply chain redundancy is achieved by ensuring that a supply chain has excess capacity and capability to deal with disruptions (Carvalho *et al*., 2011; Chopra & Sodhi, 2004). Redundancy can be achieved by having excess manufacturing capacity, maintaining a relationship with an alternative supplier, committing and possibly paying for excess inventory or capacity at suppliers (for raw materials, packaging materials and/or transportation). Another form of redundancy is multi-skilling employees to perform various function such as being able to operate a variety of machines. As such when one machine is not required to be run and there is unexpected shortage of people in another production area employees can be moved with ease.

2.5 Building Lean Supply Chains

Various supply chain initiatives have been implemented to make supply chains leaner and efficient. The following sub-sections review some of the initiatives that build lean supply chains in detail.

2.5.1 Value Stream Mapping (VSM)

Value stream mapping (VSM) is the process used by supply chain practitioners to better understand and improve the materials and information flows within the supply chain (Lu, Yang & Wang, 2011; Dal-Forno, Pereira, Forcellini & Kipper, 2014). During VSM process practitioners use time and motion studies, and follow the physical material flows while noting down the required information flows, decision points and decision makers including deeper understanding of the rationales thereof. Using this information the supply chain practitioners are able to map the current value map, and applying diverse knowledge of various people involved, the team seeks to eliminate non-value adding steps in the current value map and reconstruct a new and improved value map. The goal of the VSM is to eliminate the non-value adding steps in the supply chain achieving reduction in costs, movement and lead-times, inventory (stocks), and improved information flows.

2.5.2 Demand-Pull

While most supply chains focus on forecasting for demand and pushing supply to meet anticipated demand a different paradigm is that of demand-pull. In demand-pull various inventory levels are set and maintained, and production or re-supply only takes once there has been actual demand of the final product at the end of the value chain (Christopher & Ryals, 2014; Verdouw, Beulens, Trienekens & van der Vorst, 2011). Effective demand-pull is supported by implementing other lean and agile initiatives such as visibility, speed (lead-time reduction), and lot-size reduction to ensure that only what is required is made or supplied, and VSM to ensure faster reaction to demand signals throughout the value change.

The challenging part about implementing demand-pull is that in most cases it requires a significant change in the ways of working, and lack of knowledge and resistance to change lead to insufficient implementation and failure of the demand–pull concept (Vlachos, 2015). The challenges of implementing a demand-pull system are further exacerbated by a situation of high demand variations and long lead-times (Lu *et al*., 2011), and therefore implementation of demand-pull concept cannot be a stand-alone and requires other initiatives to reduce lead-times and improvement in information visibility and collaboration.

2.5.3 Just-in-Time (JIT)

At times, just-in-time (JIT) is related to demand-pull however the origin of just-in-time did not necessarily mean reaction to final demand signal. JIT is built on the back of VSM, variability reduction and Kanban system implementation to ensure efficient and predictable flow of materials in the supply chain (Kumar, Choe & Venkataramani, 2012; Carvalho *et al*., 2011). One of the key foundations to JIT is the need to have stable and predictable demand which is used to plan ahead supply capacity; and flow can be predicted within a certain range and managed through what is called a “takt rate” and Kanban bins. Takt rate is the average rate at which sales takes place, and therefore the upstream production rate can be set and controlled at that rate, and since takt rate can be predetermined the upstream activities do not necessarily need to wait for actual demand and need only respond to flow signals within the chain as controlled through Kanban bins – and this is the fundamental difference between demand pull and JIT. The high dynamism of demand in some of the supply chains especially within retailers and FMCGs with high variability of demand would likely make JIT a challenge to implement within the retailers and FMCGs.

2.5.4 Strategic Sourcing

Strategic sourcing refers to the long-term relationship a firm has with its suppliers with a view of improving the material flows between the two firms with regard to quality, speed and reduction of costs and overall inventories (Qrunfleh & Tarafdar, 2013). Some of the activities involved in strategic sourcing are co-planning, product co-development, single-source of each product, postponement (as discussed in supply chain agility above) and just-in-time material flow. Due to the increased interactions between the two trading firms (for example a raw materials supplier and FMCG manufacturer), in strategic sourcing firms tend to only implement strategic sourcing initiatives amongst a limited number of suppliers, and to that effect firms that implement strategic sourcing tend not to employ redundant supplier philosophy used to drive supply chain agility (Purvis, Gosling & Naim, 2014).

2.5.5 Inventory Reduction

Some of the initiatives already discussed; demand-pull, JIT, visibility, CPFR and VSM, contribute towards reduction of overall inventory in the supply chain. Other techniques being implemented to reduce inventory are Kanban (visual control of inventories at various point of the supply chain), 5S; a house keeping technique that originated from Japan (seiri = sort, seiton = set in order, seiso = shine, seiketsu = standardise, shitsuke = sustain), lot size reduction, single minute exchange of die (SMED) which is a technique focused on change-over time reduction to reduce machine and people downtime (Gapp, Fisher & Kobayashi, 2008; Carvalho *et al*., 2011).

2.5.6 Product and Process Standardisation

Standardisation within supply chain can take form of product standardisation and/or process standardisation (Khan, Al-Ashaab, Shehab, Haque, Ewers, Sorli & Sopelana, 2013). Standardisation of a product family through design reduces the number of sub-components required and also reduces process variations within that family of products. Product family group standardisation supports the practice of postponement found within the agile initiatives (Tang, 2006). Also process and product standardisation support implementation of JIT and demand-pull as sources of variability are reduced. Process standardisation, documentation and training are some of the key activities that must take place following VSM activities to ensure that non-value adding activities do not creep in into the improved processes and material flows.

2.5.7 Total Productive Maintenance (TPM)

A number of organisations have made a realisation that even if they have some of the best machines and resources in their manufacturing and supply chain facilities, they are not able to achieve the rated outputs of those machine due to frequent downtimes and quality issues. To counter this, some of the leading organisations have implement total productive maintenance (TPM) (Piechnicki, Sola, & Trojan, 2015). The objective of TPM is to increase efficiencies of various equipment by empowering employees through skills development and giving them authority to ensure continuous (autonomous) maintenance as well as planned maintenance to prevent unplanned shutdown and quality problems (Attri, Grover & Dev, 2014). By ensuring increased up-time for the resources and reducing wastage, higher supply chain efficiency as well as effectiveness, driven by additional capacity, can be attained.

2.5.8 Customer Relationship Management (CRM)

Extending the management of the value chain to always include the customers' voice is another way that assist organisation in becoming leaner and faster. This is done by working closer to the customer through a concept called customer relationship management (CRM) (Jasti, & Kodali, 2015). Though some aspects of CRM can be related to CPFR, CRM is harnessing people, processes and technology to enhance the interactions and feedback loops between a company and its customers to ensure that value is maximised for both the company and its customers. The relationship is managed so as to ensure that appropriate products (or services), channels and interactions are monitored and improved to create greater customer satisfaction (Chen & Popovich, 2003). The idea is to use customer feedback and inputs during the process of VSM to ensure that a product or service that the supply chain delivers is what the customer really wants. The outcomes of using the customer voice ensures that aspects of the product that the customer does not value can be eliminated (or reduced), resulting in lower waste, lower costs and shorter lead-times (Di Pietro, Mugion, & Renzi, 2013; Agus & Shukri-Hajinoor, 2012). Also this process ensures that aspect of the product that the customer value are really enhanced and that the supply chain system is fully geared to deliver on that which the customer values.

2.6 Conclusion of Literature Review

Agile Supply chain initiatives are being implemented to varying extends by different companies to ensure that their supply chain operations are able to respond effective to the dynamic business environments in which today's companies operate. Agile supply chain initiatives have been driven through the following: visibility of supply chain demand and

supply information, reduction of lead-times (speed), redundancy, postponement, strategic stocks, flexible sourcing and flexible transportation (Tang, 2006; Carvalho, Duarte & Machado, 2011; Gligor & Holcomb, 2012; Purvis *et al*., 2014; Qrunfleh & Tarafdar, 2013; Shao, 2013). Some of the initiatives that have been used to drive lean objectives are: value-stream mapping (VSM) demand-pull, just-in-time (JIT), visibility, inventory reduction, product and process standardisation and strategic sourcing (Carvalho *et al*., 2011, Dal-Forno *et al*., 2014; Qrunfleh & Tarafdar, 2013; Kisperska-Moron & De Haan, 2011, Dal-Forno *et al*., 2014, Christopher & Ryals, 2014; Tang, 2006). These initiatives are implemented to streamline operations, reduce waste and working capital within the value chain. Some of the initiatives that seem to improve both agility and leanness are postponement, visibility and collaboration, lead-time reduction; while other initiatives such as flexible sourcing and strategic sourcing seem to have conflicting effects. The summary of the various initiatives, as per the literature review, and their impact on supply chain effectiveness and efficiency is illustrated in Table 1 below.

Table 1. Summary of Agile and Lean Initiatives from Literature Review

Initiative	Type of Initiative	Effectiveness	Efficiency
Collaboration	Agile & Lean Initiative	Increase	Increase
Customer Relationship Management	Agile & Lean Initiative	Increase	Increase
Cross-Docking	Agile & Lean Initiative	Increase	Increase
Postponement	Agile & Lean Initiative	Increase	Increase
Process Standardisation	Agile & Lean Initiative	Increase	Increase
Product Standardisation	Agile & Lean Initiative	Increase	Increase
Supply Chain Speed (Lead-time reduction)	Agile & Lean Initiative	Increase	Increase
Supply Chain Visibility	Agile & Lean Initiative	Increase	Increase
Flexible Sourcing	Agile Initiative	Increase	Decrease
Flexible Transportation	Agile Initiative	Increase	
Strategic Stocks	Agile Initiative	Increase	Decrease
Supply Chain Redundancy	Agile Initiative	Increase	Decrease
Demand-Pull	Lean Initiative		Increase
Inventory Reduction	Lean Initiative	Decrease	Increase
Just-in-Time (JIT)	Lean Initiative	Decrease	Increase
Strategic Sourcing	Lean Initiative	Decrease	Increase
Total Productive Maintenance (TPM)	Lean Initiative	Increase	Increase
Value Stream Mapping (VSM)	Lean Initiative	Increase	Increase

CHAPTER 3: RESEARCH QUESTIONS

3.1 Main Research Proposition

The literature review discussed in the above sections suggest that agile supply chain initiatives can lead to better supply chain effectiveness attaining higher customer service levels and flexibility. Also lean initiatives can lead to better supply chain efficiency achieving lower costs and lower overall supply chain inventory in support of the five core areas of the SCOR model. The aim of this research is to ascertain if the lean initiatives are supportive of the aims of agile initiatives, and vice versa; within FMCGs and food retailers in South Africa. To that effect the following research proposition is put forward:

Research Proposition One

Both lean supply chain initiatives and agile supply chain initiatives have positive impact on supply chain effectiveness, that is better customer service, responsiveness (lead-times) and flexibility; and supply chain efficiency, that is lower costs and lower inventory levels, within the food FMCGs and food retailers in South Africa.

3.2 Supplementary Research Propositions

To support exploration of the above main proposition the following propositions are also made for further investigation:

Research Proposition Two

All lean supply chain initiatives instituted by South African food FMCGs and food retailers have led to higher efficiencies in supply chain; that is shorter lead times, lowering of business costs and/or supply chain inventories.

Research Proposition Three

All agile supply chain initiatives instituted by South African food FMCGs and food retailers have resulted in lower efficiencies for the supply chain; that is have led to longer lead times, higher of business costs and/or higher supply chain inventories

Research Proposition Four

All agile supply chain initiatives instituted by South African food FMCGs have food retailers led to higher supply chain effectiveness; that is higher customer service levels and/or better supply chain responsiveness.

Research Proposition Five

All lean supply chain initiatives instituted by South African food FMCGs and food retailers have resulted in lower supply chain effectiveness, that is lower customer service levels and/or less responsiveness supply chain.

Research Proposition six

Food retailers have implemented mostly agile supply chain initiatives while food FMCGs have mostly implemented lean supply chain initiatives.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction to Research Methodology

The research aimed to unearth some of the lean and agile initiatives that have been implemented by South African FMCGs and retailers to drive efficiency and effectiveness, and it was critical that the research method used supports that goal. The method chosen allowed the researcher to unearth some of the practices that have been implemented, and also allowed for deeper understanding of the impact of agile and lean initiatives on supply efficiency and/or effectiveness (Saunders & Lewis, 2012). The next sections elaborate more on the research methodology and design.

4.2 Research Design

The research was carried out using a qualitative research design. Although some of the lean and agile initiatives that have been implemented in supply chain globally are known, it was not clear which ones have been implemented, and done so successfully, in FMCGs and retailers in South Africa. A quantitative descriptive research would have limited opportunities to unearth what are some of the common practices that are being applied in South Africa (Denzin & Lincoln, 2008). On the other hand a qualitative study allows one an opportunity to unearth some of the realities or knowledge that may not have been previously exposed (Vaismoradi, Turunen, & Bondas, 2013). The research philosophy taken was that of critical realism approach as there are opposing arguments for the sand cone theory and its application in the supply chain field especially regarding efficiency and effectiveness improvements (Saunders & Lewis, 2012).

4.3 Data Collection

Data collection was done through a form of semi-structured interviews, through prepared questions (Saunders & Lewis, 2012). Based on the aforementioned literature review an interview guide was drawn. However the interview guide did not represent exhaustive questions, as some of the questions were lead based on the prior interview answers. Interviews were recorded using two digital voice recorders and thereafter transcribed and coded for purposes of further analysis. Two digital voice recorders were used to ensure that there is a back-up data collection device in case one of them failed (Kvale, 2009).

Other data collection methods such as expert interviews, pilot study and case studies were considered however they were judged not to be appropriate. Expert interviews would have

been good for unearthing different practices for lean and agility however expert interviews would not necessarily be able to provide diverse information across a number of companies. On the other hand a pilot study or a case study in two different companies, for example one retailer and one FMCG, could have allowed for much in-depth comparison as has been used by Kisperska-Moron and De Haan (2011), however diversity of information would have been limited and also would have required longer than available period of time.

4.3.1 Interview Schedule

The interview schedule with semi-structured questions was used to elicit data and information regarding the research propositions from targeted respondents. See Appendix 1 for the interview schedule used. An informed consent letter, to promote and uphold ethical data collection process was used to inform the participants of the research and how the information was to be used, accompanied the interview schedule. See Appendix 2 for the example of the informed consent letter used and was signed by the participants and researcher. Actual signed informed consent letters can be made able on request. The interview schedule had a set of prepared questions and these were asked in an open-ended manner allowing the participants give as much feedback as possible to be able to explore the various propositions. Follow-up questions, and few some close questions, were also used to gain deeper understanding of the respondents' feedback (Barbour, 2008).

4.3.2 Interview Schedule Pre-Testing

The interview schedule was pre-tested (piloted) with two people who are experienced supply chain professionals, and thereafter refined to ensure appropriateness and effectiveness of the flow of the interview and the questions thereof (Barbour, 2008). The pre-testing also allowed the researcher to gain confidence and more familiarity with the usage of the interview schedule and the process thereof.

4.4 Population

Although it had been envisaged that the research will explore lean and agile initiatives in FMCGs and retailers, it was critical to still clearly define the population for data collection and analysis. Population definition is fundamental for research as it sets the research context, applicability and limitations thereof (Saunders & Lewis, 2012). The population universe for this research is all the FMCGs that manufacture and sell packaged food and food retailers in South Africa. However the research did not intend to sample all the packaged food FMCGs but only a representative sample of the population.

Food retailers in this context are also referred to as general dealers, supermarkets and hypermarkets such as Shoprite, 7Eleven and Woolworths Food. This research excluded out-of-home food consumption retailers such as restaurants; for example Nandos, KFC and Steers. The universe was envisaged as such due to the size and impact of the said companies in the economy of South Africa. The overall value of the packaged food industry value chain was estimated to contribute over 3.8% towards gross domestic product (GDP) of South Africa. Food retailers (general dealers, supermarkets and hypermarkets) contribute a net of 5.6% to the GDP when all other products other than food are included (STATSSA, 2015; Aye, Balcilar, Gupta & Majumdar, 2013). The 5.6% figure for retailers only refers to the net value add by retailers however as the retailers are a critical element to the value chain of many products and industries their impact on the country's GDP is enormous.

4.5 Unit of Analysis

Unit of analysis in research refers to the source that would provide data and the level at which data from a number of the sources could be aggregated and analysed (Zikmund, Babin, Carr & Griffin, 2012). The unit of analysis for this research is the end-to-end supply chain of a food FMCG or a food retailer. Data about the supply chain was collected from supply chain managers who work for food FMCGs and food retailers. A supply chain manager for the purpose of this research was defined as someone responsible and accountable for leadership, strategy formulation and execution of one or all of the key five areas of supply chain, that is; plan, source, make, deliver and return. Typical job titles of the senior supply chain managers that were be targeted are: supply chain director, supply chain executive, supply chain manager, supply chain operations manager, logistics manager, distribution manager, purchasing manager, supply chain planning manager and reverse-logistics manager. The ideal goal was to interview supply chain directors who are members of the companies' executive leadership or their direct reports leading various supply chain functions so as to ensure that there was breadth and depth in the interview session, and also to ensure quality of feedback and validity of the research results.

4.6 Sampling

4.6.1 Sampling Frame

Once a unit of analysis was defined it was necessary to identify a suitable sampling frame from which research participants could be drawn. A sampling frame is defined as "a complete list of all members of the total population" (Saunders & Lewis, 2012, p. 133). It may not

always be possible to have an ideal sampling frame that will have the entire number of members however effort was made identify a sampling frame that would have the ideal population. This was done to ensure that the researcher could identify as many and as diverse members of the population to ensure that the sampling frame is a representative of the population (Ritchie, Lewis, Nicholls & Ormston, 2013).

Due to the consolidated nature of the food retailers in South Africa (Hughes, McEwan & Bek, 2015), the sampling frame for food retail companies is the top five food retailers in South Africa, that is Shoprite Holdings, Pick'nPay Holdings, Spar Group, Massmart Holdings. The top five retailers contribute 64% of the retail sales in South Africa, and have an extensive national footprint and information from their supply chain managers offered a significant input and understanding of application of the concepts of lean and agile supply chains in South Africa. The food FMCGs sampling frame is the list of packaged food FMCGs in South Africa as published by Passport (2015). The Passport list was found to be the most comprehensive list of the FMCG's in South Africa. See Appendix 3 for the list of the food FMCGs in South Africa and their market shares (Passport, 2015). Although the sampling frames selected for FMCGs and retailers do not consist of all of the members of the population they represent significant representatives of the total population. Valuable insights could still be drawn from information sampled from these frames however care was taken to ensure that untested inferences were not made in as so far as to supply chains that are not represented by the sampling frame.

4.6.2 Sampling Technique

The right choice of a sampling technique is important to ensure correct interpretation and usage of the results, as much as possible sampling should seek to attain normal distribution however at times this may not be possible due to time pressures and availability of participants (Saunders & Lewis, 2012). The sampling technique used for selecting supply chain managers in FMCGs was a non-probability sampling using quota sampling. The research aimed to contact as many as possible of the top 30 FMCG companies and effort was made that there are representative companies in the following groupings top five, next six to fifteen and then the next sixteen to thirty. Drawing supply chain managers from the various market share segments groups of the FMCGs was done so as to improve the likelihood of the results being a representative of the whole population. For the retailers a quota sampling technique was also used however effort was made to get information from all the top five retailer groups being targeted, and the available supply chain managers were interviewed.

4.6.3 Sample Size

The aim of selecting the right sample size was to ensure data sufficiency, theoretical saturation and possibly informational redundancy, so that the results can as much as possible show significant trends in the population dynamics (Onwuegbuzie & Leech, 2007; Saunders & Lewis, 2012). Onwuegbuzie and Leech (2007) recommend that an ideal sample size of ten interviews be done for an exploratory study such as this one. Guest, Bunce, and Johnson (2006) recommend a sample size of six to twelve interviews as generally major an common themes become apparent at a sample of six. The targeted sample size of this research was ten; seven food FMCGs and three retailers. To a certain extent the actual sample size was impacted by the availability and interest (or lack thereof) of target participants. Eventually the actual sample size was eight, made up of two retailers and six FMCGs, which was considered sufficient given the qualitative research guidelines (Guest, Bunce & Johnson, 2006). The number of FMCGs was higher as there is a higher number of FMCGs than there are retailers in the sampling frames.

4.6.4 Measurement Instrument

The measuring instrument used to analyse the research data is a computer-aided qualitative data analysis software (CAQDAS) called ATLAS.ti. Following the interviews, the audio recordings were transcribed; with the respondents' and companies' names assigned codes of the format Respondent_01, Respondent_02, *et cetera*, to promote anonymity of results and confidentiality. Transcription was done by an expert transcriber and thereafter checked by the researcher for accuracy. Information from the interview transcripts was saved in separate documents and the file names used were identifiers of the various respondents, though still keeping anonymity, such that the documents could be easily used within document manager of ATLAS.ti for further analysis (Saunders & Lewis, 2012; and Barbour, 2008). ATLAS.ti is one of the best CAQDAS tools for qualitative data analysis (Lewis, 2004), and was deemed appropriate for the usage.

4.7 Data Analysis

There is generally two approaches to analyse qualitative feedback from interviews; divided into deductive approach and inductive approach. Deductive approach is used when a prior theory of organising feedback has been established while on the other-hand inductive theory is useful for unearthing new trends and relationships (Burnard, Gill, Stewart, Treasure & Chadwick, 2008). Although the existence of possible relations as explored in the literature review suggest a deductive approach can be used for this research in that lean initiatives are

associated with efficiency and agile initiatives are associated with effectiveness, the need to explore impact of lean initiatives on effectiveness and agile initiative on efficiency an inductive approach was used. To that effect inductive thematic analysis which is method of analysing and linking emerging themes in interviews was used for this research.

Thematic analysis is slightly different to normal content analysis in that content analysis mostly focuses categories and sub-categories that are mentioned frequently in qualitative data. On the other hand thematic analysis takes it further and seeks to identify emerging themes and also identify potential linkages within themes (Vaismoradi, Turunen, & Bondas, 2013). Thematic analysis was useful in this regard as there was likely some linkages between lean initiatives and agile initiatives.

Once the interviews were transcribed the following process was followed for data analysis (Barbour, 2008; Clarke & Braun, 2013; and Rohleder & Lyons, 2014):

- Familiarisation with data – data was read by the research, and re-read again, while making notes regarding some points of interest.
- Coding the data – descriptive codes that summarised various content of the interview were developed and assigned to sections of the interview that related to some of the issues that were being researched .
- Searching for themes (families) – once coding was completed the various codes were studied to check for similarities and those codes were be clustered into themes (referred to as families with ATLAS.ti).
- Reviewing themes – this step involved checking the identified themes against the coded data to ensure consistency of linkages of themes to the initial data.
- Defining themes (families) – this step involved building definitions for the themes based on linkages of various themes and supported by the underlying data, and assigning names to the defined themes. Attempt was made to make as less themes as possible however due to the diversity and the depth of some of the themes it was decided so as not to lose invaluable insight that the number of themes be left many.
- Linking themes – in this step the coded segments were recoded with additional codes that were given names of the identified themes (families). This was done so as to pick up codes and themes that are inter-related. The linkages of the codes and the themes (families) are included in the results section for illustration of the relationships and drivers.

Once the data analysis was completed, comparison was made between the uncovered themes and the research propositions derived from the literature review. The results of the

analysis is presented in Chapter 5, and the discussion of the results follows thereafter in Chapter 6.

4.8 Ethical Considerations

Consideration was made to ensure that the issue of research ethics is addressed throughout the process of data collection, data storage, data analysis, research results and discussions thereof. Appropriate ethical conduct by the researcher was necessary to ensure that the rights of the research respondents and the companies they represent are protected and that there is no prejudice (Saunders & Lewis, 2012, and Ritchie, Lewis, Nicholls & Ormston, 2013). The following was done to ensure appropriate ethical process of the research:

- **Ethical clearance** – The research proposal, research methodology as well as interview guide were put through the GIBS ethical clearance committee to ensure that potential unethical issues were dealt with before the data collection phase. And ethical clearance was given by the committee, see Appendix 4.
- **Consent of the respondents** – respondents were asked to go through and sign the Informed Content Letter before interview questions were put across to them, and they had an option to opt out of the interview at any stage should they have thought the interview was inappropriate or could prejudice them.
- **Confidentiality** – confidentiality of the respondents is promoted by ensuring that the research results do not identify names of the respondents and the companies they work for. In the research report respondents and companies are assigned codes names. Also during transcription of the interviews information that was shared that could have resulted in identifying the company name was changed, for an example a reference to a brand name was changed to “product X”, for example.
- **Data Storage** – care was taken to ensure that notes taken during the interview and audio recordings are store in a secured space.

4.9 Limitations

This study is focused on the lean and agile initiatives within food retailers and packaged food FMCGs, and therefore no inferences with regard to trends and benefits in other retailers such as motor retailers and clothing retailers and other manufacturers such as home appliances manufacturers would be made. However since most (if not all) of the practices being explored could be used in other industries the outcome of this study could be used or extended to test existing initiatives in other industries.

It should also be noted that the sampling frame did not consist of smaller food retailers (general dealers) and therefore no inferences of the lean and agile initiatives can be made with regard to the general dealers in this study. Although significant and emerging trends can be picked up from a qualitative study, generalisation of the results to the whole population is not possible (Onwuegbuzie & Leech, 2007), and therefore this research does not intend to explore and earth exhaustive list of all agile initiatives and lean initiatives that have been implemented.

4.10 Research Reliability

To further minimise potential errors and improve research reliability in the study the researcher employed the following technique with regard ensuring validity:

- **Researcher Flexibility**: The researcher was open about the fact that he had prior knowledge of some of the lean initiatives that have been trialled by some of the FMCGs, and prior studies of lean initiatives from an industrial engineering perspective may have led to potential biases in the study and did guard against that. However such prior knowledge was used for clarifying and follow-up questions.
- **Peer Debriefing**: Peer debriefing sessions were held with the research supervisor to ensure valid research procedure was maintained through the process, (Creswell & Miller, 2000).
- **Data Collection**: Reliability of data collection was enhanced by usage of two voice recorders and the copy of the records was kept safe and handed in to the university for safe keeping, and verification if it were ever deemed necessary.
- **Sample Selection**: To drive quality of feedback care was be taken to ensure that only senior supply chain managers were selected for the interviews.

CHAPTER 5: RESULTS

5.1 Introduction to Results

Using the research methodology outlined in the previous section, data was collected and analysed and the results thereof are presented in this chapter. This section start by giving the overview of the sample that was obtained, and thereafter the results are presented in sequence from results of research proposition one all the way to research proposition six. As research proposition one was the main proposition, the bulk of the results section focuses on this proposition, and the rest of the results follow. In instances whereby results are shown in tables the numbers in the table show how often that theme was mentioned during the interviews. The theme may have been mentioned more than once in one interview and therefore the total number of mentions in most cases does exceed the number of respondents. The various segments of the interviews were coded, and these codes were grouped and linked to themes. Some of the results presented below illustrate the linkages of the codes to the themes (families).

5.2 Sample Description

Although the initial target was to have ten participants (respondents) in the research, a total of only eight participants was achieved and this was deemed sufficient for the study (Guest, Bunce, & Johnson, 2006). The respondents consisted of senior supply chain managers and practitioners all of them with more than ten years of working experience in supply chain and have been in the companies they work for more than five years. Table 2 below gives the titles of the various participants.

Table 2. Summary of Respondents**

Group	Position
Food FMCGs	Business Supply Chain Manager
Food FMCGs	Logistics Operations Manager
Food FMCGs	Supply Chain Director
Food FMCGs	Customer Facing Supply Chain Analyst
Food FMCGs	Supply Chain Director
Food FMCGs	Factory Supply Chain Manager
Food Retailers	Supply Chain Projects Manager
Food Retailers	Business Supply Chain Manager

** The sequence in this table is random and does not indicate who is Respondent_01, Respondent_02, et cetera.

The numbers of participants and interviews and transcripts lengths are summarised in Table 3 below.

Table 3. Interview Statistics

Item	Sampling Results
Number of targeted respondents	10
Actual number of respondents	8
Number of retailers' respondents	2
Number of food FMCGs respondents	6
Number of completed interviews	8
Total time of interviews	426 minutes = 7 hours, 6 minutes
Average time of interviews	53 minutes
Shortest time of interviews	39 minutes
Longest time of interviews	69 minutes
Total number of pages of transcripts	127
Average pages of transcript	16
Shortest pages of transcript	13
Longest pages of transcript	20

5.2.1 Distribution of Results by Respondents

It was important to check the distribution of themes and codes amongst the respondents and the spread thereof. Table 4 below illustrates the themes that were uncovered through the interviews and the data analysis that followed, as well as the spread of the lean and agile initiatives' themes amongst the respondents. Some initiatives are common amongst most of the FMCGs and retailers while others were mentioned by one or two of the respondents. For example cross-docking was mentioned by only Respenden_04, while continuous improvement was mentioned by all respondents. It must be noted that the transcript of Respondent_01 contributed much more significant codes (118) versus the least number on codes, 35, from Respondent_03.

Table 4. Distribution of Themes by Primary Respondents

Initiatives	Type of Initiative	Respondent 01: FMCG SCM	Respondent 02: FMCG SCM	Respondent 03: FMCG SCM	Respondent 04: FMCG SCM	Respondent 05: FMCG SCM	Respondent 06: FMCG SCM	Respondent 07: RETAIL SCM	Respondent 08: RETAIL SCM
Centralise Distribution	Agile & Lean Initiative	5	0	1	1	1	2	8	8
Collaborate with Suppliers and Customers	Agile & Lean Initiative	7	2	1	2	8	9	6	6
Continuous Improvement	Agile & Lean Initiative	5	8	5	5	5	10	4	7
Cross-Dock Products	Agile & Lean Initiative	0	0	0	5	0	0	0	0
Standardise and Document Processes	Agile & Lean Initiative	12	0	0	1	2	0	5	0
Standardise Products	Agile & Lean Initiative	5	0	1	1	0	1	0	0
Supply Network Design/Redesign	Agile & Lean Initiative	5	2	3	4	0	3	0	2
Visibility of the value chain	Agile & Lean Initiative	14	4	3	8	3	7	3	1
3PL/4PL	Agile Initiative	2	1	3	2	0	1	1	0
Contingency / Dual Suppliers	Agile Initiative	0	5	0	1	1	0	0	0
Flexibility	Agile Initiative	7	1	0	1	0	2	3	0
Invest in Capacity / Technology	Agile Initiative	0	0	3	2	0	0	0	3
Explore Alternative Suppliers	Agile Initiative	0	1	1	0	0	0	0	0
Direct Deliveries	Lean Initiative	0	2	0	0	3	0	0	0
Increase Transport Utilisation	Lean Initiative	0	3	2	2	0	7	6	0
Value Stream Mapping (VSM)	Lean Initiative	5	0	1	0	1	0	0	1
SKUs Reduction	Lean Initiative	3	0	0	0	0	0	2	0
Total Productive Maintenance (TPM)	Lean Initiative	0	2	0	0	3	0	0	3
Control / Influence / Partner	General Initiative	4	0	4	1	0	2	0	1
Demand Planning	General Initiative	11	1	1	5	7	1	1	3
ERP System	General Initiative	6	1	0	2	0	2	2	0
Industrial Relations	General Initiative	0	1	0	0	0	0	0	0
Integrated Products Innovation Process	General Initiative	1	1	2	2	0	1	0	0
Safety and quality	General Initiative	2	1	0	0	0	1	0	2
Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP)	General Initiative	4	4	2	2	2	0	0	0
Service Level Agreements (SLAs)	General Initiative	2	0	0	2	0	2	5	0
Skills Gap Analysis and People Development	General Initiative	3	2	1	1	2	0	1	0
Strategy / Tactics Alignment (Internal and External)	General Initiative	15	3	1	1	1	1	4	1
TOTALS:	**TOTALS:**	**118**	**45**	**35**	**51**	**39**	**52**	**51**	**38**

5.3 Results of Research Proposition One – Lean and Agile Initiatives Increase Both Supply Chain Efficiency and Supply Chain Effectiveness

5.3.1 Introduction

Research proposition one sought to understand if the lean and agile initiatives that have been implemented by the food FMCGs and retailers have resulted in both higher efficiencies and higher effectiveness of their supply chains. Section 5.3.2 below illustrates the impact of initiatives that drive both leanness and agility, section 5.3.3 presents the impact of initiatives that are primarily there to drive agility while in section 5.3.4 the results of the impact of primarily-lean initiatives are presented.

5.3.2 Initiatives that drive both Lean and Agility

Eight initiatives were uncovered which are both lean and agile initiative in their nature. Table 5 below shows the results and how often each initiative was mentioned. All the eight initiatives were found to driving both higher effectiveness and higher efficiency of the supply chain. Continuous improvement, visibility of the value chain as well as collaboration with suppliers and customers seem to be the leading initiatives that drive higher effectiveness and higher efficiencies

Table 5. Results of Research Proposition One – Initiatives that drive both Lean and Agility

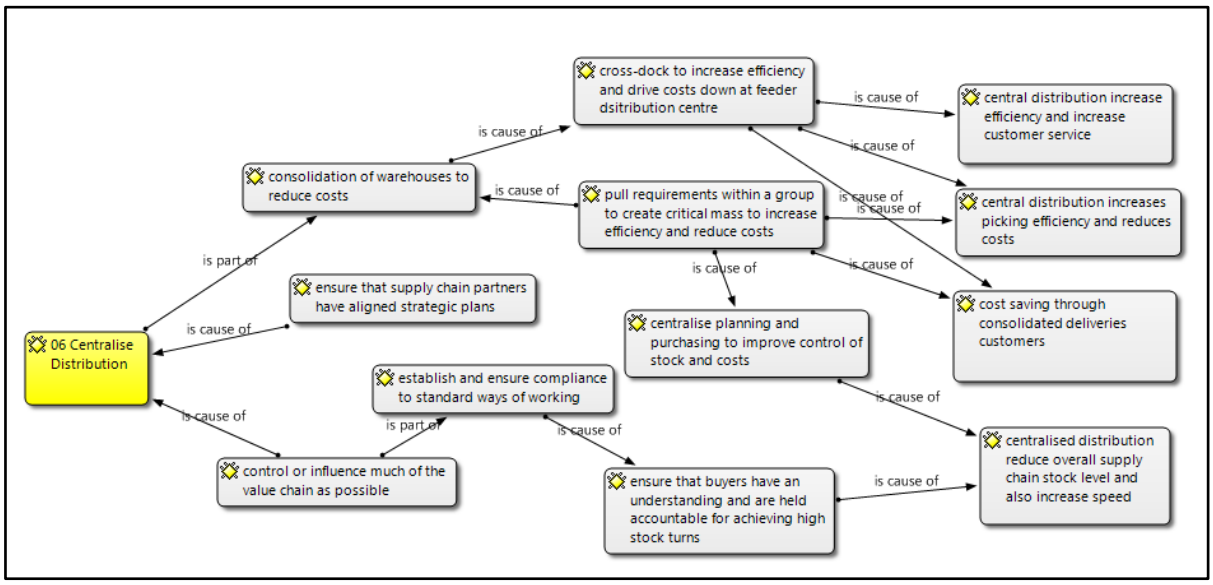
Initiative	Type of Initiative	01 Increase effectiveness	02 Increase efficiency
Centralise Distribution	Agile & Lean Initiative	8	21
Collaborate with Suppliers and Customers	Agile & Lean Initiative	29	19
Continuous Improvement	Agile & Lean Initiative	21	42
Cross-Dock Products	Agile & Lean Initiative	3	4
Standardise and Document Processes	Agile & Lean Initiative	13	10
Standardise Products	Agile & Lean Initiative	4	8
Supply Network Design/Redesign	Agile & Lean Initiative	16	12
Visibility of the value chain	Agile & Lean Initiative	22	31

The next sub-sections look at the detail sub-themes within the identified initiatives above and how they interact to create both higher efficiency and effectiveness.

5.3.2.1 Centralise Distribution

A number of respondents referred to centralisation of distribution being one of the keys to drive both supply chain agility and leanness. Figure 11 below illustrates the sub-themes within centralising distribution. It was highlighted that costs of distribution centres and were the biggest drivers towards centralised distribution. By centralising, fixed costs are reduced, while centralised planning ensures better coordination and execution to ensure economies of scales are achieved to drive higher efficiencies.

Figure 11. Centralise distribution sub-themes and interactions



It was also noted that centralising distribution reduces the overall lead-time which results in higher customer service responsiveness and effectiveness. Below is some of the detailed feedback that the respondents gave regarding centralising distribution.

Respondent_03*: "For these reasons, adding to that of cost as well, our volume is big enough to pass through our own facility, so we do not need to have multiple warehouses all over, we can consolidate."*

Respondent_06*: "We needed space to house some of the stock at our factories for the stock to be distributed straight from there to our customers and cutting out the leg from distributing from our factories to our own distribution centres then to our customers. By building those warehouses we have managed to cut out one leg of distribution and save those costs. There is a steady increase in customer service given the change of the distribution network that has greatly affected our business."*

Respondent_07: "*We are trying to centralise ordering as much as possible. We have got centralised replenishments in merchandise; we have got centralised replenishments in liquor, but we do not have centralised replenishments in food. That is starting to change, we are starting to pull a lot of it to the centre at the moment, and in the process of doing so and in the implementation of replenishment systems."*

Respondent_08*: "We drive the lead-time compliance and equally within the centralised distribution environment, centralising distribution allows them to be faster and more*

responsive to lead-time and order cycle. They are, suppliers that is, able to execute in one day to distribute what would traditionally take them four or five days or a week to execute to a store."

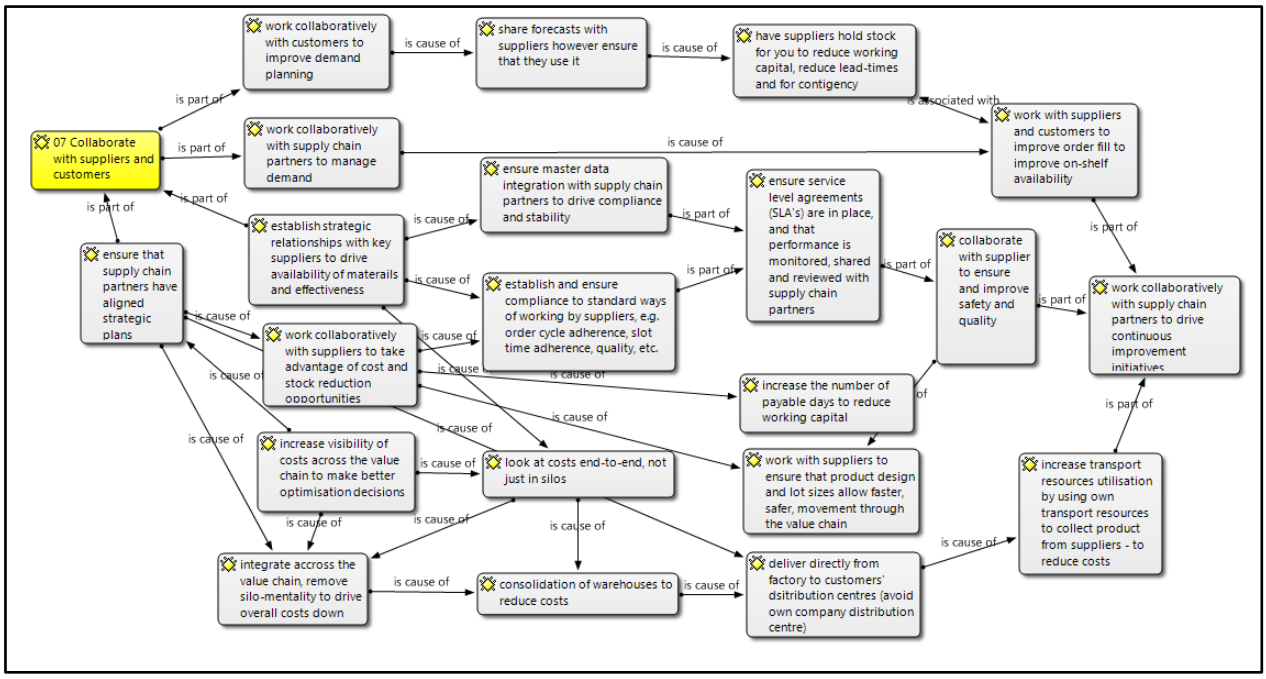
It should be noted that the centralisation of distribution by some of the retailers has also driven some of the FMCGs to centralise as well, as noted from Respondent_04 below.

Respondent_04*: "This was also the situation back in the days because our customers as well did not have central distribution areas, the only customer that always had central distribution was Retailer-Z; but lately you have Retailer-X and Retailer-Y as well building their own distribution centres and that has actually enabled us to take advantage of this situation where our customers have actually built their own distribution centres then we are able to reduce costs."*

5.3.2.2 Collaborate with Suppliers and Customers

Another significant initiative that was uncovered is collaboration with suppliers and customers to drive both supply chain agility and leanness. Figure 12 below illustrates the sub-themes that were uncovered regarding collaborating with suppliers and customers. See Appendix 5 for a bigger diagram showing interactions of sub-themes under collaboration initiative.

Figure 12. Collaborating with suppliers and customers themes and relations



It was noted some of the FMCGs are collaborating with their customers to ensure on-shelf availability and higher customer service, as illustrated by Respondnt_01, Respendent_02, Respondent_03 and Respondent_06 below.

> Respondent_01*: "Rather be pro-active and say there is a promotion coming up next week, put in an extra load now, as opposed to reacting after your stock at the distributorship has been depleted and then now you want two loads urgently. So we playing a much closer role in ensuring that we push stock to our distributors and we maintain stocks at our distributors, and not drive this month end "peakiness" that was the big issue."*

> Respondent_02*: "South Africa is still one of the countries where merchandisers are allowed in stores compared to what you find in the USA or in Europe or in the UK, where stores do their own merchandising and therefore we are able to also then influence the rate at which shelves are replenished. Most of that is in those stores and is certainly within our control."*

> Respondent_03*: "Yes, I think in the material space and the supplier's space we have embarked on a partner to win campaign and what that means is we have got a very close relationship with our key suppliers. And we have identified who the key suppliers are and therefore we have a very close understanding and relationships with their businesses. We have shared our forecasts with them very openly and they too have done a number of activities on their side such as holding stock, procuring extra raw materials et cetera to really get to a partner to win relationships with our company. That has made us responsive."*

> Respondent_06*: "Customer Collaboration Department works extremely close with the customer to gauge exactly what the needs are and in turn are then the voice of the customer within the company. We basically bridge that gap between both supply chains and even the sales team*."

On the upstream side South African FMCGs are collaborating with their suppliers to ensure availability of raw and packaging materials to ensure continuity of supply while driving down costs, as noted through the feedback from Respondent_01, Respondent_04 and Respondent_05 below.

> Respondent_01*: "That is the one element, the other is that we are now getting the flexibility of being able to change products so we have the supplier come to us and say*

they have an excess of an ingredient, this is the price do we want it. It is very easy for us to get a sample, test that it meets our requirements and then change our bill of materials and stick it in. We are going to put R3 million in our pocket, purely because this guy has an excess of one ingredient."

Respondent_04*: "Our procurement department does it, it is called SSD, Strategic Supplier Development. Their job is to work with suppliers to develop suppliers. Ensuring that expectations are well understood in terms of stock availability and quality"*

Respondent_05*: "Suppliers holding stock for us is part of Supplier Facing Supply Chain and that in itself also helps with the reduction of working capital. But also sharing the forecasts with the suppliers it helps them to more or less procure raw and packing materials they need to produce. They also do not have to run around like headless chickens when we place an order with them because they already more or less have an idea of the call-offs that we are going to be making in the next four or five weeks for example. That in itself it helps to stabilise the whole supply chain."*

Respondent_06: "*In terms of the overall costs of the supply chain we have brought down our costs of distribution by around 40% in the past five years if I am not mistaken. It is about collaborating and working very closely with all stakeholders and role players within our supply chain*."

And amongst the retailers they are also collaborating more and more with their suppliers (FMCGs) to drive effectiveness and efficiencies as noted by Respondnt_07 and Respondent_08 below.

Respondent_07: *"And we manage that process via what we call our JBPs; which is our Joint Business Partner relationships and we meet with our Joint Business Partners biannually, so every six months, where basically each representative party would present key results and if there are some initiatives that we basically had that have come out of our previous JBP session, we would report back on those initiatives."*

Respondent_08: *"With some strategic vendors we have started forecasting as well or sharing forecast, although in the South African market we finding that the maturity around dealing with forecast or the responses to forecast is actually quite poor"*

5.3.2.3 Continuous Improvement

Within the initiative of continuous improvement the following selected sub-themes were found and are listed in Table 6 below. Not all sub-themes are listed below as continuous improvement was found to be touching on almost all the initiatives, in that even when one is not doing a specific big initiative on one aspect of the supply chain they are likely to focus still on improving that aspect on a continuous basis.

Table 6. Continuous Improvement Themes in Supply Chain

Continuous Improvement Themes	Number of Occurances
do continuous improvements to get leaner - reduce costs and reduce stocks	10
work collaboratively with supply chain partners to drive continuous improvement initiatives	8
embed a culture of continuous improvement and be persistent	4
develop and empower people to do problem solving and drive continuous improvement	4
monitor performance and give feedback, to various functions, periodically to drive continuous improvement	3
have a basic understanding and visibility of cost drivers so as to start managing, and improving, them	3
drive causes of credit notes through root-cause-analysis and continuous improvement	2
ensure simpler processes for better control and continuous improvement	2
identify big value leakage areas and implement specific project, e.g. DMAIC, to drive waste reduction	2
work collaboratively with suppliers to take advantage of cost and stock reduction opportunities	2
address simple problems continously through root-cause-analysis and continous improvement methodologies	1
benchmark across various operations to identify opportunities and do continous improvement	1
have IT/ERP reporting tool that drive performance visibility to drive continuous improvement	1
lean value stream analysis to optimise materials handling - reduce distance and time	1
standardise process and then implemement continuous improvement to drive efficiency	1

Below are some of the thoughts regarding continuous improvement that were picked up. All the respondents commented on continuous improvement.

> Respondent_02: *"we are looking for continuous improvement savings, we look at logistic savings, we look at procurement savings."*

> Respondent_03: *"The idea at the end of the day is to increase our service while decreasing our costs that is the whole basis of continuous improvement. So increase your efficiencies while decreasing the costs of the supply chain. Effectively with all these projects there is a very clear KPI that either talk to costs, and when I say costs it is the cost of the service we are offering and ultimately what the consumer pays for; and then increasing service if I am implementing these continuous improvements programmes how does that link to improve customer service."*

Respondent_03: *"In the distribution space we have embarked on number of continuous improvement projects, this talks to lane optimisation transport route optimisation; for warehousing within warehouses we have a number of projects that we run over the last year to decrease travelling time in the warehouse and ensure the fastest route for picking stock for outbound. We continue to challenge ourselves."*

Respondent_04: *"Every single day if you are focussing on getting rid of the waste, of the wasteful processes and practices that cause costs and you are looking at those costs all the time, for me that is close enough."*

Respondent_05: *"We say the CEP itself is about the environment of the workers and operators, to basically solve problems on the lines. Back in the day we had area where we can plan but operators were not allowed to say anything on that because they were not necessary empowered to actually solve any problem on the line. The Continuous Excellence Programme (CEP) journey has helped to ensure that the employees, the operators who work on the shifts on a daily basis are really empowered to make changes and suggestions of possible improvements to actually improve the output on the different machinery that we have in the different plants."*

Respondent_06: *"to drive continuous improvement we engage people on the shop floor to come up with improvement initiatives as to how we could better manage in this situation that we find ourselves in right now through targets alignment, through lean, through total productive maintenance (TPM), through six sigma and its derivatives and the implementation of Customer Collaboration Department within these markets. All of that has helped us to improve over the past five years."*

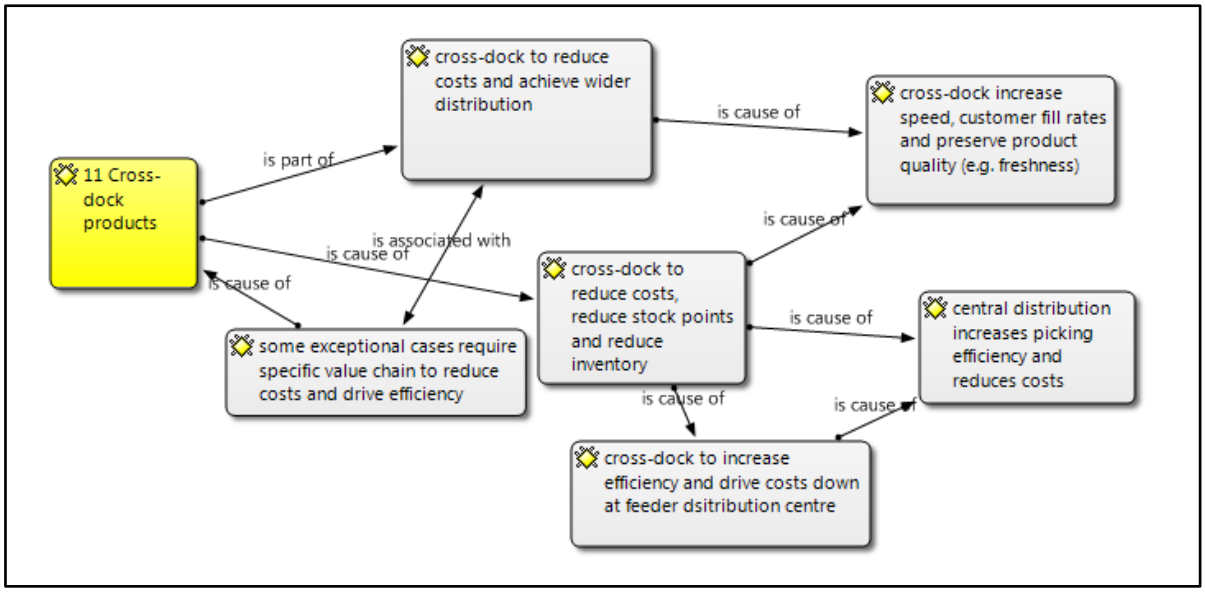
Respondent_07: *"we continue looking at improvements so it is always a work in progress at every distribution centre on a daily basis. There is obviously multiple reporting platforms that are in place one of them is share point Office365, we use that where the distribution centres can compare themselves at any point in time with any of our productivity standards right across the group, so those are looked over all the time."*

Respondent_08: *"I think we are constantly working on initiatives to remove costs out, to take stock out. We do not label it as a lean supply chain but I have got a supply chain optimisation team, which is a collection of industrial engineers who focus on that exact thing but we do not call it lean initiatives specifically."*

5.3.2.4 Cross-Dock Products

Only one respondent, Respondent_04, referred to having implemented cross-docking. Figure 13 below illustrated the concepts that were drawn out of cross-docking theme and their interactions to drive effectiveness and efficiency of a supply chain.

Figure 13. Cross-docking products themes



In the quotations below the supply chain director describes how cross docking has helped to achieve better and wider service while reducing costs and inventory levels. This is done by reducing the need to have bigger storage facilities and also eliminating the need to store products for an extended period, which result in shorter lead times and better and more effective service.

> *Respondent_04: "The cross-docking does a couple of things; firstly it avoids costs so you do not need a very big infrastructure, remember we are dealing with a cold chain so it means that we do not just have ambient warehouses we have fridges so our warehouses are quite expensive to run. By having cross-dock facility you achieve two things; you reduce your costs in terms of physical locations and what you do is you allow possibly deeper market penetration."*

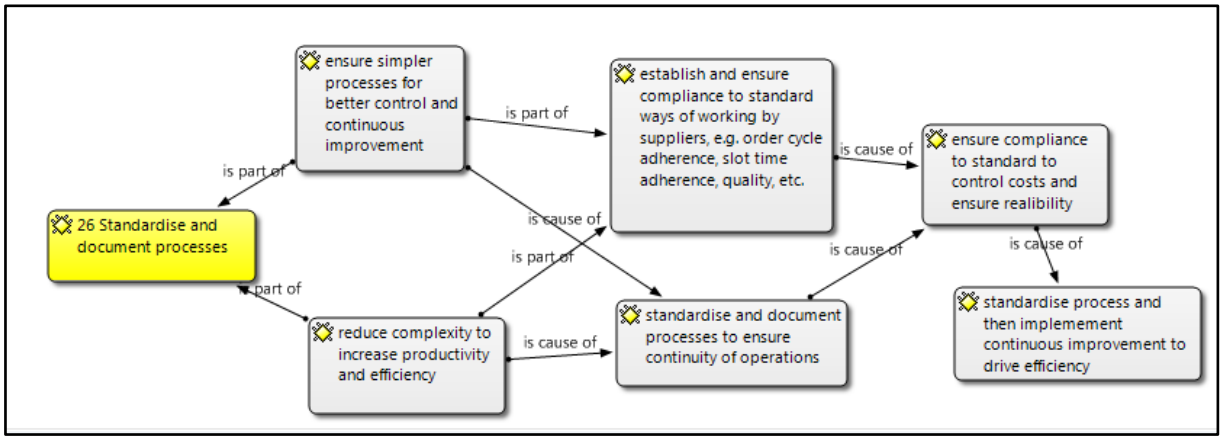
> *Respondent_04: "Maybe each one of our cross-dock depots was a stocking point, what it means is obviously we need the facility there and it costs more whereas cross-docking is very simple we do not have to manage the inventory there, it just comes in and it goes out. We also can have better inventory management because you only have stock now in four main depots instead of having inventory in twelve different locations. In terms of being*

more cost effective it is not only running it but you can improve your inventory management and your inventory optimisation for wanting a better word."

5.3.2.5 Standardise and Document Processes

Standardising and documenting processes is one of the key initiatives that was found to drive both higher effectiveness and efficiency. By standardising and documenting possibility of errors in executing processes is reduced while continuity and reliability of service are enhanced. Also it was highlighted that with standardised processes it was easier to drive continuous improvement to drive higher efficiencies, see Figure 14 below for illustration.

Figure 14. Standardise and document processes themes within supply chain



Respondent_01, an FMCG supply chain manager highlights how the standardisation of frozen food processes by one retailer has enhanced the efficiency of moving products through their value chain.

Respondent_01: *"The reason why it has not worked for RetailerA, it is that RetailerA has tried to do two frozen temperatures. You get ambient, you get chilled and you get frozen. That is how RetailerX runs it. Everything frozen at RetailerX is minus twenty or colder; they do not get minus thirteen, minus twelve, minus eleven. All their frozen products are consolidated, they will not accept product that is not minus twenty eight into their cold room. They have the chilled which is your dairy; between zero, two and five; and then your ambient. They have been very strict so as to say, "You cannot deliver stuff that is not minus twenty". They have cut out this dual frozen complication."*

Respondent_04 highlighted the importance of having standardised and documented processes to ensure continuity of operations even when people leave organisations.

Respondent_04: *"but then again when you lose people then you are not good at anything anymore so how do you make up for that for the people loss? So you have to have very strong processes in place and well documented SOPs (standard operating procedures) that becomes another problem, that if you do not have well documented SOPs then you have to learn from scratch again. Then again you drop balls and product availability is an issue."*

Respondent_08 and Respondent_05 highlighted the importance the benefit of having standardised and documented processes in that when things do go wrong or performance degenerate, it is easier to identify and rectify what had gone wrong.

Respondent_08: *"However when it comes to supply chain orientated activities and driving efficiencies within the business an element of centralisation is required and a focus around best practice is absolutely necessary. We cannot afford to have varying different ways of picking product in a store or varying different ways of receiving a distribution centre delivery."*

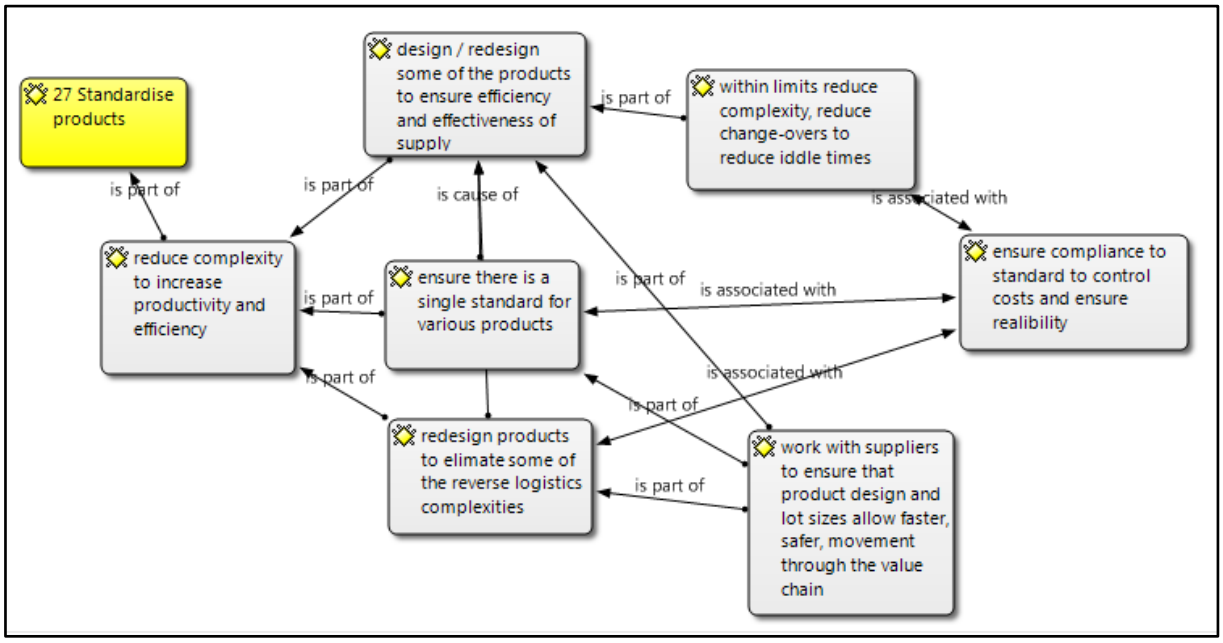
Respondent_05: *"What we then did is a Simple Improvement project (SI) to try and identify what are the root causes. Within the SI itself it asks you the question of whether there is a standard. So we did find that the standard did exist and the next question the SI asks is whether the standard is being followed which we found out that the standard in that case was not being followed. The guys will have a purchase order or a stock-transfer order to move the product from the factory to the distribution centre but what will normally happen is that they will be picking and without staging they would load them. The risk with that is that if you avoid the staging process or step you will end up with a lot of problems when you are loading because sometimes you do not find the product that you are looking for in the warehouse, which in itself will basically delay the whole loading process. Basically in a nutshell the standard is really the best practice within the different processes within the organisation, it is really just about going back into it; what is the best practice in executing this activity and then try and execute the activity in line with the standard that has been defined."*

5.3.2.6 Standardise Products

It was highlighted in the feedback that standardising products reduces complexity of manufacturing and supply chain processes, thereby further enhancing standardisation of

processes to drive higher effectiveness and efficiencies. By standardising products, manufacturing change-overs are reduced and therefore machines have higher productivity, procurement is enhanced as suppliers supply less varying materials and therefore can achieve higher economies of scale resulting in overall lower supply chain costs. Figure 15 below illustrate the sub-themes regarding standardisation of products and how this lead to higher efficiencies and effectiveness.

Figure 15. Standardising products relationships within supply chain



Some of the insights from FMCGs supply chain managers are captured below to illustrate the point.

> Respondent_01: *"There are less change-overs as there is less flavours. You reduce the complexity of your mixing. You reduce the complexity of your change-overs between flavour changes on the line and you have longer runs."*

> Respondent_03: *"The biggest challenges we have faced has been around the inconsistent materials supplied, we faced challenges in those areas over the last two to three years. Therefore we had to consolidate; we have had to change formulation,"*

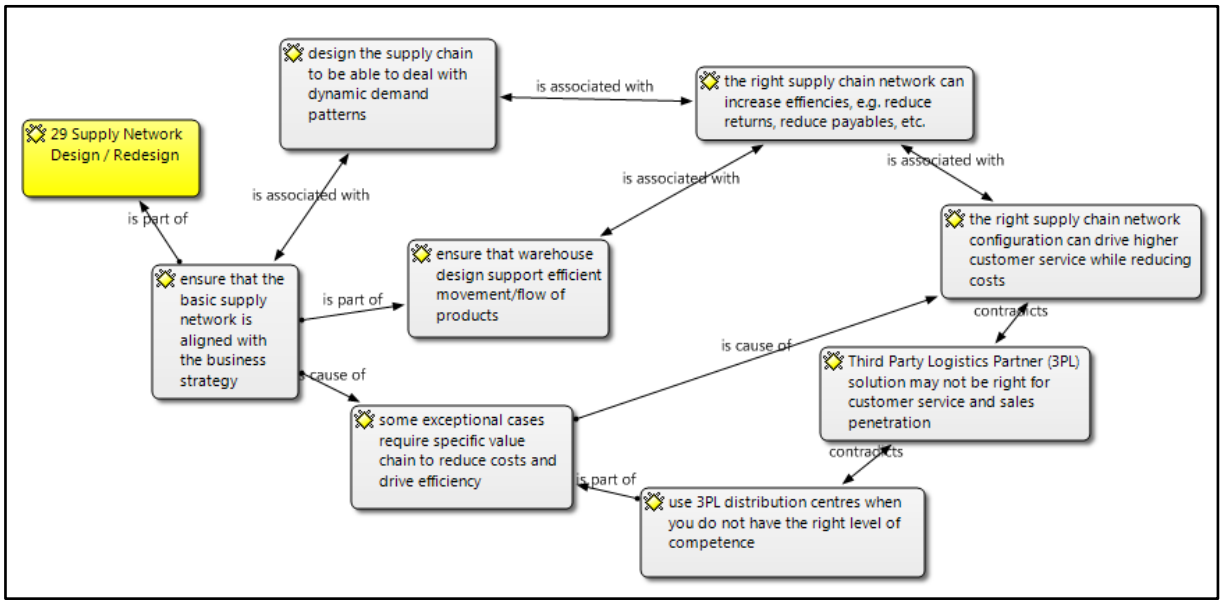
Standardisation of products is quite important for food retailers as well as highlighted by Respondent_07 below, in that with standardised products there is less errors and there is more efficient movement of products.

Respondent_07: *"Some of the things that we do is that we engage collaboratively with suppliers and our buyers, we measure a number of exception reporting across various suppliers just to make sure that our guys are buying in configurations that supports movement through a distribution centre"*

5.3.2.7 Supply Network Design / Redesign

One of the key insights derived from the respondents is that the inherent nature of the supply network design (value chain design) can promote or inhibit supply chain effectiveness and efficiency. For that reason a number of supply chain manager have had to redesign their supply chain networks. Figure 16 below shows the sub-themes that drive the need for supply network redesign, and how a good design enhances supply chain performance and a bad design can do the opposite.

Figure 16. Supply network design/redesigning themes within supply chain



Below is some of the respondents' experiences regarding the need to review/redesign supply chain network.

Respondent_01: *"In term of true van-selling the reason we implemented, we felt there are a couple of things it could address. Firstly it is more cost effective; you only have one vehicle going out. The second element is around the service level, so you have got that team that goes and you get instant gratification of the customer."*

Respondent_06: "*in some of our factories we do warehousing capacity whereby we are able to store limited amounts of stock at our factories for us to be able to distribute from our factories straight to our customers but it is a selected few customers that we do that with, it is not all the customers. This was something that was built as we saw that as the distribution network changing and we now had to have capacity to do distribution from our factories.*"

Respondent_07: *"So we carry a select number of SKUs in the satellite distribution centre or a number of our key suppliers deliver directly into that satellite distribution centre. So one supplier who is based close to Limpopo province; for example, might deliver directly into Polokwane as opposed to delivering to one of the distribution centre in Gauteng area, and thereafter Polokwane deliver to the immediate stores within the vicinity of Polokwane. So it will be better to deliver directly into the satellite distribution centre instead of delivery to the main distribution in Gauteng then thereafter go all the way back to Polokwane"*

Respondent_08: *"One of our initiatives that we have embarked on is looking at our inland supply chain and what we have done is identified the number of slow moving items which is quite extensive so it represents over fifty percent of the actual SKUs but only about six percent of the volume and what we are doing is we are going to consolidate those within one of our distribution centres. If you look our Gauteng facility it is in the process of becoming one of our Inland Consolidated Centre (ICC) where we will consolidate those SKUs from selected suppliers and it is mainly our biggest FMCG suppliers"*

Respondent_04 highlighted the need to keep focus on the initial goals while doing supply chain design. In this case in their design they had gone for a model that included a 4PL who subcontracted a number of 3PLs however the 4PL was not able to drive the necessary economies of scale to drive costs down.

Respondent_04: *"I do not know, but I think the idea was to provide a good service at a good cost and the costs are just too much. I think the costs that we are seeing are more than what we have originally planned for. So the idea was to deliver a good service at some realistic cost, but I think the reality was a bit different for us. The evolution of costs has been higher looking after it ourselves; it is a much more expensive model because of that we have a massive focus on productivity and performance management and we are working a lot with 4PLz to understand the costs and to drive productivity."*

5.3.2.8 Visibility of the Value Chain

Visibility of the value chain was found to be one of the most critical drivers of better performance in supply chain. Some of the sub-themes that were uncovered regarding visibility are illustrated in Table 7 below. Visibility include visibility of supply chain stock levels, costs, internal performance measures and performance measures of supply chain partners.

Table 7. Visibility of the Value Chain Themes

Visibility of the Value Chain Themes	Number of Occurances
look at costs end-to-end, not just in silos	7
increase frequency of demand and supply planning reviews	6
have a supply chain ERP system that helps with managing basic things	5
ensure that there is visibility and monitoring of stocks and other processes across the supply chain	5
monitor performance and give feedback, to various functions, periodically to drive continuous improvement	4
have a basic understanding and visibility of cost drivers so as to start managing, and improving, them	3
integrate the value chain, remove silo-mentality	3
embed a culture of continuous improvement and be persistent	3
it is important to get a good handle on the demand plan	3
ensure sufficient monitoring, gap anaysis and action planning of demand plans and sales perfomance	2
identify big value leakage areas and implement specific project, e.g. DMAIC, to drive waste reduction	2
increase visibility of costs across the value chain to make better optimisation decisions	2
ensure service level agreements (SLA's) are in place, and that performance is monitored, shared and reviewed with supply chain partners	2
benchmark across various operations to identify opportunities and do continous improvement	1
establish and ensure compliance to standard ways of working	1
ensure that there is a balanced score card (BSC) to drive perfomance and continuous improvement	1
have IT/ERP reporting tool that drive performance visibility to drive continuous improvement	1
monitor usage of vehicles to ensure high utilisation to reduce costs	1

Respondent_01 highlighted the need to have visibility of performance across the value chain so as to reduce silo decision-making and sub-optimisation of the value chain.

> Respondent_01*: "That was their thinking, and it worked purely from a silo factory point of view. But the implications for the supply chain overall was that we had to build excessive amounts of stock to cover for big productions. What we have identified is that if we can increase the flexibility of the factory and run it an extra day or two days, to change our production from four days, to five or even six days a week, in October, November and early December, we could reduce our outside storage substantially, so we implemented that."*

Respondent_02 highlighted the need to have visibility of a diverse number of measures.

> Respondent_02: *"Probably I would say we measure all the typical balanced scorecard and*

supply chain measures; non-conformances in quality therefore from suppliers, non-conformance from our factories to our customers. Those are the kinds of things we measure and obviously through HR as well we do take a big stick to get to measure the mood and the culture of what is going on in the business."

Respondent_ 03 and Respondent_08 highlighted the need to have visibility and understanding of costs of the entire value chain.

Respondent_03*: "Let me just clarify; the costs of the product, the costs of good sales or the costs of the product distribution costs, and so long as we are able to manage or contain distribution costs it means that the category does not necessarily expect price increases to cover their costs that year or to cover their margin aspiration in the business. That is why managing your supply chain costs, controllable costs is an important factor and obviously what the business finally decides what goes onto the deal they set to make with the customers."*

Respondent_08: *"Yes they do, absolutely. They are not necessarily conflicts certainly where we would not want to add costs into the supply chain. Principle number one is to take costs out, if that is your opening principle then you are automatically on the same page as your vendor, so there is no sensitivities there."*

Visibility of suppliers' operations was seen to be important is as so far as it impacts on the availability of raw and packaging materials as highlighted by Respondent_04.

Respondent_04*: "We have put more micro-management processes in place for example to monitor their production processes, monitor their stock levels et cetera so that is done and dusted."*

Respondent_07 highlighted the benefit of having visibility and sharing of performance measures for benchmarking and continuous improvement purposes.

Respondent_07: *"There is obviously multiple reporting platforms that are in place one of them is share point Office365, we use that where the distribution centres can compare themselves at any point in time with any of our productivity standards right across the group, so those are looked over all the time.*

5.3.3 Initiatives That Primarily Drive Agility

This section presents the results of the initiatives that were uncovered that are primarily agile initiatives in their nature. Table 8 below shows the results and how often each initiative was mentioned. Four agile initiatives were uncovered, and all four were found to drive both increased effectiveness as well as increased efficiency.

Table 8. Results of Research Proposition One – Initiatives That Primarily Drive Agility

Initiative	Type of Initiative	01 Increase effectiveness	02 Increase efficiency
3PL/4PL	Agile Initiative	2	7
Contingency / Dual Suppliers	Agile Initiative	7	1
Flexibility	Agile Initiative	8	9
Invest in Capacity / Technology	Agile Initiative	5	1
Explore Alternative Suppliers	Agile Initiative	1	2

The next sub-sections look at the detail sub-themes with the identified initiatives above and how they interact to create both higher efficiency and effectiveness.

5.3.3.1 Third-Party Logistics Partner (3PL) or Fourth Party Logistics Partner (4PL)

The usage of third-party logistics partner (3PL) or fourth party logistics partner (4PL) has been highlighted to hold potential to drive both supply chain effectiveness and efficiency. Effectiveness is driven by being able to find a 3PL/4PL who is able to offer a service or capacity that one does not have, and efficiency can be attained by having a 3PL/4PL who is able to drive economies of scales to drive costs down.

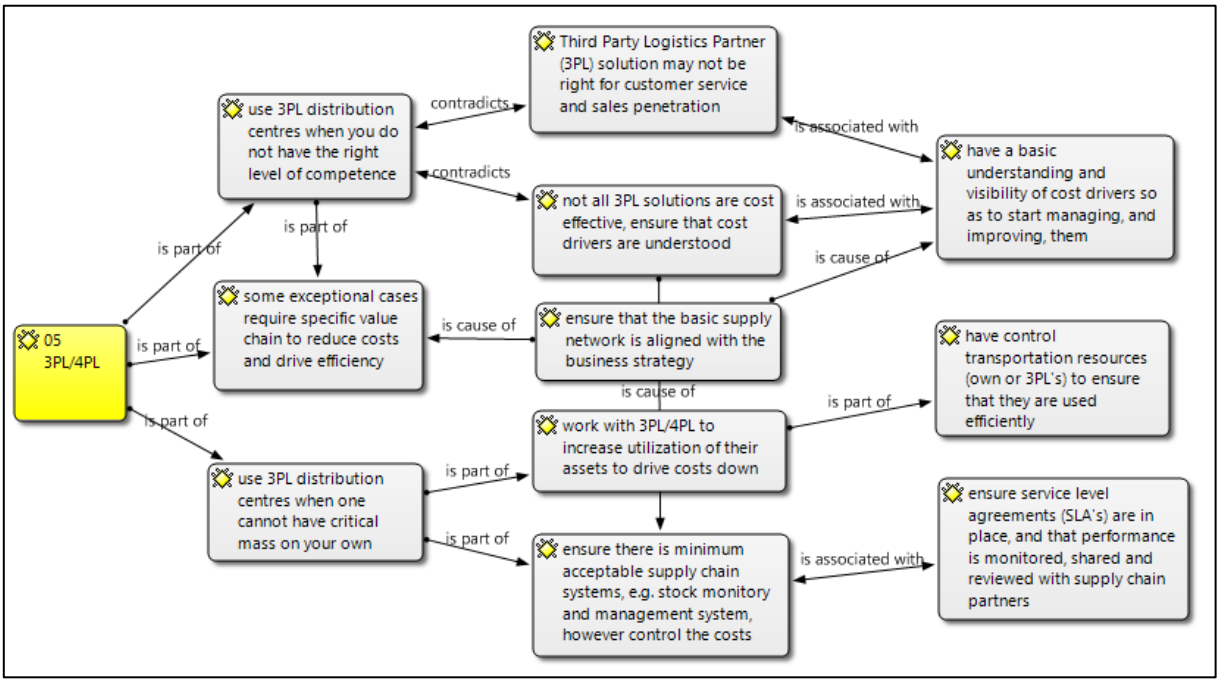
Below are some of the insights from supply chain managers regarding the potential and impact of 3PLs and 4PLs in supply chain.

> Respondent_01: *"Or you could go to a big company; you could go to the 3PLx or 3PLy, all those kind of guys. They will probably be better at the elements of pure stock control, but it also comes at a cost. Supply chain in this country is exorbitantly expensive. The big providers are actually in my view making obscene profits."*

> Respondent_02: *"The balance goes through third party logistics service provider who then leverages with other multi-principals to reduce costs and improves services into customers."*

Figure 4 below illustrate how 3PLs/4PLs can drive effectiveness and efficiencies.

Figure 17. 3PL/4PL themes within supply chain



Some of the FMCGs, as indicated by Respondent_03 below, have found that they gain better control of operations and costs from switching from a 4PL to a 3PL, which gives them more say in what happen in the 3PLs they have contracted.

> *Respondent_03: "With regard to third party transportation we do not manage our own vehicles, so we still have managed third party transportation. What we have decided to do is to in-house the management of that so we can no longer have 4PL model where we have another company managing these hauliers we effectively have decided to bring in-house the management of these hauliers. The reason we have done that is to have a bit of control, to manage costs, to manage the efficiencies, et cetera, with respect to hauliers."*

It was also highlighted that one can use 3PL for supply chain services when one does not have capability internally as mentioned by Respondent_03 below.

> *Respondent_03: "So the cold chain is very key within the chilled distribution and this is probably the other reason why we use a third party because they have got the experience in maintaining the cold chain and that is not an element we can manage on the ambient side"*

A side-note was also made by Respondent_07 to highlight that it is important to be clear not to outsource a competence that one does best as it creates competitive advantage, and outsourcing that can disadvantage the company.

> Respondent_07: *"We make sure that teams that are managing that transport network are working at optimum level and generally they do; I think they have done quite a good job. We all manage our own fleet internally so it is something that is quite special for us and we keep harnessing those costs and manage it as best as possible."*

5.3.3.2 Contingency / Dual Suppliers

Only two respondents alluded to having contingency/dual supply for some of their materials, product or services; that is Respondent_02 and Respondent_04. Dual and contingency suppliers are used to mitigate against expected and unexpected interruption of supply of key services and materials. Materials are either finished goods or raw and packaging materials. A key service that was highlighted is electricity supply whereby due to constrained electricity supply from the national supplier a number of organisations have resorted to contingent self-generation of electricity through the use of diesel generators. This is a widespread negative impact however this phenomena was only mentioned by one supply chain manager to having impacted the performance of supply chain.

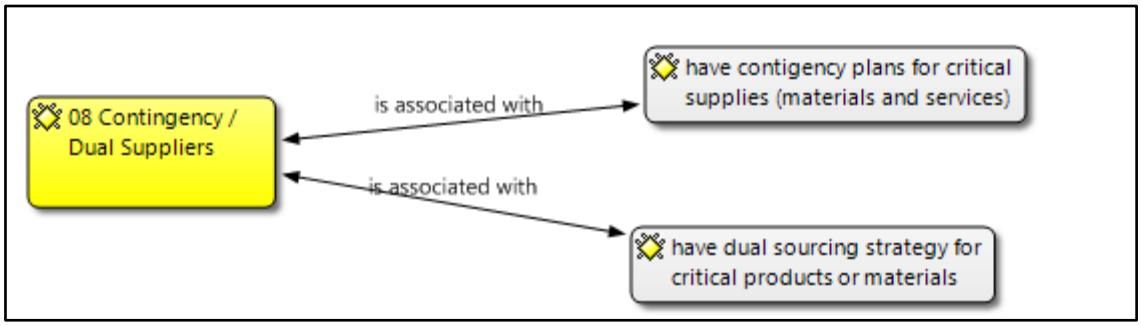
> Respondent_02: *"The other challenge has been the supply and availability of electricity; we have had to put in several contingency plans in place to mitigate that impact."*

> Respondent_02: *"So our consideration is been to have back-up supplies for certain fruits and vegetables of finished goods in other parts of the world. So we do have a dual strategy to cover us for that and we have had to activate it from time to time because you have to provide them with some volume to keep those suppliers interested. You cannot rock up when you have got problems and it takes eight weeks from the time you activate and the products land in Durban. So you need to have an on-going supply chain, so that all you do is ramp up volume and your responsiveness can be effective."*

> Respondent_04: *"One of the other strategies that we had is that we have gone to outsource production, so we would go to another producer to say can you make some additional product for us? That also works well and we use that quite often. That is kind of the easiest and the quickest because it is very difficult to control the customer."*

Figure 8 below illustrate the sub-themes regarding how contingency/dual suppliers are used by the two organisations, both being FMCGs.

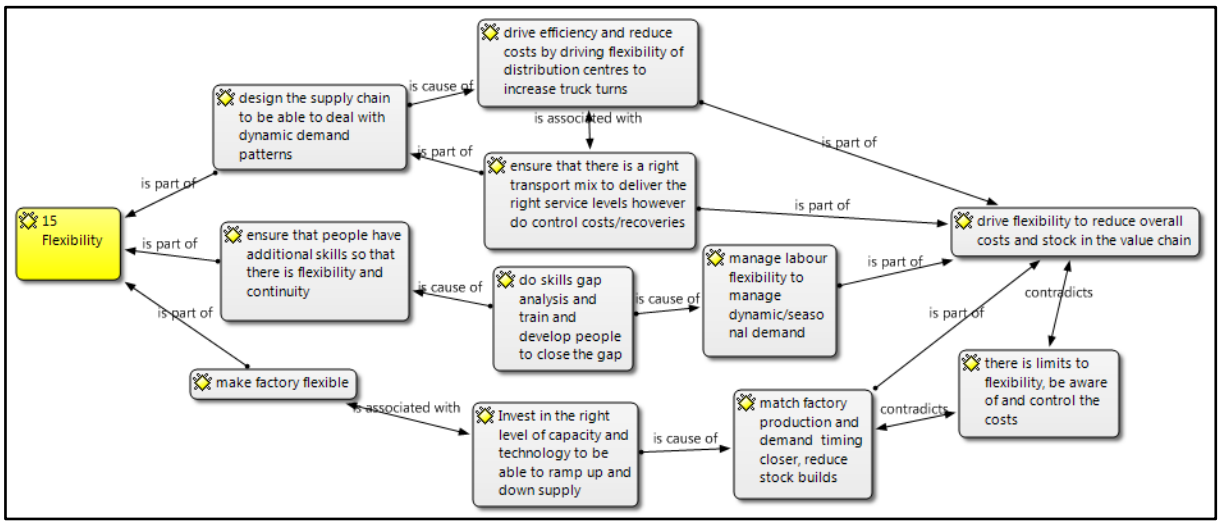
Figure 18. Contingency / dual suppliers themes within supply chain



5.3.3.3 Flexibility

Flexibility of the supply chain was also highlighted as one of the key themes that drive supply chain responsiveness and effectiveness. Flexibility is required to be able to deal with unexpected changes in demand, seasonal demand and unexpected interruption of supply. Figure 19 below illustrated how flexibility drives effectiveness to meeting dynamic demand of customers. Also it noted that although flexibility is primarily an agile initiative, having flexibility in the system as able to drive costs down as the supply chain is better able to deal with changes.

Figure 19. Flexibility of supply chain themes



Respondent_02 highlighted the need to have flexibility in the value chain due to dynamic demand patterns in the economy.

Respondent_02: *"Secondly is that with the economy being where it is the buying pattern of the consumers has changed. It is not as predictable as it used to be and therefore customers are keeping less stock in their distribution centres and in the back of the stores and therefore when the demand climbs unexpectedly you need to be responsive to that as well."*

Respondent_01 highlighted the need to have flexibility in the value chain due to seasonal demand patterns of their products, in that factory production should be flexible to produce small lot sizes during low demand months.

Respondent_01: *"One of the areas that we've identified was factory inflexibility. The factory's opinion is that for them to be most efficient, they had to run four days a week, twenty hours a day, compressed work shifts, and then it had to shut down. So they reduced the number of wash out and clean out and sterilizations and made better utilization of labour. That was their thinking, and it worked purely from a silo factory point of view. But the implications for the supply chain overall was that we had to build excessive amounts of stock to cover for big productions."*

Respondent_04 highlighted the need to have flexibility of usage of some of the input materials, in that one finished products cannot be made or is no longer required the materials can be used elsewhere. This further highlight the need to standardise products as covered in 5.3.2.6 above.

Respondent_04: *"We have a little more flexibility as to what we could do with the semi-finished material. In the old days with CompanyB we had some rigid constraints for example we had to sell the semi-finished material to them at a very low price and that was part of the deal."*

The need for FMCGs' factories flexibility regarding being able to work throughout the year, including December, was highlighted by Respondent_07, as the lack of flexibility in that regard has an impact of stock availability in the retailers.

Respondent_07: *"The delay start-up times after plant closure at the end of December and sometimes has a knock-on effect on us in terms of January and February. so that slow start-up impact in filling the pipe once you get plants up and running again, sometimes it becomes a bit of a challenge and we have seen it in terms of order fills come January and February and it only hits us around February and they are all factors that would contribute to our on-costs."*

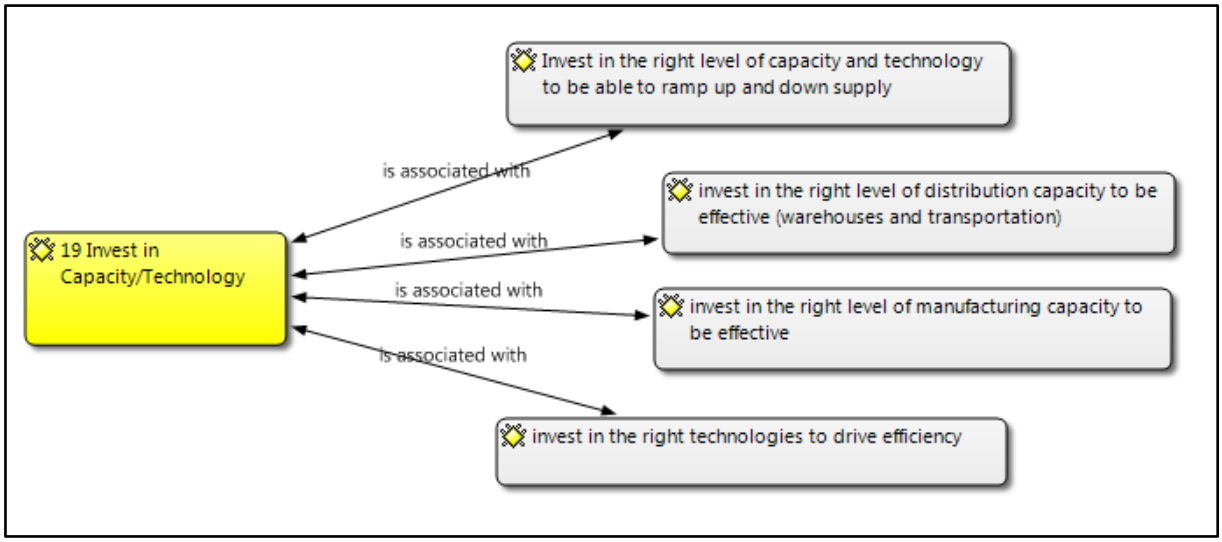
Furthermore one of the retailers' managers highlighted that even at the stores level there is still an opportunity to drive higher service levels by having more flexible operating hours to be able to move stock around the clock.

> Respondent_08: *"There equally is not an awareness or consciousness around some of the inefficiencies that are caused by our own behaviour. A good example of that is truck turns; quite simply our stores operate their receiving areas between seven and three pm, at best we could get two trucks in during that period, but we know that we could save a significant amount of money if we could deliver to the stores twenty four seven as an example."*

5.3.3.4 Invest in Capacity/Technology

Capital expenditure (capex) to expand capacity and also in right technologies is required in some instances to drive effectiveness. It was highlighted that at times due to increasing demand existing capacity may not be sufficient to meet demand and also deal with unexpected demand spikes, and in those cases new capacity is required. During the investment decision making stage it is critical to invest in capacity and technology that can support both higher effectiveness (increase processing time and speed of movement) and higher efficiencies (technology that drive higher utilisation). Figure 20 below highlight the sub-themes regarding investing in the right capacity and right technology.

Figure 20. Capacity and technology investment themes within supply chain



Below are some of the insights from practitioners regarding investing in capacity and technology.

Respondent_03: *"In the manufacturing space on capacity perspective we have invested a lot of money in order to obviously build the capacity to the manufacturing unit so that we could supply to the market demands, so over the last three years you would have seen a lot of investment to combat the impact of insufficient manufacturing capacity."*

Respondent_03: *"Then similarly in the warehousing space as well, we have bought more warehouses, et cetera, that is also once again to provide us with the capacity required to deal with the challenges that come with increased volumes of the peak season; additional transportation to assist us to getting the volume through to customers as well."*

Respondent_04: *"Capacity constraints could be because we do not have enough raw or packaging materials, so we have a supplier issue and it does not allow us to produce enough or we do not have sufficient capacity to make enough products on the machine itself. What we do is we have spent quite a lot of money on capital expenditure (capex) to extend capacity on the factory that is a fairly normal strategy. We have extended capacity in the factory."*

5.3.3.5 Explore Alternative Suppliers

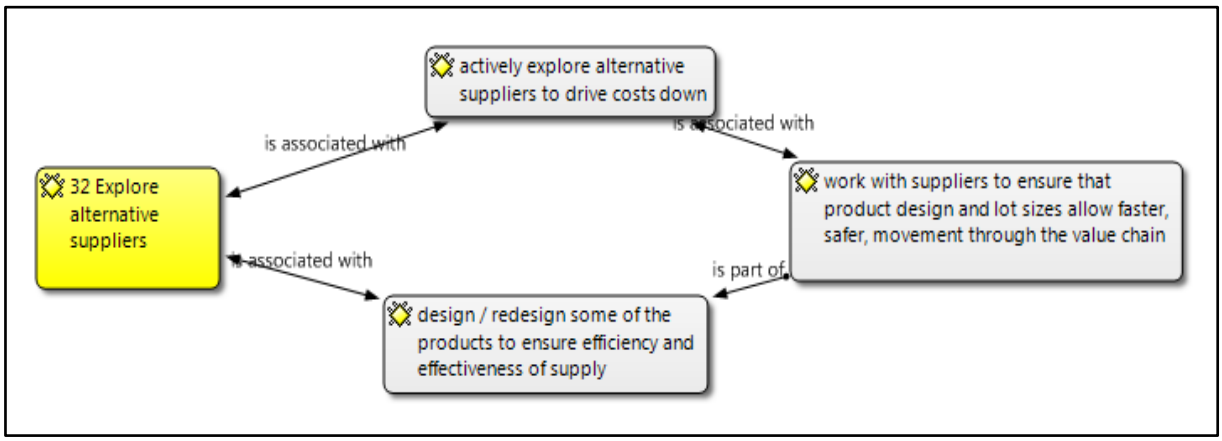
In some instances it was highlighted that it was possible to drive better effectiveness by engaging with alternative suppliers who can give better service and reliability, as highlighted by Respondent_02 and Respondent_03 below.

Respondent_02: *"And the other thing is to put out a request for proposals and let service providers bid and negotiate a much lower price than you have; an old request for proposal (RFP) approach helps as well."*

Respondent_03: *"The biggest challenges we have faced has been around the inconsistent materials supplied, we faced challenges in those areas over the last two to three years. Therefore we had to consolidate; we have had to change formulation, we have had to bring on new suppliers to assist us."*

Figure 21 below highlights how exploring alternative suppliers can lead to better supply chain effectiveness and reliability while reducing costs.

Figure 21. Alternative suppliers imperatives in supply chain



5.3.4 Initiatives That Primarily Drive Lean

This section presents the results of the initiatives that were uncovered that are primarily lean initiatives in their nature. Table 9 below shows the results and how often each initiative was mentioned. Five lean initiatives were uncovered, all five were found to drive increased efficiency however just four of the five were found to drive increased effectiveness. Increasing transport utilisation was found not to increase supply chain effectiveness.

Table 9. Results of Research Proposition One – Initiatives that Primarily Drive Lean

Initiative	Type of Initiative	01 Increase effectiveness	02 Increase efficiency
Direct Deliveries	Lean Initiative	3	5
Increase Transport Utilisation	Lean Initiative	0	19
Value Stream Mapping (VSM)	Lean Initiative	5	8
SKUs Reduction	Lean Initiative	3	5
Total Productive Maintenance (TPM)	Lean Initiative	6	7

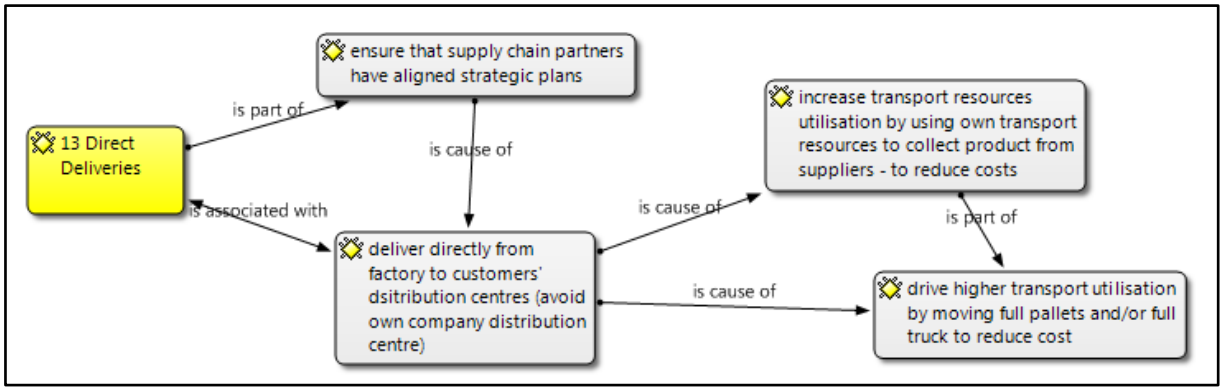
The next sub-sections look at the detail sub-themes with the identified initiatives above and how they interact to create both higher efficiency and effectiveness.

5.3.4.1 Direct Deliveries

Traditionally in a food FMCG will have a factory and a distribution centre and finished products will move from the factory to the distribution centre and after storage thereafter move from the FMCGs' distribution centre to the retailer's distribution centre or store. With direct distribution, products move from the FMCG's factory directly to the retailer's distribution centre, bypassing the FMCG's distribution centre. This reduces materials handling instances, reduces inventory levels, increases transport utilisation leading to shorter

lead-times (higher effectiveness) and lower costs (higher efficiency), as illustrated in Figure 22 below. It should be noted that to fully execute this it requires alignment with supply chain partners, in this case FMCGs and retailers.

Figure 22. Direct deliveries dynamics in supply chain



Below are some of the insights from the supply chain practitioners.

Respondent_02: *"Most of our products we can distribute directly from factories let us say between sixty and seventy percent can be full trucks, full loads full pallets, that can leave from our manufacturing unit into customer space, that we tend to do directly from our own factories ourselves."*

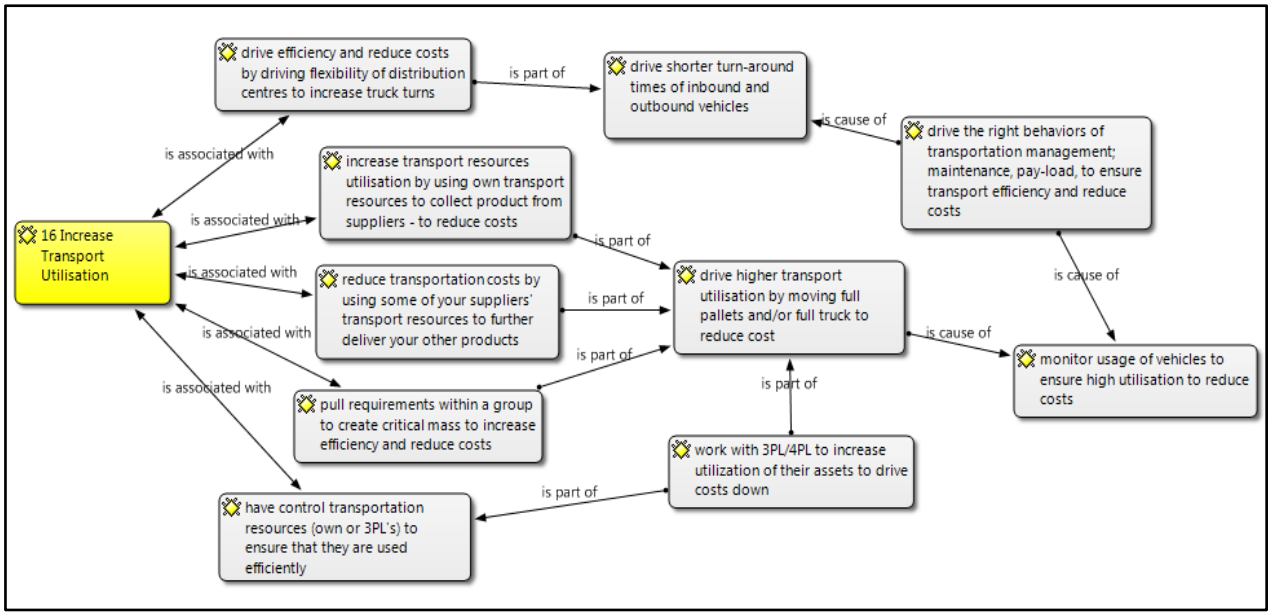
Respondent_05: *"One of the things that was identified in the last five years was the increase in distribution costs because whenever the customer orders, like your Retailer-X, you will have to deliver the product into each and every single store of Retailer-X. What happened lately, to try to reduce the distribution costs, is what we call directs; so instead of moving our product from our factories to the three distribution centres we have reduced our distribution costs by moving the products directly from the factory into the distribution centres of our customers."*

Respondent_05: *"And, also reduce the double-handling as well because if we move our products into our distribution centres and then from our distribution centres into our customers' distribution centre as well it increases the number of damages within the process and also a lot of costs. Us shipping directly to our customers we have seen significant improvements as far as our distribution costs are concerned"*

5.3.4.2 Increase Transport Utilisation

The attainment of higher transportation utilisation was highlighted as one of the key areas FMCGs and retailers have been driving to attain higher efficiencies. The dynamics of attaining higher transport utilisation to reduce costs are illustrated in Figure 23 below.

Figure 23. Higher transportation utilisation drivers in supply chain



Supply chain practitioners are looking for better ways to drive higher transportation by ensuring that they make full truck loads when delivering products, as noted from Respondent_02, Respondent_03 and Respondent_04 below.

> Respondent_02: *"In other areas is that it is just an on-going process of improving your full pallets, full trucks to fully optimise transport utilisation. Improving your turn around times because an idle truck costs you a lot of money, that is your inbound and outbound."*

> Respondent_03: *"An example of efficiency with the vehicle utilisation, so effectively ensuring that we increase our payload per trip on vehicles, and making sure you fill the truck to the right weight. The other efficiency of truck and drive is our right vehicle type, in other words you match your customer load to the right vehicle type. By doing that you decrease your costs of distribution or transport, you decrease your carbon emissions from the perspective of less trucks on the road for the volume that you are moving; those are the type of efficiencies that we drive with our transport being in-house"*

Respondent_04: *"So instead of taking a fleet of eighty trucks out if you could do that same with sixty trucks it means you have to turn around faster at the customer it means you have to have more drops on route so you have to be more efficient, your turnaround times with that customers have to be better."*

Respondent_07 raised the point that increasing transportation utilisation can go some way to off-setting some of the increased fuel costs.

Respondent_07: *"Just in terms of the ever increasing price if you have a look at how fuel was five years ago we were at sub-ten rands, it has been just trying to make sure that within something we have no control over, rather than we can manage the processes and we can best optimise what we have available to us, and really just making sure that our fleets are running at optimal efficiency level. And that is from driver to behaviour to planned maintenance to making sure we are running the right fleet of vehicles and that our vehicles are regularly serviced, all the good stuff is aligned just to making sure that those optimal transport processes and stuff that it supports that is where it should be, to make sure we, slightly if anything, try and manage to harness those on-costs that are coming up our way and have been coming over the last five years specifically related to fuel."*

Reducing dead-miles and costs of the suppliers by using the FMCGs' trucks to on-deliver stock for the retailer, increasing the utilisation of FMCGs transportation, was highlighted by Respondent_07 who is a retailer supply chain practitioner.

Respondent_07: *"What we have done slowly over time we have looked at some of the opportunities across suppliers and we have mapped out a number of those supplies and we have said hang on, you are running back here and you have passed a the company store on your way back and you could take a delivery for us and deliver on our behalf. When he is finished delivering at our company distribution centre he gets dedicated onto a bay depending on the vehicle type and it will need to be something that is conducive to loads. So we would have to very selectively select stores that are very compatible towards the type of vehicle that delivers into us. Then we would select that store, we would engage with that store as well as the third party holder or supplier and what we do is fill that back leg by asking the supplier or that third party in order to deliver on our behalf at an agreed rate. Generally because there would have not been any revenue supply for that transport or third party running home or the supplier in this case. We would then share on that saving initiative and that is what we refer to as one way trips."*

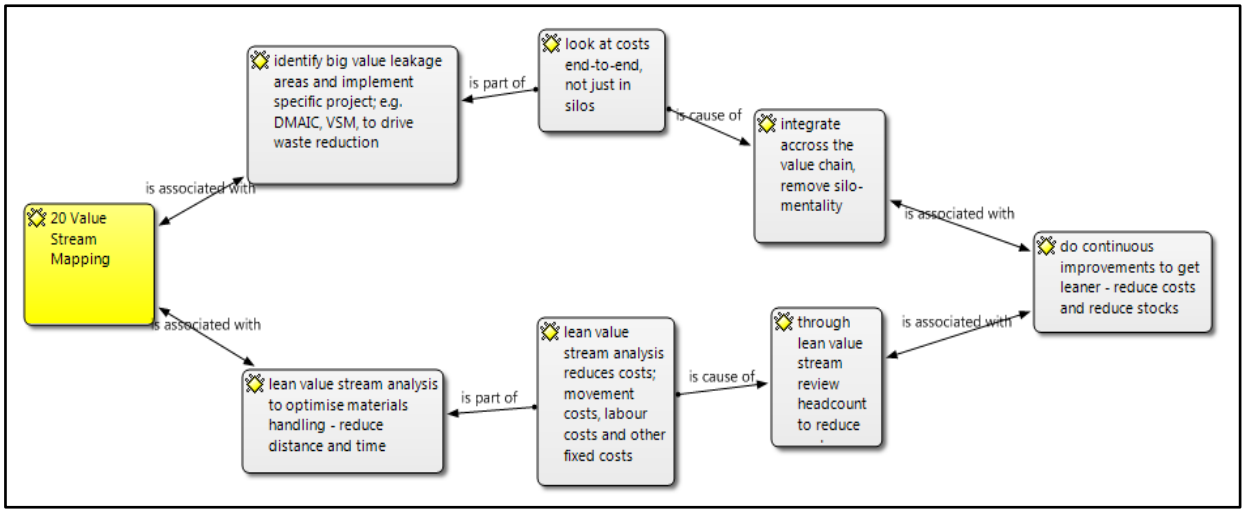
One retail supply chain manager, Respondent_08, highlighted the phenomena whereby they are increasing utilisation of their trucks by collecting products from the suppliers instead of the supplier delivering to the retailer, thereby saving costs.

> Respondent_08: *"We wanted to transport more of the vendor stock into our businesses than we do currently and we are still on that trend, I think that's one of the bigger opportunities that we are confronted with is the fact that within the subsidiary we have got a lot of fixed transport capacity which we can deploy a bit better particularly in the vendor transport space. We can go collect our own stock from vendors as opposed to vendors delivering them; they are kind of leveraging the market a little bit better.*"

5.3.4.3 Value Stream Mapping (VSM)

A number of practitioners alluded to the fact of having implemented value stream mapping (VSM) to identify and reduce areas of waste and also to streamline materials flows in the value chain. Figure 24 below illustrate how VSM is being used to drive higher efficiencies and reduce costs

Figure 24. Doing value stream mapping in supply chain



Respondent_01 highlights how VSM was used to drive factory flexibility and reduce stock levels while reducing costs of the value chain.

> Respondent_01: *"We undertook this lean value stream exercise, and what we have identified is that if we can increase the flexibility of the factory and run it an extra day or two days, to change our production from four days, to five or even six days a week, in*

October, November and early December, we could reduce our outside storage substantially, so we implemented that"

Respondent_01: *"I am one of the first people to drive cost reduction, head count reduction, things like that to run a lean business, but as I said the results speak for themselves in terms of that. But I'm very concerned we are on the edge of that at the moment, very close to that edge. I just do not want to go too far."*

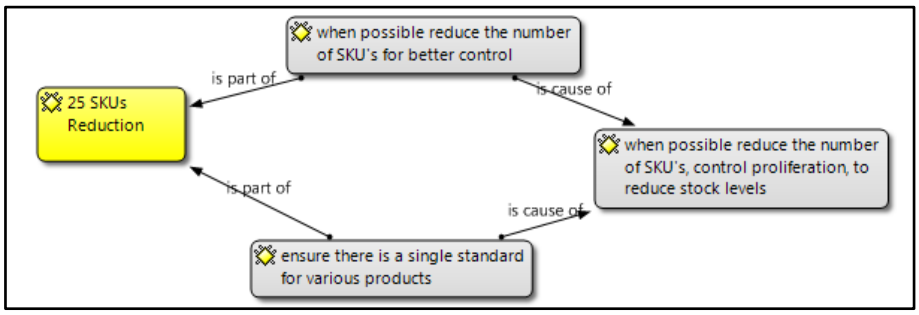
Respondent_03 highlights that VSM was used, to optimise and make faster materials movements in a warehouse (distribution centre).

Respondent_03: *"for warehousing within warehouses we have a number of projects that we run over the last year to decrease travelling time in the warehouse and ensure the fastest route for picking stock for outbound. We continue to challenge ourselves on how fast we can put stock away in the warehouse and how fast we can take it away from the warehouse within the time resource limits and there is a number of projects that can drive these types of efficiency in our distributions."*

5.3.4.4 SKUs reduction

In some instances supply chains are not able to attain better performance due to the complexity and the higher attention that is required to deal with extremely high number of stock keeping units (SKUs). One initiative that was found to having been implemented by some of the supply chain professional in South Africa is that of reduction of SKUs. SKUs that make little commercial contribution while creating too much complexity are eliminated to ensure that the value chain can be focused on delivery products of high commercial value while driving higher efficiencies through economies of scale. Also due to lower number of SKUs control measures are better implemented and monitored as focus is not divided amongst too many things – see Figure 25 below for illustration.

Figure 25. SKUs reduction to drive supply chain efficiency



Respondent_01, FMCG supply chain manager, and Respondent_08, retail supply chain manager, highlight below that both FMCGs and retailers can benefit from SKUs reduction.

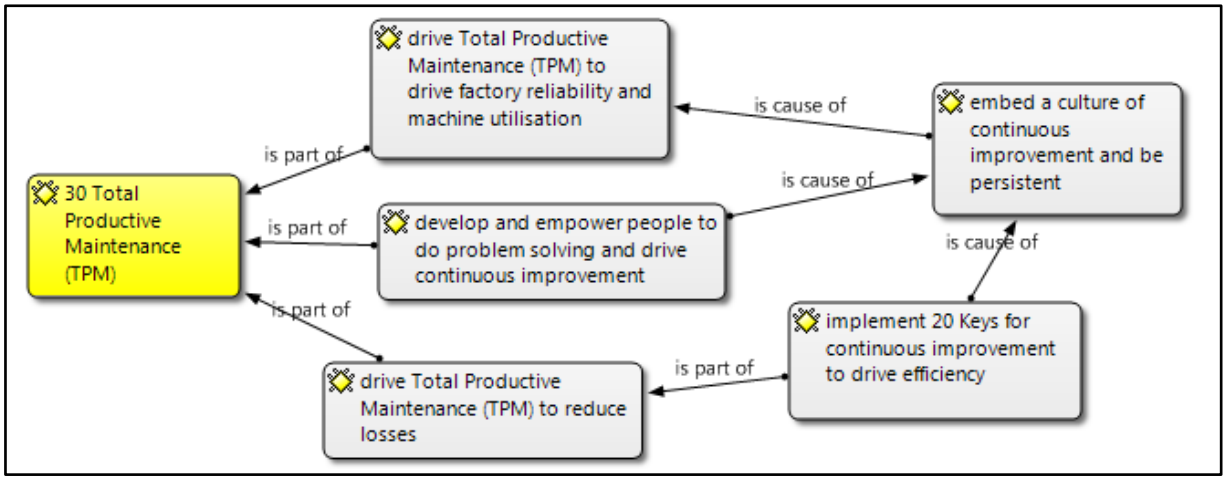
> Respondent_01: *"We have done a lot of SKU rationalisation over the last few years, we have probably led the pack. We have come down to more than two hundred SKUs to just seventy where we are sitting at the moment. I think the SKU portfolio we have driven it from supply chain point of view, we have cut the dogs if I could call it."*

> Respondent_08: *"Yes, we have about sixty odd thousand products at any given time listed in our business. So we have a lot of complexity in that space. We are also looking at ranging at the moment, the proliferation of range is something that we are trying to halt and address and that is kind of typical supply chain theme and those are the kind of key element. We are definitely stock heavy, and what we want to make sure of is that within our business model we recognise that stock is important, but stock is not important to every product."*

5.3.4.5 Total Productive Maintenance (TPM)

Section 5.3.3.4 examined the theme of investing in new capacity to drive effectiveness and possibly higher efficiency (not always the case). However within existing or newly installed capacity there arises a need to drive higher efficiencies, and number of FMCGs have done just that through implementation of total productive maintenance (TPM). As illustrated in Figure 26 below TPM is used to drive loss-reductions, ensure factory reliability and higher utilisations and further drive continuous improvement.

Figure 26. Driving supply chain performance through total productive maintenance (TPM)



Respondent_02 highlighted that TPM was used to drive losses down in many areas, not limited to manufacturing, and further highlight the benefits of TPM in manufacturing (also highlighted by Respondent_05).

> Respondent_02: *"TPM is the way we drive losses in the business and we consistently implement it across. It is the only way, there is no other way."*

> Respondent_02: *"Basically the reliability of our machines or our factory are really the root cause of us not being able to meet the plan. In many cases you find that because maintenance that has not been done you end up paying a heavy price because the machine will break down, then you do not necessarily be able to fix it now because you are not maintaining or doing a preventative maintenance on the equipment and then I think sometimes it is the issue of the standards."*

> Respondent_05: *"Within Total Preventative Maintenance (TPM), we are basically assisting the factories to identify the maintenance that need to be done on the different equipment on a regular basis to prevent failure of those machines. That is what has been done and if you look at the last year or so, there has been a lot of improvements in the assets intensity for a lot factories across the country so the trend is very much positive. "*

> Respondent_06: *"TPM is Total Productive Maintenance, it is about getting our factories to function in the most efficient and effective ways possible to maximise output. Through the implementation of TPM we have managed to increase our output in one of our most problematic factory whereby output could never reach what the demand was. Through TPM implementation we are now at the level whereby the output is exactly where it is supposed to be it is a very good thing."*

5.3.5 Additional Initiatives Build Lean and Agile Supply Chains

Over and above the specific lean and agile supply initiatives that have been in implemented by food FMCGs and retailers as illustrated in section 5.3.2, 5.3.3 and 5..3.4 above, there were other initiatives that were uncovered to having been instrumental to achieving higher supply chain effectiveness and efficiency. These initiatives could not be classified as traditional lean or agile initiatives and were left as general supply chain initiatives. The following general supply chain initiatives, illustrate in the table below, as shared by various supply chain professionals were uncovered.

Table 10. General Initiatives in Supply Chain

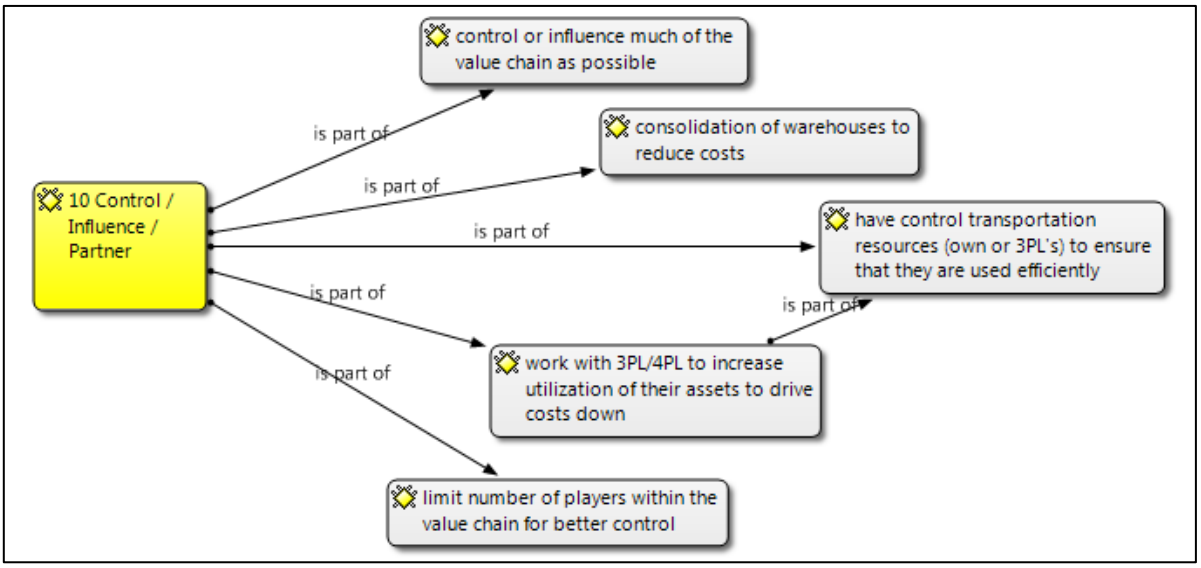
Initiative	Type of Initiative	01 Increase effectiveness	02 Increase efficiency
Control / Influence / Partner	General Initiative	4	11
Demand Planning	General Initiative	29	9
ERP System	General Initiative	11	3
Industrial Relations	General Initiative	1	0
Integrated Products Innovation Process	General Initiative	6	6
Safety and quality	General Initiative	5	1
Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP)	General Initiative	10	7
Service Level Agreements (SLAs)	General Initiative	10	0
Skills Gap Analysis and People Development	General Initiative	7	5
Strategy / Tactics Alignment (Internal and External)	General Initiative	18	16

The next sub-sections look at the detail sub-themes with the identified initiatives above and how they interact to create both higher efficiency and effectiveness.

5.3.5.1 Control / Influence / Partner

A number of the interviewed respondents highlighted the need to be able to have control of the extended value chain. This included being able to exercise control over 3PL/4PL, being able to control/influence distributors or strategically partnering with some of the supply chain players. Control also included the need to reduce number of supply chain nodes so as to be able to control fewer elements. Figure 27 below shows some of the themes that were derived from the insights given by the supply chain managers about how they have gone about increasing their influence and control of their value chains.

Figure 27. Need to have control of the value chain



Respondent_01 highlighted the need to control/influence the whole value chain beyond area of immediate control so as to ensure that the product reach the final consumer.

> Respondent_01: *"The fact is that it is not controlled by us. I use that term loosely because we have got to manage our own products. There are a lot of steps along this chain, it can go wrong at the distributor, at the store, at a number of a place where these delays can happen and that is where you will see the product. You cannot have individual elements in this value stream being coordinated by different people. One person needs to be the boss of it, I use that term loosely. One person needs to sit, and have a look at what happening from literally the planning, the procurement of the first raw material, until it gets to the customer's shelves. So that entire value stream needs to be owned; my view by supply chain."*

Respondent_03 highlight that his company had to terminate services of a 3PL warehousing as the company saw an opportunity to exercise better control in warehousing and drive the necessary efficiency and sustainability initiatives.

> Respondent_03: *"I would not necessarily say a problem, I believe it was just an opportunity to bring to the market a better cost to serve. We thought that by in-housing we could save obviously on the distribution costs related to it; we could also drive more efficiencies because internally we had better control and visibility of what was happening. Also, for instance with a third party, when you have multi-principals facility, programmes such as "zero-waste-to-landfill" become a little bit more difficult to drive. The company obviously set themselves numbers of sustainability targets and as such going through 3PLs warehouses does make it difficult to implement these initiatives that we have around sustainability"*

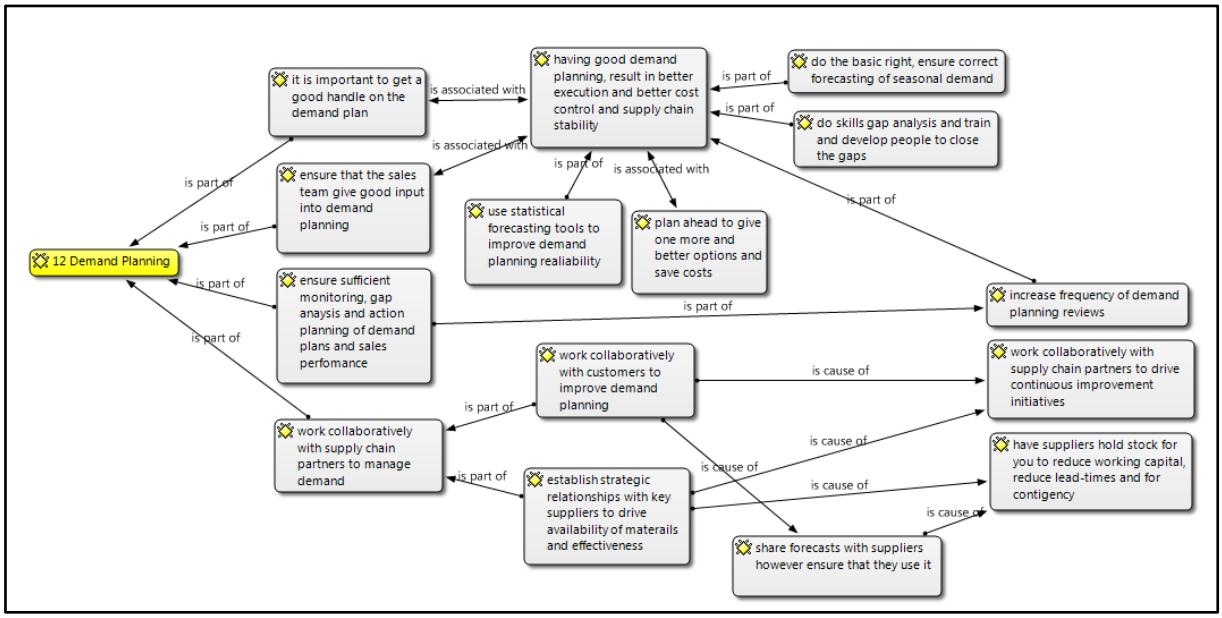
Respondent_07 from the retail side highlighted the need to have tighter control on transportation as lack of control will impact on the service they provide to the stores.

> Respondent_07: *"I think there are benefits to owning your transportation because in my opinion just because you have control over what you do and your ability to service your stores, they are our life blood out there, you are not dependent on anyone else. I am not saying third party will not be able to provide you with decent service but I think it is something we have managed very well over the years. It has certainly given us a competitive edge in my opinion."*

5.3.5.2 Demand Planning

Demand planning was highlighted as one of the key drivers of an effective and efficient supply chains. Demand planning drives the supply chain, internal and externally. Demand planning informs the supply plans that are made, the manufacturing capacity made available and also impact of the raw and packaging materials that are shared with the upstream suppliers. Most of the supply chain practitioners interviewed highlighted the need to get the demand plan more accurate. The dynamics of demand planning as per the insights from the practitioners are illustrate below in Figure 28.

Figure 28. Impact of demand planning on supply chain dynamics



Respondent_05 highlighted that they found that knowledge gap regarding statistical forecasting was an inhibitor to better demand plans. They then spent time and resources to train the demand planners so as to skill them sufficient to do statistical forecasting which supports the overall demand planning process (as highlighted by Respondent_04).

> Respondent_05 "*When the demand plan was not really correct, it was a knowledge gap issue within the demand planning team so there was a lot of support and training and we also had an expert who came from the Regional Support Centre (RSC) who stayed with the company here in South Africa for two years basically trying to assist in the demand planning area.*"

> Respondent_04: "*We found that because this number sometimes as far as supply chain is concerned is sort of a wishful number, it is not necessarily based a lot on facts and now*

we introduced more of statistical forecasting. To basically help the business, we present that number to the sales and marketing team saying last year you only sold so much, so this number that you are predicting to sell this month is actually unrealistic based on where you actually landed last year, unless otherwise you have got very clear impactors and uplifts that you have quantified."

Respondent_01 highlighted the need to get better inputs from sales personnel so as to derive better demand plans.

Respondent_01: *"but probably the area where we can spend more time to improve the effectiveness is around demand forecasting. I know you could throw systems at it, formula, algorithms you name it and try and predict your demand, I think it truly comes down to the input you're getting from your sales team. And if you are not getting valuable input from your sales team, you will never get your demand right."*

Need for frequent demand reviewing was highlighted, with some FMCGs moving from month demand planning to weekly demand planning (Respondndet_01), while others are already doing demand reviews daily (Respondent_04).

Respondent_01: *"This is what each region is going to sell each week, and then next week is going to report back on what you have sold. You promised X, you have delivered Y, and where is the gap, why is there a gap and what are you doing to make sure there is no gap next week? That is one of the fundamental changes that new business is bringing by the way. It is moving from monthly reporting to weekly meetings. Everything will be done on a weekly basis"*

Respondent_04: *"It is a very complicated forecasting hierarchy because it is such a low level, a lot of noise and you have to look at it often. We literally look at all the SKUs every day, we look at the forecast every day for every SKU to see if we are selling ahead or lacking behind.*"

The need to share forecasting with upstream supply chain partners is highlighted by Respondent_03, Respondent_04 and Respondent_07 below..

Respondent_03: *"We have shared our forecasts with them very openly and they too have done a number of activities on their side such as holding stock, procuring extra raw materials et cetera to really get to a partner to win relationships with our company. That has made us responsive."*

Respondent_04: "*The things that we have gotten involved in have been around sort of compliance to the SLA and planning processes that we work with the supplier on, for example this one supplier that let us down at the beginning of this year we spend a lot of time with them working in terms of making a little bit more collaborative planning so this is our plan; "we give you a forecast for the next six weeks we then discuss the next two weeks what our requirements are and what does your production look like and can we get visibility on your stock on hand.*"

Respondent_07: "*With some strategic vendors we have started forecasting as well or sharing forecast, although in the South African market we finding that the maturity around dealing with forecast or the responses to forecast is actually quite poor and we see very little or no benefit of actually sharing a forecast with vendors, it does not seem to influence behaviour quite sufficiently."*

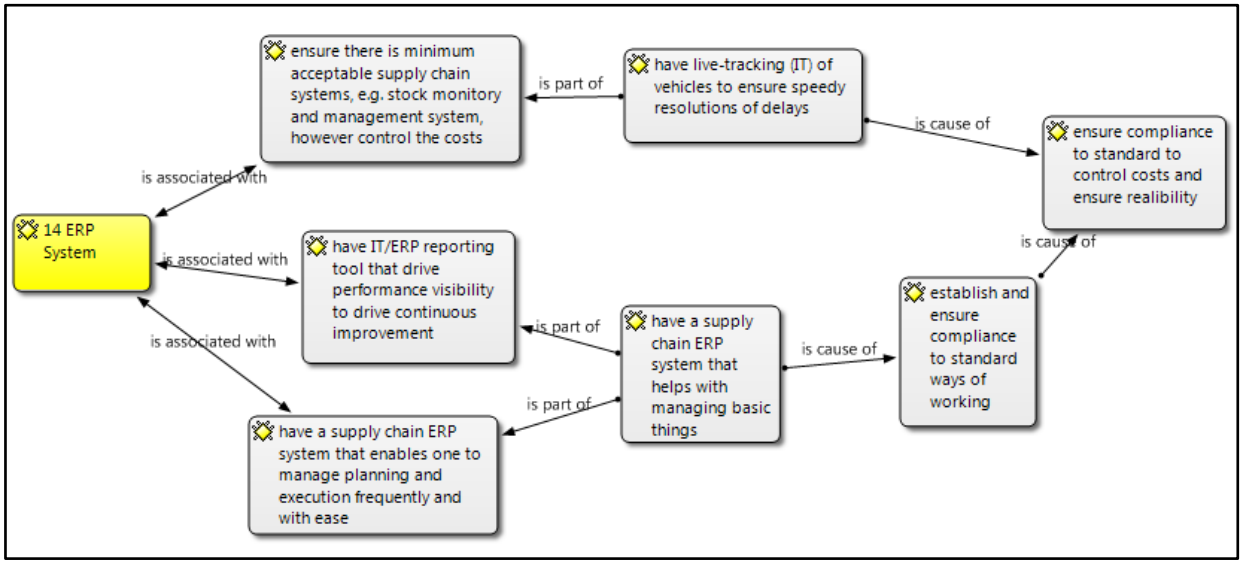
5.3.5.3 Enterprise Resource Planning (ERP) / Information Technology (IT) Systems

The need for usage of Enterprise Resource Planning (ERP) systems or other forms of Information Technology (IT) systems was highlighted as holding key higher supply chain effectiveness and efficiencies. Some of the companies of the interviewed supply chain practitioners highlighted that they have implemented some form of ERP or IT systems to automate and simplify execution of some of the supply chain processes. And there are further plans to entrench more implementation of such systems. Figure 29 below highlights some of the sub-themes regarding how ERP drives better supply chain performance

Respondent_01 highlighted the need to couple a revised supply network design with the right level of IT automations to drive efficiencies, and meet the intended goals of the new value chain.

Respondent_01: *"But you have got to support it with a good technology solution, you have got to be able to invoice there and then, so our guys have handhelds, that they taking the order while talking to the store keeper. And they have printers that actually hang on their belts. As soon as they take the order they can show the customer this is what it is going to cost him, he says he is happy, prints the invoice, it prints out of his belt, they go fetch the stock and deliver it and take the cash and go. It is efficient and it is quick"*

Figure 29. Need for ERP system in supply chain



Respondent_04 highlighted the diversity of what a good ERP solution should be able cover and assist with, and the need to have an integrated ERP system.

> Respondent_04: *"From an IT perspective we have SAP as the base, we have a warehouse management system and we have planning tools. Planning tools cover demand planning, production planning, production scheduling and deployment planning, the normal things that we do. We have fully integrated planning, transactional processing, finance, all that sort of stuff that is altogether. All integrated or all inter-phased I suppose I would say"*

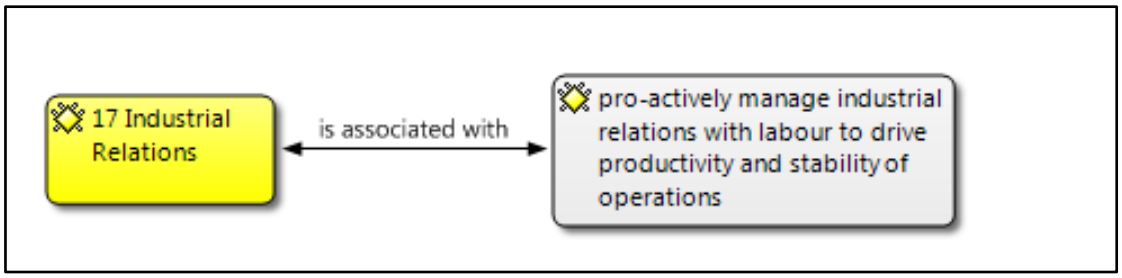
Respondent_08 highlights the need to have less and less human intervention in the planning and execution of product movements through the value chain, with more and more processes that need to be automated using ERP and IT solutions to drive higher efficiencies.

> Respondent_08: "*In some cases faster moving products moving through the network are going to become a little bit more agile and a little bit more algorithm driven within our warehouse management systems, less about human intervention and more about systems doing the thinking for us. That is definitely going to become a big part of the process and a link between replenishment and what we do within the network is going to be critical."*

5.3.5.4 Industrial Relations (IR)

Respondent_02 did highlight that South Africa still has a fragile industrial relations (IR) environment and that there is a need to proactively manage and build such relationships to ensure supply chain operations stability. Figure 30 illustrate this theme. This will enable organisations to be able to deal with issues proactively before escalate to work stoppages.

Figure 30. Industrial relations management in supply chain

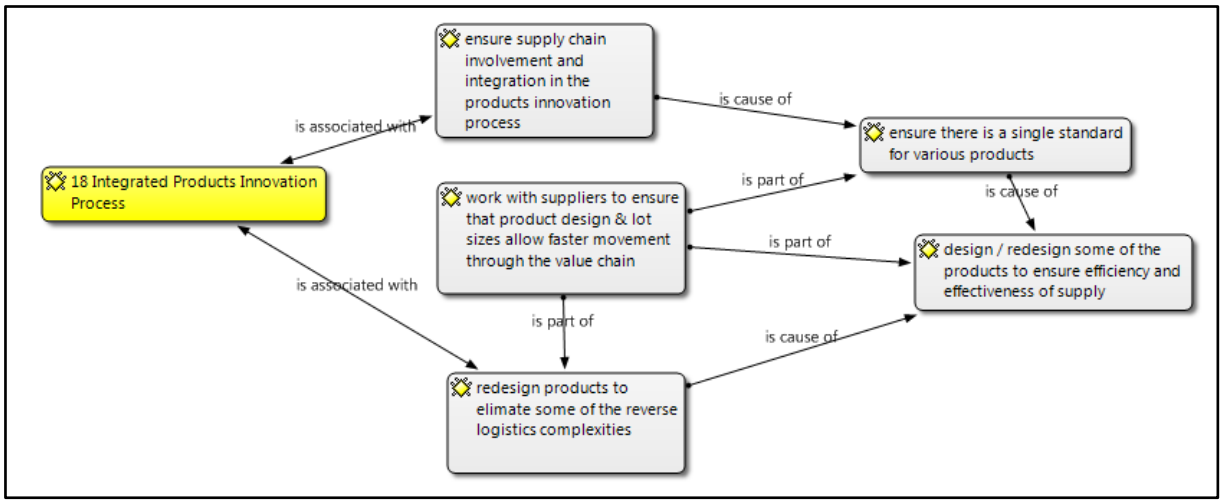


> Respondent_02: *"The other one that I did not touch on before is that in South Africa you always operate with a challenging industrial relations (IR) environment. Working on those relationships and improving relationships between shop-floor, union and management is also very key to drive performance."*

5.3.5.5 Integrated Products Innovation Process

Another process that was found to be a cornerstone for a better supply chain performance is an integrated products innovation. Product innovations can create complexities that reduce efficiencies if they are executed in an uncoordinated and unintegrated manner, for examples introduction of products that require special equipment and long change overs can reduce utilisation and increase lead-times. On the other hand an integrated innovation of old products can lead to standardisation of products and processed which lead to higher effectiveness and efficiencies as indicated in section 5.3.2.5 and 5.3.26. Figure 31 below indicate how an integrated products innovation process drive better supply chain performance.

Figure 31. Integrated products innovation process drive within supply chain



Respondent_01 and Respondent_02 highlighted the need to have integrated innovation process touching across various functions of the organisation.

> Respondent_01: *"One of the issues that we have with the business at the moment is that we struggle to launch effectively. Either products are not there or it runs out or they still tweaking products, my view on it is that I had like supply chain to manage that project for that, because we know when we had have to order the materials, when it has to be delivered here, what the critical path is to get that product into the cold room and ready to sell. We know what it is from a supply chain point of view."*

> Respondent_02: *"When marketing people sit somewhere or customer guys sits somewhere and decide that they are going to do this promotion, we are going to launch this product ultimately it is going to be made and delivered in the supply chain and if supply chain is not equally represented in those decision making forums the quality of execution will then manifests itself in the results of business. For supply chain as well there is a responsibility that we must step up and also be part of the decision making not just receiving that we are equal partners and we work closely with our marketing and our customer colleagues."*

Respondent_04 and Respondent_03 further emphasised the need to have the innovation process formalised supported by the leadership of the organisation, and also having post-review evaluations for the various innovations to ensure learning and continuous improvement.

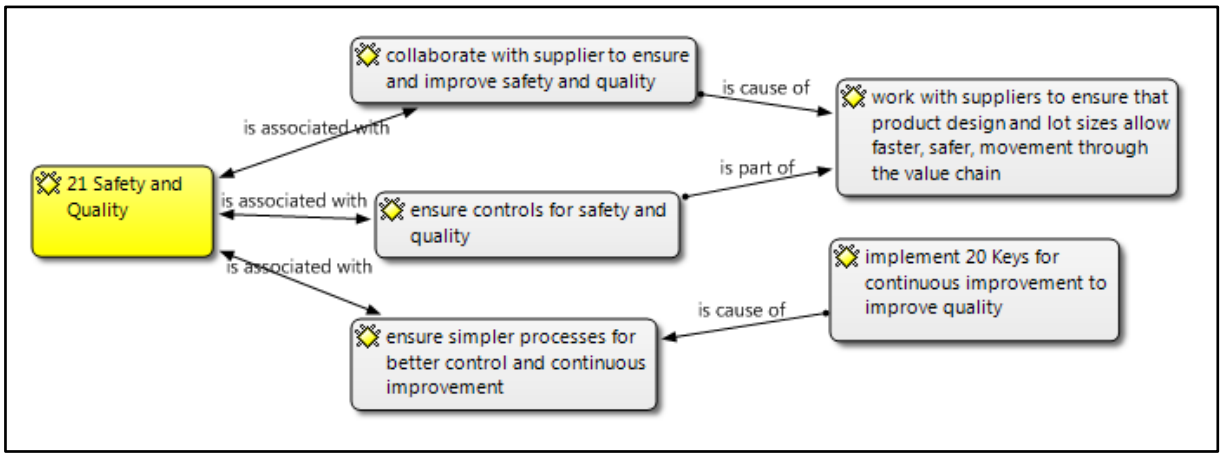
Respondent_04: *"we do have cross functional teams where there is integration across purchasing or SSD, supply chain, sales and marketing in these new product development (NPD) projects; we have formal processes in place where we have got cross-functional integration specifically for innovation and renovation."*

Respondent_03: *"I think things like post launch evaluation where we review all types and we review through leadership teams the success of the innovation that has gone, what happened in the past or failure I think that is great. I know the focus we have given around innovations is that there should be margin improvement, so they should bring better margin to the business and we should be stricter on that"*

5.3.5.6 Safety and Quality

A number of respondents highlighted the need to ensure quality and safety through the value chain. The sub-themes of safety and quality are illustrated in Figure 21 below.

Figure 32. Need to ensure supply chain safety and quality



Respondent_06highligted that safety in the number priority of their operations.

Respondent_01: *"Safety is our number one priority at the company."*

It was highlighted that supply chain partners need to communicate and resolve quality issues with speed.

Respondent_01: *"In terms of quality issue, the buyers and the vendor know about it pretty quickly. Whereas in the past it could take two weeks before the vendor would know the product is being rejected in your plant. I think the integration of having everyone in your plant physically closer together has got huge benefit for us."*

Respondent_07: *"We are feeding back to suppliers on the stuff that is impacting on the inbound side. And it could be that the way the truck is loaded at plant level or at warehouse level and its supportive, often you would have a long distance truck coming in that does not have side-support and then dependent on the nature of the product and the respective platforms, so it is on the pallet and let us say the corrugate that is used is of a poor standard and they are over-stacking the pallet so you have a little bit of over bulging going on the bottom of the pallet and no real support because they are trying to optimise on their transport as much as possible but they might be overstating the tie high"*

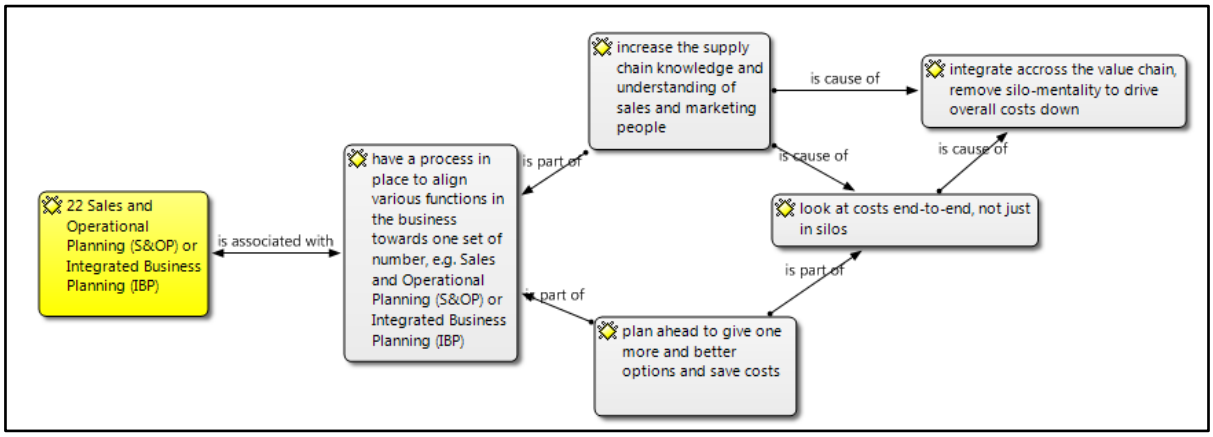
Respondent_02 highlighted the need to embed quality and safety culture through a formalise programme; in his case what is referred to twenty key methodology (Petrarolo, 2011; ODI, n.d.) (sic).

Respondent_02: *"The twenty keys methodology has several module; one around team building, one around 5S which is around cleanliness, the other one or several around quality, safety, training and development et cetera."*

5.3.5.7 Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP)

Amongst the FMCGs it was emphasized that one of the drivers supply chain effectiveness and efficiency is integrated planning, and to that effect a number of organisations have implemented Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP). Figure 33 below illustrate how a process such an S&OP or IBP align an organisation towards a high performing value chain.

Figure 33. Sales and operational planning for supply chain alignment



Respondent_01and Respondent_03 highlighted the need to have aligned forward plans for marketing, sales, manufacturing and supply chain so as to be able to deal with seasonal demand and dynamic capacity requirements and productions plans required thereof.

> Respondent_01: *"It takes thinking and planning upfront. It is not something you could walk into and say let us do it now, we plan it two or three months ahead. In May, June before shutdown we already planning what products we going to run at a high level view in August and September, and then October, November and December how we are going to change the mix that runs through the factory. So planning ahead and bending rules."*

> Respondent_03: *"Processes that we have put in place like sales and operations planning, innovation processes and the way we run businesses because businesses are run by business teams and those business teams have got representation from all functions be it marketing, customer and supply chain is that supply chain and our colleagues are taking responsibility for the decision and execution of those decisions and that we must also bring the understanding of the supply chain and its capabilities to the marketing and customer colleagues"*

Furthermore Respondent_03 and Respondent_05 emphasised the need to work together throughout the organisation towards one number. The one number being that if there is a certain sales figures that sales is working towards, that one sales number should be reflected in the demand plan and supported by aligned supply plans – with the associated single set of profits, costs and working capital.

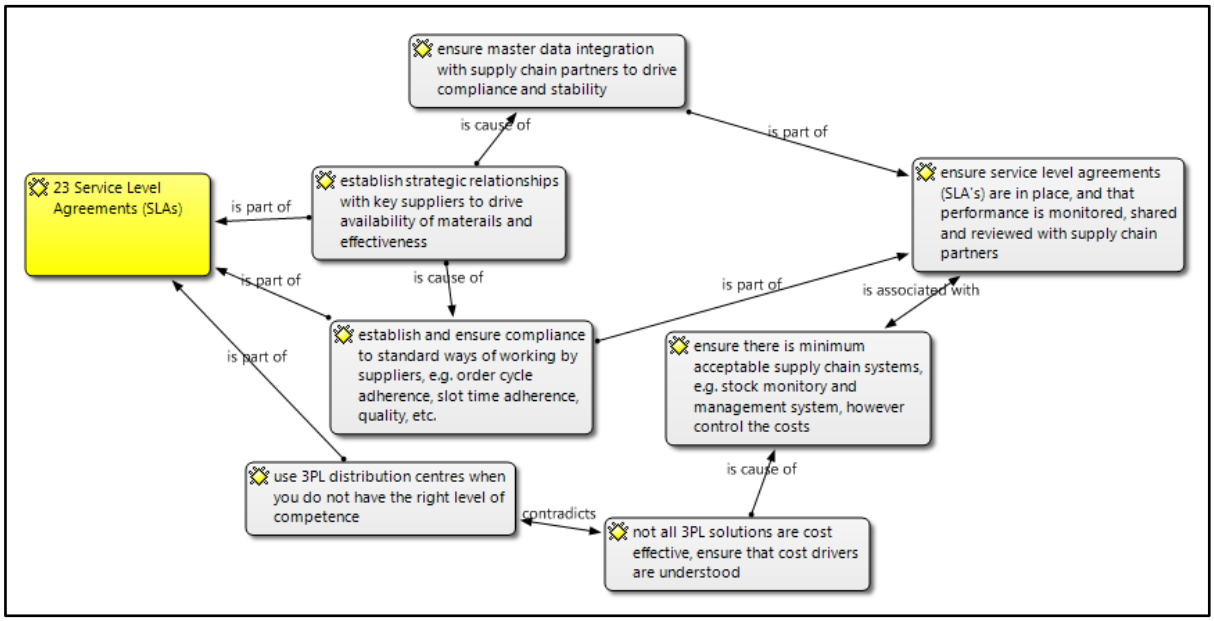
> Respondent_03: *"Some of the benefits as we are really learning about our sales and operations planning as a culture in the business, your sales team and your supply chain team are working towards one number, that has been a real benefit and that the collaboration and communication that happens is part of the sales and marketing and of the supply chain."*

> Respondent_05: *"The most important part of the Integrated Business Planning (IBP) process is alignment between the different stakeholders. We have what we call the "one number principle" to ensure that everybody whether it be sales, technical, supply chain or the business unit; that they are aligned as to exactly what the number or projected sale number or the projected sale volume of products are going to be sold for the following months. It is basically to help the company to concentrate their energies on that one number that they are all aligned and there is no misalignment between the different departments"*

5.3.5.8 Service Level Agreements (SLAs)

Even though more and more organisation are moving towards building collaborative and strategic partnerships with their supply chain partners, it was emphasised through the conversations that there is still a need to have proper service level agreements (SLAs) with one's supply chain partners. SLAs clarifies what is expected from each partner and also are used to hold each one accountable to deliver on their promises to drive supply chain reliability and effectiveness. Figure 34 below illustrate the sub-themes regarding the impact of SLAs, compliance to SLAs and the impact on supply chain effectiveness thereof.

Figure 34. Need to ensure service level agreements with supply chain partners



Respondent_04 highlighted the key role that procurement hold to ensure that there is proper SLAs in place with suppliers.

> Respondent_04: *"Our procurement department does it, it is called SSD, Strategic Supplier Development. Their job is to work with suppliers to develop suppliers. I am not involved a lot in that but it is really about ensuring that the contracts are very clear that the service level agreements (SLAs) are in place and that the expectations are well understood in terms of stock availability and quality."*

Respondent_01 did note the need to have not just SLAs around commercial terms however to also ensure that SLAs cover the framework of materials movement in the value chain, in this case slot-time adherence.

Respondent_01: *"Other elements that we have, you may notice that our customers are more demanding on us in terms of slot times for deliveries and making sure that we deliver the product on the day that it ordered or I within a slot time, but we are not good at asking our suppliers to do the same thing. I think there is still an opportunity to get better at scheduling trucks coming in and running them against a roaster, it is fairly simple and also reducing spikiness of products coming in, so we still have fourteen fifteen deliveries on a Monday and one or two on a Tuesday, so spread that through the week and I think we can be more efficient on our inbound side as well."*

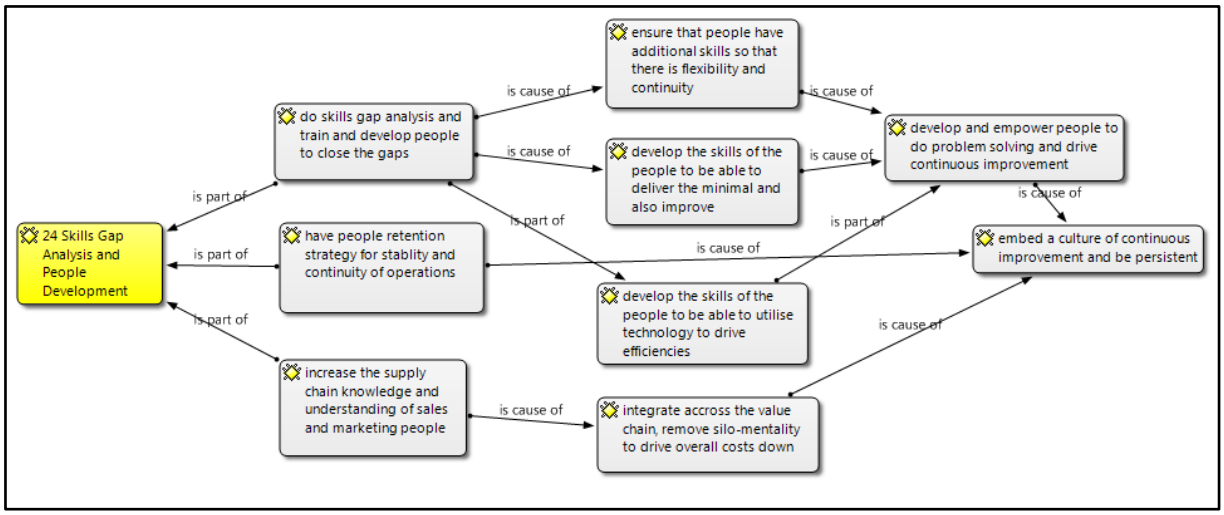
Respondent_07 further highlighted the need to have periodic SLAs performance reviews so as to highlight gaps and/or drive continuous improvement.

Respondent_07: *"And at the service level agreement meeting those are the common things that are discussed inbound service level, order fill, damages, turnaround times, et cetera, so those are the components that are being measured."*

5.3.5.9 Skills Gap Analysis and People Development

Another area that was highlighted as key to supply chain success is that of ensuring the right level of skills to run the supply chain. As supply chain evolve the skills requirements have evolved and it is important that organisations do skills gap analysis, make plans to close the gaps and execute those plans. Some of the key skills that were highlighted is the need to empower people to do problem solving and run continuous improvement initiatives; see Figure 35 for illustration of the sub-themes uncovered.

Figure 35. Skills gap analysis and developing people for supply chain



The importance of skills gap analysis and people developments was captured through the insights by supply chain practitioners below.

Respondent_01: *"I believe we have got a really strong team, a really good team. The guys deliver, they work and they know their stuff."*

Respondent_02: *"Availability of skills, finding really good supply chain people, there is not a limitless capability in the market. So putting programmes in place to develop your own is of a critical importance and retaining it is also of critical importance and competing effectively in acquisition of that talent has also become quite critical and important in the last three to five years"*

Respondent_02: *"We have also inherited over a period of time a low skilled work force and as you implement new technologies you find it difficult due to the mismatch of the skills level that you have and what the new technologies requires. So we have had to put in a lot of development plans to bring people up to skill."*

Respondent_03: *"Within the supply chain we have something called Supply Chain Academy. And that Supply Chain Academy caters for all those training requirements across the supply chain."*

Respondent_05: *"It was a knowledge gap issue within the demand planning team so there was a lot of support and training and we also had an expert who came from the Regional Support Centre (RSC) who stayed with the company here in South Africa for two years basically trying to assist in the demand planning area."*

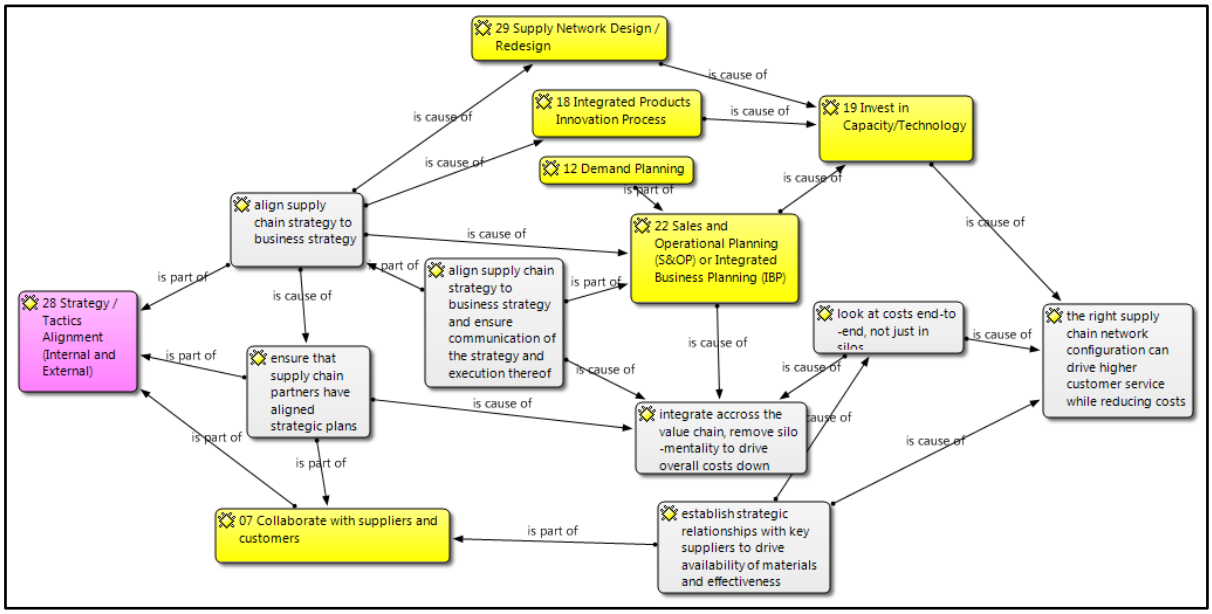
Respondent_06: *"Yes, training just about everyone on the shop floor, everyone has been trained on basics of problem solving methodologies. They have been trained on how to solve problems using Gemba-Think-Resolve (GTRs) which is probably our basic mostly used problem solving initiative at the company. So the shop floor can just get a Gemba-Think-Resolve form and go do what we call a "Gemba", Gemba meaning going to see where the issue is taking place* (Womack, 2011) (sic)"

5.3.5.10 Strategy / Tactics Alignment (Internal and External)

A number of respondents highlighted the fact that throughout the value chain and the dynamics involved thereof there is a need to ensure strategic and/or alignment internally and

externally. Some of the alignment is carried out through the processes such S&OP/IBP (section 5.3.5.7) or integrated innovation process (section 5.3.5.5), however on a higher level it is important that the various functions of the organisations are aligned towards a single strategy. The dynamics of alignment as experienced by various supply chain managers is illustrated in Figure 36 below. Proper alignment is also required with supply chain partners more so with the changing dynamics of distribution network changes with FMCGs and retailers moving consolidated warehouses and centralised distribution (section 5.3.2.1), and the need to drive higher transportation utilisation through different initiatives (section 5.3.4.2)

Figure 36. Impact of strategy alignment in supply chain



Respondent_01 highlighted the risk of having unaligned organisation in that when making unaligned decisions results can be catastrophic and costly with sub-optimised value chain.

> Respondent_01: *"I think one of the key issues we have got between this whole silo mentality we had around the old business, around one department that does your procurement, the other department your ordering running your factories and all that kind of stuff. If they are not working closely together the implications are massive. One of the key successes that we have had, it is been about two years ago, we did a lean value stream mapping exercise for the our product business as a whole. One of the areas that we've identified was factory inflexibility. The factory's opinion is that for them to be most efficient, they had to run four days a week, twenty hours a day, compressed work shifts, and then it had to shut down. So they reduced the number of wash out and clean out and sterilizations and made better utilisation of labour. That was their thinking, and it worked purely from a silo factory point of view. But the implications for the supply chain overall*

was that we had to build excessive amounts of stock to cover for big productions. It was not unusual for us to get to nearly seven thousand pallets of stock, so the balance had to be outsourced. And that comes at a cost."

Respondent_02 and Respondent_08 highlighted the fact that most, if not all, business decisions will impact supply chain and that supply chain need to always aligned with the rest of the organisation.

Respondent_02: *"I always say that the people must not underestimate that any decision made in the business ultimately manifests itself in the supply chain and the quality of that decision making is also of critical importance in that how well we execute and deliver in the supply chain."*

Respondent_08: *"Equally what we have witnessed within the parent group and we have stayed close to it around the final mile stuff. For example for e-commerce, rather than building fulfilment centres or rather than creating a separate business to run your e-commerce business, try to integrate it to become part and parcel of what we are, that has been quite an interesting exercise for us. It is good to be part of the group, because it gives us a plenty of expertise that we can call upon when we want it."*

On the other hand Reposndent_01, Respondent_02 and Respondent_08 highlighted the fact that the retailers' distribution network has changed and is still changing, and the need to continuously align with supply chain partners on strategic plans remains; even from the retailers' side to understand the plans of the FMCGs.

Respondent_01: *"There is a rethink happening at the moment, and it seems like there is going to be some consolidation happening, and it may consolidate all the our product into one network, the likes of CompanyX, CompanyY and many others into a unique our product supply chain, so that there will then be consolidation at RetailerA warehouse of all the our product and will be delivered separately"*

Respondent_02: *"Secondly is that customers have been redesigning their supply chain networks, where we used to go to stores directly a whole lot more customers now we distribute to their central distribution centres and then they redistribute product on themselves. We had to reconfigure our supply chain to deliver that."*

Respondent_08: *"It has an agenda and the agenda normally covers the previous minutes, you then have both of the CEOs report back on what is the status of the company from the landscape point of view, high level view of how the company is going in the key issues*

that have suddenly popped up in the course of the year and all the trading period that you are reviewing, your opportunities, potential challenge"

Furthermore Respondent_03 emphasised the need for communications with all employees to drive strategy alignment and implementation

Respondent_03: *"You need to ensure that your people from a mind-set perspective, behaviour perspective are all pulling in that direction. That is why I say setting clear business objectives, clear strategies, clear communications, you are having the right forums for certain decisions to be taken, having the right processes, having the right training of the individual people, those are important for your organisation to work properly."*

5.3.6 Summary of Results to Research Proposition One

The full results of proposition One are illustrated in Table 11 below.

Table 11. Results of Research Proposition One

Initiative	Type of Initiative	01 Increase effectiveness	02 Increase efficiency
Centralise Distribution	Agile & Lean Initiative	8	21
Collaborate with Suppliers and Customers	Agile & Lean Initiative	29	19
Continuous Improvement	Agile & Lean Initiative	21	42
Cross-Dock Products	Agile & Lean Initiative	3	4
Standardise and Document Processes	Agile & Lean Initiative	13	10
Standardise Products	Agile & Lean Initiative	4	8
Supply Network Design/Redesign	Agile & Lean Initiative	16	12
Visibility of the value chain	Agile & Lean Initiative	22	31
3PL/4PL	Agile Initiative	2	7
Contingency / Dual Suppliers	Agile Initiative	7	1
Flexibility	Agile Initiative	8	9
Invest in Capacity / Technology	Agile Initiative	5	1
Explore Alternative Suppliers	Agile Initiative	1	2
Direct Deliveries	Lean Initiative	3	5
Increase Transport Utilisation	Lean Initiative	0	19
Value Stream Mapping (VSM)	Lean Initiative	5	8
SKUs Reduction	Lean Initiative	3	5
Total Productive Maintenance (TPM)	Lean Initiative	6	7
Control / Influence / Partner	General Initiative	4	11
Demand Planning	General Initiative	29	9
ERP System	General Initiative	11	3
Industrial Relations	General Initiative	1	0
Integrated Products Innovation Process	General Initiative	6	6
Safety and quality	General Initiative	5	1
Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP)	General Initiative	10	7
Service Level Agreements (SLAs)	General Initiative	10	0
Skills Gap Analysis and People Development	General Initiative	7	5
Strategy / Tactics Alignment (Internal and External)	General Initiative	18	16

Eight initiatives were uncovered which drive both leanness and agility in their nature, five initiatives that drive mostly agility and five that drive mostly leanness. All eighteen initiatives, with the exception of one (increasing transport utilisation) were found to have positive impact on supply chain efficiency and effectiveness. In addition a further ten general supply chain initiatives were uncovered to having helped some of the food FMCGs and retailers to drive higher effectiveness and efficiency in supply chain.

5.4 Results of Research Proposition Two – All Lean Initiatives Increase Supply Chain Efficiency

5.4.1 Introduction

Research proposition two sought to assess if all lean supply chain initiatives instituted by South African FMCGs and food retailers have led to higher efficiencies in supply chain; that is shorter lead times, lowering of business costs and/or supply chain inventories. The following section present the results found following data analysis regarding research proposition two.

5.4.2 Results of Results of Proposition Two

Table 12 below illustrates the impact of lean initiatives on supply chain efficiencies. All the primarily lean initiatives were found to have a positive impact on increasing supply chain efficiencies. On the other hand some of the initiatives that drive both leanness and agility were found to have at time negative impact supply chain efficiency.

Table 12. Results of Research Proposition Two

Initiative	Type of Initiative	02 Increase efficiency	03 Reduces efficiency
Centralise Distribution	Agile & Lean Initiative	21	2
Collaborate with Suppliers and Customers	Agile & Lean Initiative	19	0
Continuous Improvement	Agile & Lean Initiative	42	0
Cross-Dock Products	Agile & Lean Initiative	4	0
Standardise and Document Processes	Agile & Lean Initiative	10	0
Standardise Products	Agile & Lean Initiative	8	0
Supply Network Design/Redesign	Agile & Lean Initiative	12	1
Visibility of the value chain	Agile & Lean Initiative	31	0
Direct Deliveries	Lean Initiative	5	0
Increase Transport Utilisation	Lean Initiative	19	0
Value Stream Mapping (VSM)	Lean Initiative	8	0
SKUs Reduction	Lean Initiative	5	0
Total Productive Maintenance (TPM)	Lean Initiative	7	0

Respondent_06 noted that a move towards centralised distribution could result in lower supply chain efficiencies in some cases.

> Respondent_06: "*Yes there has been. Our distribution centres are quite big and we had very large capacity, when the distribution network changed the majority of stock now moved straight into our customer distribution centres we had a problem of over-capacity, whereby we would have so much capacity in our distribution centres but we did not have the product to house because now all of the majority stock went into customer distribution centres*."

5.4.3 Summary of Results to Research Proposition Two

Overall it was established that most of the lean initiatives definitely enable higher supply chain efficiency – lower costs and lower inventories.

5.5 Results of Research Proposition Three – Agile Initiatives Decrease Supply Chain Efficiency

5.5.1 Introduction

Research proposition three was tested to ascertain if all agile supply chain initiatives instituted by food FMCGs and retailers have resulted in lower efficiencies for the supply chain; that is have led to longer lead times, higher of business costs and/or higher supply chain inventories. The results for proposition three are presented in the following section

5.5.2 Results of Research Proposition Three

Table 13 below illustrates the impact of agile initiatives have on supply chain efficiency. Although it was found that most agile initiatives were found to have positive impact on supply chain efficiency there were significant instances where it was found that such initiatives had a negative impact on supply chain efficiency. Initiatives such as usage of dual suppliers, 3PL/4PL and investment in additional capacity were found to have such negative impact on effecting in some instances.

Table 13. Results of Research Proposition Three

Initiative	Type of Initiative	02 Increase efficiency	03 Reduces efficiency
3PL/4PL	Agile Initiative	7	2
Contingency / Dual Suppliers	Agile Initiative	1	4
Flexibility	Agile Initiative	9	2
Invest in Capacity / Technology	Agile Initiative	1	5
Explore Alternative Suppliers	Agile Initiative	2	0

In some instances in the process of redesigning the value chain, involving 4PLs could result in higher costs than anticipated, as highlighted by Respondent_04, which is what their company experienced after they contracted the services of a new 4PL which did not have a the required critical mass to run cost-effective operation.

> *Respondent_04: "The evolution of costs has been higher looking after it ourselves; it is a much more expensive model because of that we have a massive focus on productivity and performance management and we are working a lot with 4PLz to understand the costs and to drive productivity. 4PLz needs to get additional principals into the warehouse, they need to get extra volume. From a cost perspective it is extra principals, additional principles and productivity."*

Respondent 03 highlighted the fact that when using dual suppliers there may be a need to keep the second supplier unnecessarily occupied at higher costs with work that is being done by the primary supplier so as to ensure that they will be available when the primary supplier is not able to supply.

> Respondent_03: *"So our consideration is been to have back-up supplies for certain fruits and vegetables of finished goods in other parts of the world. So we do have a dual strategy to cover us for that and we have had to activate it from time to time because you have to provide them with some volume to keep those suppliers interested. You cannot rock up when you have got problems and it takes eight weeks from the time you activate and the products land in Durban. So you need to have an on-going supply chain, so that all you do is ramp up volume and your responsiveness can be effective."*

Even though flexibility is required to drive supply chain effectiveness Respondent_01 did highlight that it may not be necessary to drive extreme flexibility; there is a need to balance flexibility and costs associated with that, as driving extreme flexibility may result in higher costs and lower efficiencies.

Respondent_01: *"Where we have had to bend the rule a little bit in terms of supply chain, I had say everyone is trying to drive extreme flexibility and not hold too much stock; what we did is get clever around how we produced. Our low volume high value products; we produce those early in the season; August, September. They do not take up a lot of space, and we produce enough to see us all the way through to December, then put that into storage. We then get the factory to really pump volume, so then your bulk products, we really drive those hard during October, November and December."*

5.5.3 Summary of Results to Research Proposition Three

Overall it was found that some of the agile initiatives do drive higher supply chain efficiency – lower costs and lower inventories, however there significant number of cases whereby agile initiatives reduces supply chain efficiencies.

5.6 Results of Research Proposition Four – All Agile Initiatives Increase Supply Chain Effectiveness

5.6.1 Introduction

Research proposition four sought to find out if all agile supply chain initiatives instituted by food FMCGs have food retailers have indeed led to higher supply chain effectiveness; that is higher customer service levels and/or better supply chain responsiveness. The outcomes for proposition four are outline below.

5.6.2 Results of Research Proposition Four

Table 14 below illustrates the impact of agile initiatives have on supply chain effectiveness. Most agile initiatives were found to have positive impact on supply chain effectiveness.

Table 14. Results of Research Proposition Four

Initiative	Type of Initiative	01 Increase effectiveness	04 Reduces effectiveness
Centralise Distribution	Agile & Lean Initiative	8	0
Collaborate with Suppliers and Customers	Agile & Lean Initiative	29	1
Continuous Improvement	Agile & Lean Initiative	21	0
Cross-Dock Products	Agile & Lean Initiative	3	0
Standardise and Document Processes	Agile & Lean Initiative	13	0
Standardise Products	Agile & Lean Initiative	4	1
Supply Network Design/Redesign	Agile & Lean Initiative	16	1
Visibility of the value chain	Agile & Lean Initiative	22	0
3PL/4PL	Agile Initiative	2	1
Contingency / Dual Suppliers	Agile Initiative	7	0
Flexibility	Agile Initiative	8	1
Invest in Capacity / Technology	Agile Initiative	5	0
Explore Alternative Suppliers	Agile Initiative	1	0

Below are some of the insights that illustrate how agile initiates improve supply chain effectiveness.

Respondent_02, an FMCG supply chain manager, on usage of dual suppliers:

> Respondent_02: "*we do not rely on one single source of supply, we have got multiple sources. There may be one or two where you may find that there are dominant players, but we try and make sure that for those as well we have got back-up plans for them*."

Respondent_03, an FMCG supply chain manager, on investing in manufacturing capacity:

> Respondent_03: *"In the manufacturing space on capacity perspective we have invested a lot of money in order to obviously build the capacity to the manufacturing unit so that we could supply to the market demands, so over the last three years you would have seen a lot of investment to combat the impact of insufficient manufacturing capacity."*

Respondent_04, an FMCG supply chain manager, on having flexible of production capacity:

> Respondent_04: *"One of the other strategies that we had is that we have gone to outsource production, so we would go to another producer to say can you make some additional product for us. That also works well and we use that quite often."*

Respondent_05, an FMCG supply chain manager, on collaborating with suppliers:

Respondent_05: *"In another way as well we have been trying to improve working capital is to get the supplier as well as to keep a certain level of stock with them. That in itself helps to manage the supply in case maybe there is a strike at the suppliers then the additional stock they can then send to us but at the same time that stock in a way in the suppliers' books and is not actually visible in our books until an order is being placed. Therefore when you looking at working capital you find that working capital is actually lower."*

Respondent_06, an FMCG supply chain analyst, on collaborating with customers:

Respondent_06: *"Customer Collaboration Department works extremely close with the customer to gauge exactly what the needs are and in turn are then the voice of the customer within the company. We basically bridge that gap between both supply chains and even the sales team."*

Respondent_05, a retail supply chain manager, on collaborating with FMCGs:

Respondent_07: *"We will end this year on fifteen joint business partner relationships that keeps us fairly busy, so that is all our big guys of which FMCG-X is them and the likes of FMCG-Y, FMCG-Z, et cetera, would be some of the big guys that make up the big group. It is really our big volume suppliers that we find we get the biggest traction out because of the relationship we share with them so we drive a collaborative process with them and some good stuff comes out of it, it has been good for our business."*

However there were few instances where it was found that such initiatives had a negative impact on effectiveness. To illustrate this Respondent 01 mentioned that in some instances the usage of distributors (3PLs) does always result in intended outcomes as the 3PLs are not able to deliver on what was promised.

Respondent_01: *"If you going to go to 3PLx that is an established institution, if you are going to start with a new distributor and establish a distributor, each person is not good at everything, individually they may have weaknesses. Some of them might be good sales people who can drive the selling in their distributor and do not manage their stock well, you get others that are good logistics people and stock control people, but they do not drive the selling well. It is quite difficult to get a mix of both or a balance of both. It really depends on the individual, but that is what happens when you have a small business running as opposed to a big professional corporation."*

To a certain extent one of the retailers found that even though they collaborate and share forecasts with one of the food FMCGs, the FMCG does not deliver according to the shared forecasts and this lead to frustrating relations with no improvement in customer service. This is a wastage of time and resources which the retailer use to create and share the forecasts.

> Respondent_08: *"With some strategic vendors we have started forecasting as well or sharing forecast, although in the South African market we finding that the maturity around dealing with forecast or the responses to forecast is actually quite poor and we see very little or no benefit of actually sharing a forecast with vendors, it does not seem to influence behaviour quite sufficiently. We will commit to buying our forecast if you commit to supplying our forecast and the supplier was just nowhere, we are still tracking at very poor flow rate despite having had gone through a forecasting process."*

5.6.3 Summary of Results to Research Proposition Four

Overall it was found that most of the agile initiatives do definitely drive higher supply chain effectiveness – better customer service and responsiveness, however there are some areas of concern especially in so far as attaining the promises of 3PLs/4PLs and the usage of share forecasts by supply chain partners.

5.7 Results of Research Proposition 5 – Lean Initiatives Decrease Supply Chain Effectiveness

5.7.1 Introduction

The fifth research proposition sought to understand whether all lean the supply chain initiatives that food FMCGs and food retailers have implemented have resulted in lower supply chain effectiveness or not. The results of proposition five are outlined below.

5.7.2 Results of Research Proposition Five

Table 15 below illustrates the impact of lean initiatives have on supply chain effectiveness. All the lean initiatives were found to have positive impact on effectiveness; none were found to reduce supply chain effectiveness. See table below

Table 15. Results of Research Proposition Five

Initiative	Type of Initiative	01 Increase effectiveness	04 Reduces effectiveness
Direct Deliveries	Lean Initiative	3	0
Increase Transport Utilisation	Lean Initiative	0	0
Value Stream Mapping (VSM)	Lean Initiative	5	0
SKUs Reduction	Lean Initiative	3	0
Total Productive Maintenance (TPM)	Lean Initiative	6	0

5.7.3 Summary of Results to Research Proposition Five

Overall it was found that all the lean initiatives implemented by SA food FMCGs and retailers drive higher supply chain effectiveness, and none was found to have negative impact on effectiveness.

5.8 Results of Research Proposition Six – Food Retailers Implemented Mostly Agile Initiatives while Food FMCGs Implemented Mostly Lean Initiatives

5.8.1 Introduction

Research proposition six sought to verify if indeed food retailers have implemented mostly agile supply chain initiatives than lean initiatives as they have higher variety of products while food FMCGs have mostly implemented lean supply chain initiatives than agile initiatives as they have lower variety of products. Respondent_01 highlighted that their business, an FMCG, operate on seventy SKUs while Respondent_08, mentioned that the retailer operate at more than sixty thousand SKUs.

5.8.2 Results of Research Proposition Six

The results of research proposition six are summarised in Table 16 below. Both the FMCGs and the retailers mostly implemented the initiatives that drive both agility and leanness; eight initiatives for FMCGs and seven for retailers. Also regarding initiatives that traditionally drive lean and those that traditionally drive agility the results show that there is an even split between lean and agile initiatives for FMCGs (five and five) and also an even split for retailers (two and two). However when one looks at how often the initiatives were mentioned in the conversations it is evident that lean initiatives dominated the conversations in the retail space, especially regarding transport utilisation.

Table 16. Results of Research Proposition Six

Initiative	Type of Initiative	FMCGs	RETAILERS	TOTAL:
Centralise Distribution	Agile & Lean Initiative	8	11	19
Collaborate with Suppliers and Customers	Agile & Lean Initiative	19	16	35
Continuous Improvement	Agile & Lean Initiative	28	14	42
Cross-Dock Products	Agile & Lean Initiative	5	0	5
Standardise and Document Processes	Agile & Lean Initiative	15	5	20
Standardise Products	Agile & Lean Initiative	7	1	8
Supply Network Design/Redesign	Agile & Lean Initiative	14	3	17
Visibility of the value chain	Agile & Lean Initiative	32	10	42
Agile & Lean Initiatives	**Count**	**8**	**7**	**8**
3PL/4PL	Agile Initiative	7	1	8
Contingency / Dual Suppliers	Agile Initiative	7	0	7
Flexibility	Agile Initiative	9	5	14
Invest in Capacity / Technology	Agile Initiative	5	0	5
Explore Alternative Suppliers	Agile Initiative	2	0	2
Agile Initiatives	**Count**	**5**	**2**	**5**
Direct Deliveries	Lean Initiative	5	0	5
Increase Transport Utilisation	Lean Initiative	7	12	19
Value Stream Mapping (VSM)	Lean Initiative	7	0	7
SKUs Reduction	Lean Initiative	3	2	5
Total Productive Maintenance (TPM)	Lean Initiative	5	0	5
Lean Initiatives	**Count**	**5**	**2**	**5**

5.8.3 Summary of Results to Research Proposition Six

Overall the findings confirmed that all SA food FMCGs and retailers evenly drive agile initiatives and lean initiatives.

5.9 Conclusion of Overall Results

The overall results of the study conducted are illustrated on Table 17 below. Overall South African FMCGs and retailers are implementing lean and agile initiatives that drive higher effectives and higher efficiencies of their supply chain. However it should be noted that there is varying levels of implementation of the initiatives across a number of companies; some organisations are at advanced stage with regard to some initiatives while being behind the curve regarding other initiatives.

Table 17. Summary of all Results

Initiative	Type of Initiative	01 Increase effectiveness	02 Increase efficiency	03 Reduces efficiency	04 Reduces effectiveness
Centralise Distribution	Agile & Lean Initiative	8	21	2	0
Collaborate with Suppliers and Customers	Agile & Lean Initiative	29	19	0	1
Continuous Improvement	Agile & Lean Initiative	21	42	0	0
Cross-Dock Products	Agile & Lean Initiative	3	4	0	0
Standardise and Document Processes	Agile & Lean Initiative	13	10	0	1
Standardise Products	Agile & Lean Initiative	4	8	0	1
Supply Network Design/Redesign	Agile & Lean Initiative	16	12	1	1
Visibility of the value chain	Agile & Lean Initiative	22	31	0	0
3PL/4PL	Agile Initiative	2	7	2	1
Contingency / Dual Suppliers	Agile Initiative	7	1	4	0
Flexibility	Agile Initiative	8	9	2	1
Invest in Capacity / Technology	Agile Initiative	5	1	5	0
Explore Alternative Suppliers	Agile Initiative	1	2	0	0
Direct Deliveries	Lean Initiative	3	5	0	0
Increase Transport Utilisation	Lean Initiative	0	19	0	0
Value Stream Mapping (VSM)	Lean Initiative	5	8	0	0
SKUs Reduction	Lean Initiative	3	5	0	0
Total Productive Maintenance (TPM)	Lean Initiative	6	7	0	0
Control / Influence / Partner	General Initiative	4	11	0	0
Demand Planning	General Initiative	29	9	1	1
ERP System	General Initiative	11	3	1	1
Industrial Relations	General Initiative	1	0	0	0
Integrated Products Innovation Process	General Initiative	6	6	0	0
Safety and quality	General Initiative	5	1	0	0
Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP)	General Initiative	10	7	0	0
Service Level Agreements (SLAs)	General Initiative	10	0	1	0
Skills Gap Analysis and People Development	General Initiative	7	5	0	0
Strategy / Tactics Alignment (Internal and External)	General Initiative	18	16	0	1

Furthermore, a comparison of lean and agile initiatives between the literature review and the research results is illustrated in Table 12 below.

Table 18. Comparison of Initiatives from Literature Review versus Actual Results

Initiative as per Literature Review	Equivalent Inititive as per Respondents
Collaboration	Collaborate with Suppliers and Customers
Customer Relationship Management	Collaborate with Suppliers and Customers
Cross-Docking	Cross-Dock Products
Postponement	
Process Standardisation	Standardise and Document Processes
Product Standardisation	Standardise Products
Supply Chain Speed (Lead-time reduction)	Direct Deliveries
Supply Chain Visibility	Visibility of the value chain
	Continuous Improvement
	Supply Network Design/Redesign
Flexible Sourcing	Contingency / Dual Suppliers
Flexible Transportation	3PL/4PL, Flexibility (of manufacturing and logistics)
Strategic Stocks	
Supply Chain Redundancy	Invest in Capacity / Technology
	Explore Alternative Suppliers
Demand-Pull	
Inventory Reduction	Centralise Distribution
Just-in-Time (JIT)	
Strategic Sourcing	Collaborate with Suppliers and Customers
Value Stream Mapping (VSM)	Value Stream Mapping
Total Productive Maintenance (TPM)	Total Productive Maintenance (TPM)
	SKUs Reduction
	Increase Transport Utilisation

CHAPTER 6: DISCUSSION OF RESULTS

6.1 Introduction to Discussion of Results

In the previous chapter 5 the results of the research study were outlined. The results were based on the analysis of the data collected using the research methodology outlined in chapter 4 and analysis that followed thereafter. This chapter discusses and interprets the results to the six research propositions made in chapter two by looking at results and contrasting them with the views that were put forward through the related literature review in chapter 2 and summarised in Table 1 of section 2.6. All the six research proposition were explored thoroughly with the research participants. Although the interview schedule used had open-ended questions the feedback provided by respondents was sufficient to draw rich information for the six research propositions. Many of the results were in line with the reviewed literature however additional and alternative insights were also raised. As per the research objective, being to identify supply chain initiatives that support the value chain to be both lean and resilient leading to more effective (agile) and efficient (lean) value chains, this section discuss the key initiatives identified and ascertain if the identified initiatives have indeed let to more effective and efficient supply chains.

6.2 Discussion of Results to Research Proposition One

Research proposition one aimed to uncover a number of lean and agile initiatives and test if those initiatives drive both higher supply chain effectiveness and higher supply chain efficiency. The results uncovered some initiatives that are covered in the literature review however additional initiatives were also uncovered.

6.2.1 Overall Comparison of Initiatives from Literature Review and Those Uncovered in Practice in South African Food FMCGs and Retailers

Most of the initiatives covered in the literature review were found to be implemented by the South African food FMCGs and retailers, as illustrated by Table 12 in section 5.9. From Table 12 one can also note that there are some initiatives from literature review that were not found to be implemented based on the sampled data; these include postponement, strategic stocks and just-in-time (JIT). However there were a number of initiatives that were not specifically covered in literature review which were found to have a significant traction in the analysed industries; some of the key ones include continuous improvement, direct deliveries and SKUs reduction. Some of these are well known supply chain initiatives, however they are not immediately associated with been lean or agile, and were found to hold special

importance to driving effectiveness and higher efficiencies. These include demand planning, S&OP (or IBP) and strategy alignment. South African food FMCGs and retailers could look further to drive higher supply chain performance by implementing the initiatives they have not implemented, that is; postponement which can assist with reducing stock levels and lead-times (Tang, 2006), strategic stocks which help with mitigating against materials supply disruptions during black swans events (Carvalho *et al*., 2011) and just-in-time (JIT) which assists with reducing overall inventories in a value chain (Kumar *et al*., 2012).

6.2.2 Discussion of Initiatives that drive both Lean and Agility – That They Increase Both Supply Chain Efficiency and Supply Chain Effectiveness

A significant number of initiatives implemented by food FMCGs and food retailers were found to primarily drive both lean and agility agendas, refer to table 5 in section 5.3.1. Continuous improvement, improving visibility of the value chain, collaborating with customers and suppliers as well as centralising distribution were the key initiatives being driven by the FMCGs and retailers. It is not surprising that continuous improvement was mentioned so often (section 5.3.2.3) in that so often when people are improving their supply chains or doing general problem solving initiatives they bundle them under the banner of continuous improvement as alluded by Respondent_02 "*we are looking for continuous improvement savings, we look at logistics savings, we look at procurement savings*" and Respondent_03 "*The idea at the end of the day is to increase our service while decreasing our costs that is the whole basis of continuous improvement*". It should be noted however that it would be better if the supply chain managers formalise these continuous improvement initiatives and track them to ensure that they meet the intend goals as has been done by the company of Respondent 05 "*the company itself has basically developed what we call a Continuous Excellence Programme (CEP). Within the CEP you have got Total Preventative Maintenance (TPM) which is implemented in the factory environment*" whereby TPM is one of the key initiatives suggested by Piechnicki *et al*. (2015).

Improving visibility of the value chain, as illustrated by the results, is key as it supports the other initiatives. Visibility of overall supply chain performance (Respondent_02; "*I would say we measure all the typical balanced scorecard and supply chain measures*") will enable managers to decide which other initiatives they need to launch and visibility of stock levels and costs (Respondent 06; "*we measure our stock levels, and we measure our costs of distribution, we measure our waste which is one of our biggest things"*) enable managers to target stock and costs reduction initiatives. Furthermore extended visibility of supply chain partners enable collaboration which is one of the key initiatives that is being heavily driven

(Respondent_08; "*so if you engineer a solution for them that bypasses their distribution centres network, if you are doing direct factory collection. Generally vendors would be willing to share variable costs with you*") as alluded to by Qrunfleh and Tarafdar (2013).

6.2.3 Discussion of Initiatives that Primarily Drive Agility – That They Increase Both Supply Chain Efficiency and Supply Chain Effectiveness

Five initiatives that primarily drive agility were uncovered and they increase effectiveness of the supply chain. And out of those five, two of them were found to have been mentioned frequently as been implemented to increase supply chain efficiency; the two are the usage of 3PL/4PL and flexibility. Interestingly these two initiates have in some instances found to decrease supply chain efficiency – refer to section 6.4.1 regarding further discussion on this phenomena.

The other three initiatives that drive both effectiveness and efficiency are usage of contingent/dual suppliers, flexibility and investment in capacity/technology. Though one may argue that the usage of dual/contingent supply may reduce efficiency, a situation where by the contingent supply is of a service that allows continuity of operations, in that case the usage of contingent supply will promote overall supply chain efficiency. This is the case with regard to the situation of Respondent_02 "*the other challenge has been the supply and availability of electricity; we have had to put in several contingency plans in place to mitigate that impact*". In this case the provision of back-up diesel generators allows for continuity of operations of the factory reducing downtime and material wastage. This is good example of doing risk assessment and having varying priorities for provisioning contingency supplies (Ruiz-Torres *et al.*, 2013).

Similarly having flexibility and investment in capacity/technology can increase both effectiveness and efficiency. Flexibility can increase efficiency with regard to having flexible labour that can do various tasks thereby reducing headcount and costs as alluded to by Respondent_01; "*effectively you have got three people doing your sell and deliver on a pre-sell. On a van selling you get rid of your sales person, essentially you move your sales person into the van, so he can multi-task.*". And investment in technology can support the reduction of headcount to drive costs down further; as further expanded by Respondent_01; "*but you have got to support it with a good technology solution, you have got to be able to invoice there and then, so our guys have handhelds, that they taking the order while talking to the store keeper. And they have printers that actually hang on their belts*". Respondent_03 also supported their idea of supplementing investment in capacity with the right technology to

drive both effectiveness and efficiency; "*the challenges were basically capacity we could not meet the market demand with the current manufacturing capacity, we had to extend, and with extending we brought in new technologies in order to give us that additional capacity, faster manufacturing lines*".

It is quite evident that the agile initiatives while they increase supply chain effectiveness, they have a quite a complex relationship with supply chain efficiency. And when supply chain practitioners implement them they need to be clear about their objectives and aware of their consequence on supply chain efficiency, a similar view expressed by Hallavo (2015), in that managers should have a clear understanding of the environment in which they operate so as to implement the right initiative(s). However it should be noted that the three key ones; contingent supply, investment in additional capacity and flexibility, are critical to reacting to unplanned demand supply disruptions which is what is truly required to be an agile supply chain (Jüttner & Maklan, 2011).

6.2.4 Discussion of Initiatives that Primarily Drive Lean – That They Increase Both Supply Chain Efficiency and Supply Chain Effectiveness

One respondent mentioned that; "*small is beautiful and controllable*", Respondent_02. Five initiatives that primarily drive lean were uncovered and were found to increase efficiency of the supply chain. All but one of those five were also found to have been mentioned frequently as to been implemented to increase supply chain effectiveness. The exception in this case was increasing utilisation of transport, in that generally to increase transportation utilisation companies seek to load full pallets and make full trucks (Respondent_02: *"in other areas is that it is just an on-going process of improving your full pallets, full trucks to fully optimise transport utilisation*"). The challenge comes in that at times trucks may be held back for delivery while awaiting additional products to make full loads and this may impact on lead-time compliance and thereby reducing supply chain effectiveness. Other than the exception of increasing transport utilisation, these initiatives increase both effectives and efficiency and supply chain managers should seek opportunities to implement them; that is doing value stream mapping (VSM) (Dal-Forno *et al*, 2014), reducing SKUs and implementing total productive maintenance (TPM) (Attri *et al*., 2014).

One of the key initiatives that were found not to have been implemented by FMCGs and retailers is that of demand-pull (Christopher and Ryals, 2014). Respondent_06 alluded to the fact that a number of organisations are trying to move towards demand-pull; "*everything is demand driven; currently every supply chain goal is to move towards a pull demand system*

as opposed to a push demand system which the company is operating under", however within the sampling scope none of the organisations alluded to having implemented demand pull. FMCGs and retailers can supplement the efficiency of their value chain by collaborating deeper and taking the aspect of sharing demand forecast and advancing it towards implementing demand-pull system. The benefit would be that all the supply chain partners will be able to execute their supply chain activities based on true end-shopper demand, resulting in the value chain being able to meet shopper needs better while driving down unnecessarily stock levels that are as result of everyone in the value chain second-guessing the demand forecast.

6.2.5 Discussion of Additional Initiatives that Build Lean and Agile Supply Chains

The sand cone model reviewed in section 2.3 suggested that having strong base of a culture of safety and quality are key foundation blocks to building lean and agile supply chains (Bortolotti *et al*., 2014). The research findings did find that strong safety and quality culture are imperative however the research results went further on to uncover other initiatives that are key foundations of building lean and agile supply chains. These are covered in results section 5.3.5, with the additional initiatives that stood out the most being the following:

- Strategy alignment (internal and external)
- Sales and Operational Planning (S&OP) or Integrated Business Planning (IBP) process (including a), and
- Strong demand planning process (including the sharing of forecasts with supply chain partners).

This processes, together strong safety and quality culture, ensures that everyone in the value chain is aligned and working towards one goal, as Respondent_03 alluded to that; "*one number principle to ensure that everybody whether it be sales, technical, supply chain or the business unit; that they are aligned*". Alignment to one number is critical in that it removes the silo mentality that may drive sub-optimisation of the separate parts of the value chain with the whole value chain remaining optimised and failing to meet it objectives.

6.2.6 Conclusion

Research proposition one aimed to find a number of lean and agile initiatives and check if those initiatives drive both higher supply chain effectiveness and higher supply chain efficiency. It was found that, with an exception of one (driving higher transport utilisation), all

the initiatives drive both leanness and agility, and therefore proposition one is positively supported by the research findings . Also, given the additional key general business and supply chain initiatives found to be important for successful lean and agile initiatives it is concluded that lean and agile initiatives do not operate on their own within supply chain. The lean and agile initiatives need to be implemented on top of strong foundation of safely, quality, strategy alignment, S&OP (or IBP) including a strong demand planning process (in the absence of demand-pull process).

6.3 Discussion of Results to Research Proposition Two

6.3.1 Discussion Regarding Lean Initiatives Increasing Supply Chain Efficiency

Research proposition two sought to check the impact of lean supply chain initiatives instituted by food FMCGs and retailers on supply chain efficiency, that do all the initiatives increase efficiency or are there instances whereby they decrease efficiency. All the twelve initiatives that drive leanness (including those that drive both lean and agility) were found to increase supply chain efficiency. Refer to Table 12 in section 5.4.2. That said there were some outliers in that in some instances the lean initiates resulted in lower efficiencies. Take for example the organisation of Respondent_06, after they started implementing direct factory to customer deliveries for their big SKUs they realised that the small SKUs still had to go through their distribution centres and the fixed costs of the distribution centres did not go away thereby increasing overall costs of distribution, Respondent_06; "*our distribution centres are quite big and we had very large capacity, when the distribution network changed the majority of stock now moved straight into our customer distribution centres we had a problem of over capacity*".

With the exceptions aside, it was found that the lean initiatives increased efficiency with the popular lean initiatives being continuous improvement as mentioned by Respondent_02; *"we are looking for continuous improvement savings, we look at logistic savings, we look at procurement savings"* and centralisation of distribution. Increasing visibility of supply chain as alluded by Respondent_07; *"there is obviously multiple reporting platforms that are in place one of them is share point Office365*" and in line with the views of Qrunfleh and Tarafdar (2013) as well as increasing transportation utilisation were also some of the most common implemented lean initiatives.

6.3.2 Conclusion

Research proposition two aimed to find if lean initiatives implemented by SA food FMCGs and retailers drive higher supply chain efficiency. And it was found that, with some few exceptional cases, lean initiatives drive higher supply chain efficiency, and therefore proposition two is positively supported by the research findings.

6.4 Discussion of Results to Research Proposition Three

6.4.1 Discussion Regarding Agile Initiatives Decreasing Supply Chain Efficiency

Research proposition three tested if all agile supply chain initiatives instituted by food FMCGs and retailers could have resulted in lower efficiencies for the supply chain. The results show that some of the agile initiatives implemented by SA food FMCGs did indeed result in decreased supply chain efficiency, see Table 13 in section 5.5.1. This is due to the fact that in some cases with the desire to increase effectiveness some of the companies have lost the economies of scale. This was highlighted by Respondent_04 regarding the usage of a 4PL they contracted to provide capacity for distribution.; "*The evolution of costs has been higher looking after it ourselves; it is a much more expensive model. 4PLz needs to get additional principals into the warehouse, they need to get extra volume. From a cost perspective it is extra principals, additional principles and productivity"*.

Some scholars, Carvalho *et al*. (2011), and Morlok and Chang (2004), when they refer to usage of 3PLs and 4PLs only focus on the fact that they provide flexibility that build effectiveness however they ignore the fact that a 4PL may not have the necessary economies of scales or they could come at a higher costs without making a contribution towards as significantly different service. This was further reinforced by Respondent_03 who mentioned that his company had to take back the management of transport from a 4PL as they could better manage transportation themselves. Respondent_03 said; "*we thought that by in-housing we could save obviously on the distribution costs related to it; we could also drive more efficiencies because internally we had better control and visibility of what was happening*". That said is worth noting that overall the usage of 3PL and 4PL does increase efficiency, it is only in some cases whereby efficiency reduces. The same could be said regarding flexibility whereby in most cases it was illustrated that flexibility though being an agile initiate does increase supply chain efficiency in most cases, refer to Table 13.

In additional to the usage of 3PL that could reduce efficiencies, the usage of dual suppliers (Purvis *et al*., 2014) as alluded to by Respondent_02 can lead to lower efficiencies; "*you cannot rock up when you have got problems and it takes eight weeks from the time you activate and the products land in Durban. So you need to have an on-going supply chain, so that all you do is ramp up volume and your responsiveness can be effective.*". In this case the efficiency of the whole value chain is reduced as the primary and secondary suppliers are not able to attain economies of scale in their operations and therefore those diseconomies are passed on to the downstream value chain in a form of higher costs of procurement.

6.4.2 Conclusion

Regarding research proposition three it can be concluded from the results that some of the agile initiatives do reduce supply chain efficiency, in agreement with the proposition, however most of the initiatives that primarily drive agility do have an increasing effect on supply chain efficiency. It is about understanding the problem and doing necessary trade-offs and if possible agile initiatives should concurrently be implemented together with a relevant lean initiative that will drive efficiency higher as recommended by Kisperska-Moron and De Haan (2011). Refer further to section 6.6 in the subsequent sections.

6.5 Discussion of Results to Research Proposition Four

6.5.1 Discussion Regarding Agile Initiatives Increasing Supply Chain Effectiveness

Research proposition four sought to check the impact of agile supply chain initiatives instituted by food FMCGs and retailers on supply chain agility, that do all the initiatives increase effectiveness or are there instances whereby they decrease effectiveness. All the thirteen initiatives that drive agility (including those that drive both agility and lean) were found to increase supply chain efficiency. Refer to Table 14 in section 5.6.2. There were some exceptional findings in that in one instead one retail supply chain manager, Respondent_08, alluded to the fact that despite sharing forecasts with a food FMCG they have not seen any improvement to customer service levels as the FMCG does not seem to be using the forecasts.

Overall agile initiatives have increased effectiveness of supply chains; with the popular initiatives being collaborating with suppliers and customers as suggested by Hollmann *et al*. (2015) and supported by Respondent_07: *"We will end this year on fifteen joint business*

partner relationships". Others being continuous improvement (Petrarolo, 2011), supply network redesign, and improving visibility of the supply chain (Carvalho *et al*., 2011), which are initiatives that drive both agility and leanness. With regard to initiatives that primarily drive agility; flexibility, investing in additional capacity as alluded to by Respondent_03: *"so over the last three years you would have seen a lot of investment to combat the impact of insufficient manufacturing capacity"* as well as usage of contingent/dual suppliers (Respondent_02: "*we do not rely on one single source of supply*") (Purvis *et al*., 2014) seemed to have gained most traction amongst the FMCGs and retailers. More importantly, referring to table 17 in section 5.9, it is noted that most agile initiatives do mostly increase supply chain efficiency as well; with the key exceptions being flexibility, usage of dual supplier and investment in capacity which can reduce supply chain efficiency.

6.5.2 Conclusion

Research proposition four aimed to find if agile initiatives implemented by SA food FMCGs and retailers drive higher supply chain effectiveness. And it was found that mostly, with some few exceptional cases, agile initiatives drive higher supply chain effectiveness and some of them also increase supply chain efficiency, and therefore proposition four is positively supported by the research findings. This means that supply chain practitioners can confidently look among these agile initiatives to improve supply chain effectiveness while also increasing efficiency.

6.6 Discussion of Results to Research Proposition Five

6.6.1 Discussion Regarding Lean Initiatives Decreasing Supply Chain Effectiveness

The results show that all the lean initiatives implemented by SA food FMCGs did not result in decreased supply chain effectiveness. It could be that the practitioners have honed in on the initiatives that do not have negative effect on effectiveness or the negative impact on effectiveness is negligible or attributed to other things. On the other hand it is noted that the whole idea of a sand cone model suggests that once one has embedded agile initiatives to drive effectiveness one can then lay lean initiatives on top to drive efficiencies (Bortolotti *et. al*., 2014). In the case of the retailers and FMCGs it could be that the concurrent presence of agile initiatives negate the possibility of lean initiatives reducing supply chain effectiveness. More so as all the organisations analysed had some form of agile initiative being implemented together with lean, refer to Table 16 in section 5.8.2, and as illustrated by this

statement from Respondent_03; "*I think in manufacturing as I said in the capacity what we have built has been great. In the distribution space we have embarked on number of continuous improvement projects, this talks to lane optimisation, transport route optimisation; for warehousing within warehouses we have a number of projects that we run over the last year to decrease travelling time in the warehouse*", which highlight the present agile initiative, investment in capacity (Carvalho *et al*., 2011), as well lane optimisation and transport route optimisation which are lean concepts (Lu *et al*., 2011).

6.6.2 Conclusion

Regarding research proposition five it can be concluded from the results that lean initiatives implemented by the analysed food FMCGs and retailers have not resulted in lower supply chain effectiveness contrary to the research proposition. It can further be said that the presence of agile initiatives is a likely prerequisite for lean initiatives not deteriorating supply chain effectiveness as alluded to by Ferdows and Thurnheer (2011).

6.7 Discussion of Results to Research Proposition Six

6.7.1 Discussion Regarding Food Retailers Implementing Mostly Agile Initiatives while Food FMCGs Implement Mostly Lean Initiatives

On the assertion by Christopher (2004) regarding supply chain fit for variety and volume, see section 2.3.1, that food FMCGs will likely implement mostly lean initiatives above agile initiatives and vice versa for food retailers, the results in Table 6 in section 5.8.3 contradicts this assertion. As stated by Respondent 08 who manages a retailer that deals with over six thousands SKUs; "*we cannot afford to have varying different ways of picking product in a store or varying different ways of receiving a distribution centre delivery*", the retailers' supply chain managers are seeking ways to be leaner and more efficient. And although the FMCGs are on the lean journey they are pretty much also equally focused on achieving greater agility as emphasised by Respondent_02; "*overall if I look in South Africa the majority of supply chain has got some serious catching up to do, so the landscape of the supply chain has still got large catch up to happen and we are still doing the basics*".

This results suggest that South African food FMCGs and retailers have not taken a conscious decision to pursue either lean or agile agenda; supply chain improvements are being pursued from various angles. This may be fine for cases whereby the initiatives being implemented increase both effectiveness and efficiency, however for some of the initiatives

that may have negative impact the consequences may be dire. For example Carvalho *et al*. (2011) and Chang (2004) support the idea of using 4PL to have flexibility of transportation, Respondent_02 highlighted the fact that at times outsourcing management of transportation resources can result in loss of control and missed opportunity to increase transport utilisation.

6.7.2 Conclusion

Research proposition six aimed to find if the food retailers are implementing mostly agile initiatives while food FMCGs implement mostly lean initiatives. It was found that, there is even split for both retailers and FMCGs regarding lean and agile initiatives, and more so, as highlighted by Table 6, the retailers and FMCGs are more mostly implementing initiatives that primarily drive both higher efficiencies and higher effectiveness.

6.8 Overall Conclusion to Discussion of Results

Overall it was found that the following research propositions were positively supported by the analysis and results, that is propositions one, two, three and four, and are therefore accepted. Data analysis and results of research propositions five and six contradicted the assertion of the propositions and therefore these two propositions are rejected.

CHAPTER 7: CONCLUSION

7.1 Introduction to Conclusion

The previous chapter; chapter six, discussed the results of chapter five that where obtained using the research methodology outlined in chapter four, in light of the literature review outlined in chapter two. This chapter start by revisiting the research objectives and goes on to outline the main findings and recommendations for various business stakeholders. Furthermore a framework for building lean and agile supply chain is proposed; the research limitations are outlined as well as possible scope for future research is suggested.

7.2 Research Objectives Revisited

The research sought to understand the applicability of the sand cone model to build lean and agile supply chains, and also to identify the initiatives that have been implemented by food FMCGs and food retailers in South Africa. The research also sort to understand the possible supportive and opposing roles of agile and lean initiatives on supply chain effectiveness and efficiency, to enable organisations to make better decisions on choosing which initiatives they should implement to improve the performance of their supply chains.

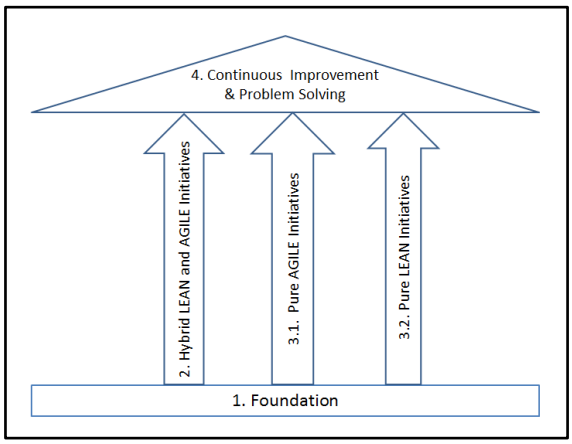
7.3 Main Findings

Using the sand cone model of Ferdows and Meyer (1990), Bortolotti *et al.* (2014) and Takala *et al.* (2006) suggested that implementation of agile initiative should precede implementation of lean initiatives in supply chain. The results from the research illustrate that the cumulative sequence of building as per the sand cone theory does not necessarily work for building lean and agile supply chain. The usage of the model by Bortolotti *et al.* (2014) and Takala *et al.* (2006) assumed that initiatives can either be lean or agile and it ignored the fact that a number of the supply chain initiatives drive both lean and agility agendas. The research found that organisations are able drive both lean and agility agendas concurrently, and therefore they do not need to choose one over the other. Organisations can build lean and agile supply chain by implementing the initiatives that drive both lean and agility, so as to increase their supply chains' efficiency and effectiveness.

7.3.1 Revised Model for Building Lean and Agile Supply Chains

Given the above finding it is therefore suggested that the sand cone model for building lean and agile initiatives, as illustrated in Figure 6 in section 2.3, be modified with the proposed basic model for building lean and agile supply chain presented below in Figure 37.

Figure 37. Revised model for building lean and agile supply chains



The model illustrates that one need some basic foundation for building lean and agility and thereafter an organisation can launch initiatives that are able to improve both leanness and agility. And thereafter can initiate improvements that drive only lean/agility, and while doing so ingrain continuous improvement and problem solving culture.

7.3.2 Foundation Required for Building Lean Agile Supply Chains

Before outlining the key initiatives to build lean and agile supply chain it is critical to outline the important finding regarding the need to build a strong foundation on which the initiatives need to be built upon. The key finding from the research is that lean and agile initiatives do not exist or rest on their own, they need to be rooted on a firm foundation. A foundation firm foundation for successful lean and agility is made up of the following:

- Business and supply chain strategy alignment,
- Supply chain objectives alignment and gap analysis (which will guide initiatives selection),
- Strong safety and quality policies and culture,
- sales and operational planning (S&OP) process or integrated business planning process (IBP), and
- and skills gap analysis which must drive people development.

7.3.3 Initiatives that Drive both Lean and Agility

The following agile and lean initiatives were found to increase supply chain effectiveness and as well as efficiency;

- increasing visibility of the value chain (preferably using ERP system),
- centralising distribution,

- collaborating with suppliers and customers,
- standardising and documenting processes,
- standardising products, and
- driving continuous improvement.

7.3.4 Initiatives that Drive Lean Only

Furthermore the following lean initiatives were found to drive higher efficiencies and cause no deterioration on effectiveness;

- FMCGs doing direct deliveries from their factories to the retailers' distribution centres (removing the need to delivering to FMCGs distribution centres),
- increasing transport utilisation,
- doing value stream mapping (VSM) to eliminate waste,
- reducing the number of SKUs, and
- implementing total productive maintenance (TPM).

7.3.5 Initiatives that Drive Agility Only

With regard to initiatives that primarily drive agility it was found that they, in some instances, can cause a reduction on supply chain efficiency. And supply chain practitioners when implementing them should be aware of the negative consequences and possibly seek to implement a countering lean initiative(s). Those agile initiatives that drive higher effectiveness are;

- usage of third-party logistics (3PL) or fourth-party logistics (4PL),
- contracting a contingent supplier or having dual suppliers for critical material/services,
- having flexible resources, and
- investment in additional capacity coupled with the right technology.

7.4 Recommendations

Hanging reviewed the research results and outlining the main findings above this section outline some recommendations for the various supply chain practitioners.

7.4.1 Recommendations for Food FMCGs' Supply Chain Managers

Supply chain professionals working for food FMCGs should firstly check to see if they have a firm foundation on which they can implement lean and agile initiatives. Once the foundation had been laid and supply chain gap analysis done they should then look into implementing

the initiatives that drive both lean and agility as outlined in section 7.3.3 above, and thereafter they can look to implement some of the specific lean or agile initiatives. One key aspect to creating a firm foundation which would be critical for food FMCGs is to ensure that their strategy and tactics is aligned with that of key food retailers as any misalignment will render the initiatives redundant. For example initiatives such as centralising distribution, doing direct deliveries and increasing transport utilisation are very much dependent on the retailers strategy and tactics as well. And to that effect once the foundation is laid it is imperative that food FMCGs build strong collaborative relationships with their customers, that is the food retailers.

7.4.2 Recommendations for Food Retailers' Supply Chain Managers

As with the supply chain professionals working for food FMCGs, similarly for supply chain managers for food retailers they should firstly check to see if they have a firm foundation on which they can implement lean and agile initiatives. Once the foundation had been laid and supply chain gap analysis done they should then look into implementing the initiatives that drive both lean and agility as outlined in section 7.3.3 above, and thereafter they can look to implement some of the specific lean or agile initiatives. One key lean initiative that food retailers should work on and drive collaboratively together with food FMCGs is that of SKUs reduction. As one supply chain manager mentioned "*small is beautiful and controllable*" (Repondent_01).

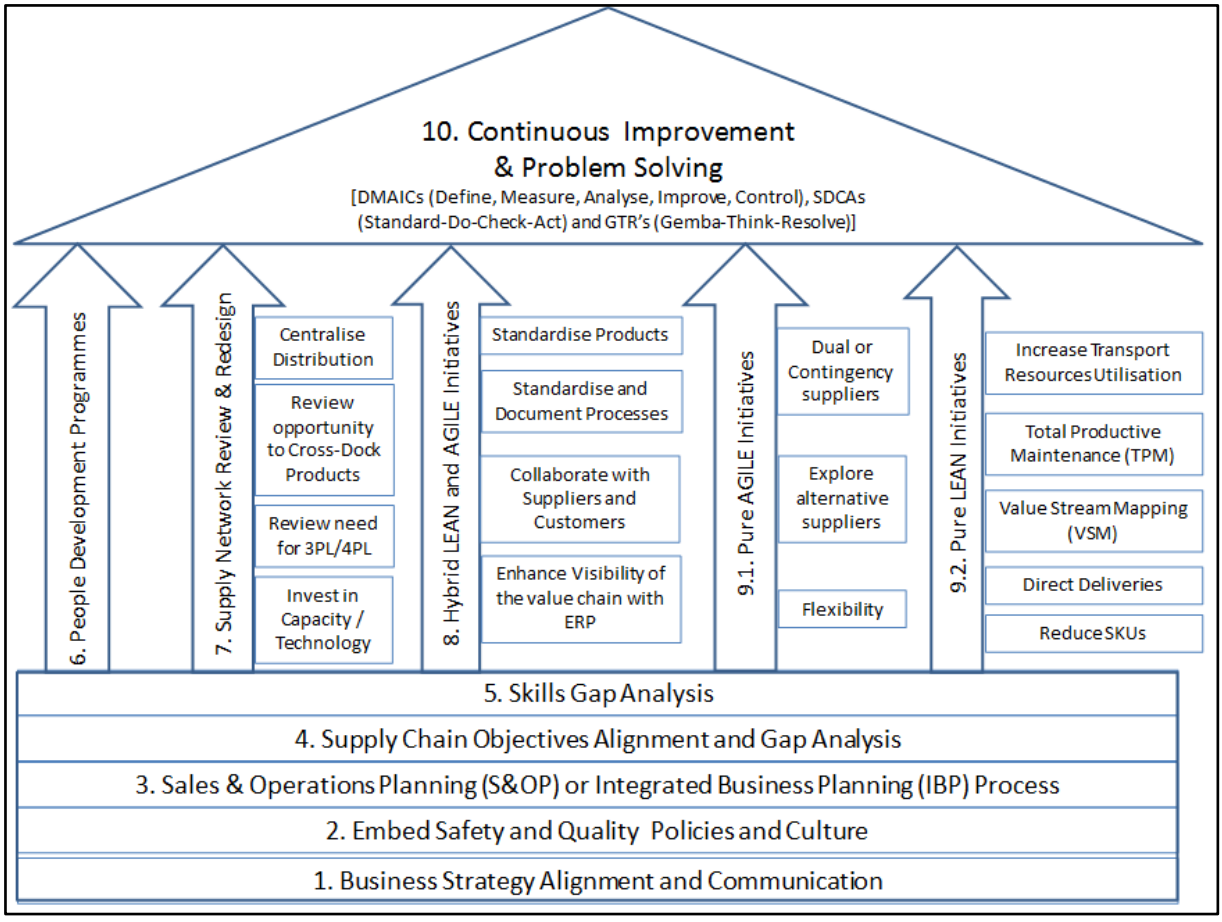
7.4.3 Recommendations for all Supply Chain Managers

Although this research looked into initiatives that are implemented in by food retailers and FMCGs, these initiatives are not specific to FMCGs and retailers and supply chain managers from different industries should look into these initiatives and seek opportunities to implement them. However supply chain managers should not implement these blindly as it has been demonstrated that some of the initiatives can have opposing effect and therefore it is recommended that they must look firstly into initiatives that drive both lean and agility and see if they could implement those, thereafter look at the specific lean and agile initiatives. And in all cases all companies should seek first to build a strong foundation in which these initiatives rest on. To that effect a framework for building lean and agile supply chains is presented in the next section.

7.5 Proposed Framework for Building Lean and Agile Supply Chains

Following the revised model for building lean and agile supply chains presented in section 7.3.1, and to assist managers to easier work with the main findings and implement the recommendations, a framework for building lean and agile supply chains is proposed. The framework was built upon the literature review, the research data analysis and results thereof. It is suggested that supply chain managers must use this framework for implementing lean and agile initiatives to make their supply chain more effective and efficient. The framework is given in Figure 38 below. In simplicity, it says that managers must start by building a firm foundation, that is items one to five in the framework, thereafter focus on people development to close skills gaps (item six), review their supply network design (item seven) and implement initiatives that build both lean and agility (item eight). Thereafter organisations could look at implementing initiatives that build lean or agility only. And top it off organisations should ingrain a culture of continuous improvement and problem solving using methods such as SDCAs (Standard-Do-Check-Act), GTR's (Gemba-Think-Resolve) and/or DMAICs (Define, Measure, Analyse, Improve, Control).

Figure 38. Proposed framework for building lean and agile supply chains



7.6 Limitations of Research

This study focused on the lean and agile initiatives within food retailers and food FMCGs, therefore no direct inferences with regard to trends and guaranteed benefits in other industries can be made. However since most (if not all) of the practices being explored could be used in other industries the outcomes of this study could be used or extended to apply the existing initiatives in other industries however care will need to be taken as it has been demonstrated some of the initiatives can have negative impact on supply chain effectives and/or efficiency. It is again highlighted that the sampling frame did not consist of smaller food retailers and therefore no inferences of the lean and agile initiatives can be made with regard to that group.

Although a significant number of themes were picked up from this study, generalisation of the results to the whole population is not possible due to the sample size of the qualitative study of this nature, and therefore this research does not intend to have unearthed an exhaustive list of all agile initiatives and lean initiatives that have been implemented in the food FMCGs and retailers, and there could possibly be other initiatives that have been implemented already. It should also be highlighted that implementing the framework suggested in section 7.5 above does guarantee results as in different organisations there may be other factors, internal or external, that could have adverse impact on supply chain performance.

7.7 Recommendations for Future Research

The following recommendations for future studies are made based on the research methodology used in this case, qualitative with a small sample size, and the industries sampled (only food FMCGs and food retailers):

- It is suggested that a quantitative research be done to test how far various supply chains in diverse industries have gone in so far as implementing the lean and agile initiatives uncovered in this research. This will could uncover specific industries that may be lagging behind with regard to supply chain evolution.
- Another area of research could be to test the proposed framework for building lean and agile supply chains using a quasi-experimental methodology to test the effect of using the framework on supply chain performance. The study can be done over a number of years across companies in different industries, to either support, refute or improve on the framework.

7.8 Conclusion

Business leaders are more and more looking towards supply chain organisations and supply chain managers to drive companies' competitiveness. Lean and agile initiatives hold a key to building efficient and effective supply chain that deliver superior customer service at lower costs. By laying great foundation for launching lean and agile initiatives and implementing the proposed framework for building lean and agile supply chains, supply chain managers can put their organisations on a path towards superior supply chain performance and competiveness.

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APPENDIX 1 – INTERVIEW SCHEDULE

Topic: Lean and Agile Supply Chain Initiatives for Leagile Supply Chains for Fast Moving Consumer Goods Manufacturers and Food Retailers in South Africa
Type of Study: Qualitative Study
Data Collection Instruments: Notebook and Two Audio Recorders

Introduction:
Hi. My name is Selepe Phetla; I am an MBA student at the Gordon Institute of Business Science (GIBS). I am conducting research on Lean and Agile Supply Chain Initiatives for Leagile Supply Chains for Fast Moving Consumer Goods Manufacturers (FMCGs) and Food Retailers in South Africa (SA). I am trying to find out what various companies are doing to improve the performance of their supply chains. More specifically I am looking to gain deeper understanding of various lean and agile supply chain initiatives that SA FMCGs and retailers have explored and/or implemented. Our interview is expected to last about one hour.

***Administration*:**
- *Ensure the area at which the interview takes place is comfortable and that there are no obvious disturbances such sources noise.*
- *Switch off cellphone.*
- *Provide the respondent with the Informed Concerned Letter.*
- *Ensure that the respondent consents to the interview, agrees to the interview being audio recorded and signs the Informed Concerned Letter.*
- *Ask the respondent if they have any clarifying questions regarding the research or the interview.*
- *Confirm with the respondent that she/he is ready for the interview and that they are not expecting any emergency phone calls.*
- *Explain how the data will be analysed and used post the interview.*
- *The following questions are to serve as guide of the conversation and there will be follow-up questions based on the answers the respondent give, and there may be a need to seek clarification from the responded regarding the answers they give.*

[*Start the recording on both recorders*]

Opening Question:

May you please introduce yourself, the company you work for and your role in the organisation?

Name of Respondent: ……...
Name of company: ……...
Role in the Organisation: ……...

Opening Question:

May you please briefly give the overview of your supply chain design and materials flows involved thereof.

Question 1:

What are some of the supply chain challenges has your company experienced in the last five years and how has your company responded to these challenges?

Question 2:

What initiatives/improvements/projects have you been implementing to improve the performance of your supply chain?

Question 3:

Considering supply chain effectiveness, please share with me about your company's journey regarding to some of the initiatives that you have implemented to improve supply chain effectiveness.

Question 4:

Considering supply chain efficiency, please share with me about your company's journey with regard to some of the initiatives that you have implemented to improve supply chain efficiency.

Question 5:

Considering your colleagues in Sales and Marketing as well as those in Finance, how has your supply chain supported meeting their various goals/targets?

Question 6:

There may be other any activities of supply chain improvement that your company has embarked on that we have not covered yet during the interview? If there is, may you please share some of those if you do not mind.

Closing Questions:

This is the end of the interview from my side. Do you have any further questions or anything else you may want to add? May I contact you for further clarification should the need arise?

Close:

Thank you for your making yourself available for this interview and for sharing valuable information that will contribute to my research and learning.

[*Stop recording both recorders*]

APPENDIX 2 – INFORMED CONSENT LETTER

As part of my Master of Business Administration (MBA) studies at the Gordon Institute of Business Science (GIBS), I am conducting research on **Lean and Agile Supply Chain Initiatives for Leagile Supply Chains for Fast Moving Consumer Goods Manufacturers (FMCGs) and Food Retailers in South Africa (SA)**. I am trying to find out what various companies are doing to improve the performance of their supply chains. More specifically I am looking to gain deeper understanding of various lean and agile supply chain initiatives that SA FMCGs and retailers have implemented or are implementing.

Our interview is expected to last about one hour.

Your participation is voluntary and you can withdraw at any time during the interview without penalty should you feel that the interview in inappropriate or could prejudice you or your company. The interview will be audio-recorded and then transcribed. The transcribed scripts will be stored with company and people names replaced with code-names so as to keep the names confidential. There are no costs that respondents and their companies have to pay for this research and there is no payment that will be given to the participants, however the research report will be shared with the participants once completed. All data will be kept confidential, and no individual name or company name will be identified in the results and discussion thereof. If you have any concerns regarding this interview/research feel free to contact my supervisor or myself. Our details are provided below.

Researcher Name: **Mr Selepe Phetla**
Email: Selepe.Phetla@gmail.com
Phone Number: +27 83 574 4035

Research Supervisor: Dr Ken Mathu
Email: MathuK@gibs.co.za
Phone Number: +27 11 771 4000

Signature of participant: _____
Date: _____

Signature of researcher: _____
Date: _____

APPENDIX 3 – LIST OF SOUTH AFRICAN FMCGs BY MARKET SHARE

% retail value rsp Company	2010	2011	2012	2013	2014
Tiger Brands Ltd	16.9	16.7	17.3	17.4	17.4
Clover SA (Pty) Ltd	4.9	5.0	5.3	5.4	5.7
Pioneer Food Group Ltd	5.8	5.5	5.5	5.5	5.3
Nestlé SA	4.3	4.4	4.6	4.4	4.3
Lactalis, Groupe	0.1	4.0	3.9	3.9	3.9
AVI Ltd	3.5	3.5	3.6	3.7	3.7
Unilever Group	3.8	3.9	3.8	3.8	3.6
PepsiCo Inc	3.2	3.2	3.2	3.2	3.2
Mondelez International Inc	-	-	2.9	2.7	2.7
Premier Foods Plc	1.9	1.9	1.9	2.1	2.1
Danone, Groupe	1.9	2.0	2.0	2.1	2.1
Willowton Group (Pty) Ltd	1.2	1.2	1.4	1.5	1.6
Dairybelle (Pty) Ltd	1.9	1.9	1.9	1.5	1.4
Foodcorp (Pty) Ltd	0.9	1.0	1.0	1.0	1.0
Mars Inc	0.9	0.9	0.9	0.9	0.9
Accolade Trading Co (Pty) Ltd	0.8	0.9	0.9	0.9	0.9
Kellogg Co	0.7	0.7	0.9	0.8	0.8
McCain Foods Ltd	0.8	0.8	0.8	0.8	0.7
Eskort Bacon Co-Operative Ltd	0.7	0.7	0.7	0.7	0.7
Rhodes Food Group	0.2	0.2	0.2	0.4	0.4
Wilmar International Ltd	-	0.3	0.3	0.3	0.4
Heinz Co, HJ	0.4	0.4	0.4	0.4	0.4
Aspen Pharmacare (Pty) Ltd	0.2	0.1	0.1	0.3	0.3
Willowton Oil & Cake Mills	0.4	0.3	0.3	0.4	0.3
Unity Food Products (Pty) Ltd	0.3	0.3	0.3	0.4	0.3
Candy Tops	0.3	0.4	0.3	0.3	0.3
Pakco (Pty) Ltd	0.2	0.2	0.3	0.3	0.3
Lancewood Cheese Co	0.2	0.2	0.2	0.2	0.3
Woodlands Dairy (Pty) Ltd	0.1	0.2	0.2	0.2	0.2
Darling Romery (Pty) Ltd	0.2	0.2	0.2	0.2	0.2
Private Label	11.9	12.4	12.8	13.4	14.0
Artisanal	3.0	2.8	2.7	2.6	2.5
Others	28.4	23.9	19.3	18.5	18.1
Total	100.0	100.0	100.0	100.0	100.0

APPENDIX 4 – ETHICAL CLEARANCE APPROVAL FOR THE RESEARCH

Gordon Institute of Business Science
University of Pretoria

Dear Selepe Phetla

Protocol Number: **Temp2015-01168**

Title: **Lean and Agile Supply Chain Initiatives for Leagile Supply Chains for Fast Moving Consumer Goods Manufacturers and Food Retailers in South Africa**

Please be advised that your application for Ethical Clearance has been APPROVED.

You are therefore allowed to continue collecting your data.

We wish you everything of the best for the rest of the project.

Kind Regards,

Adele Bekker

APPENDIX 5 – SUB-THEMES UNDER COLLABORATION INITIATIVES