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Implementing forward-integrated supply chain strategy to improve operational efficiency in South African FMCG manufacturers

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Abstract

Research Purpose: Customer focus has become increasing critical in order for organisations to effectively compete. Organisations operate in continuously changing environments, with dynamic customer needs requiring that organisations frequently revisit their strategic objectives. Supply chain integration provides organisations with an opportunity to keep up with these changing environments, offering a platform for collaboration with external partners. This research explores three of the customer-focused supply chain capabilities and their relationship with organisation's operational efficiency and overall performance

Research Methodology: A quantitative and descriptive correlational research approach was conducted, with a self-administered online survey questionnaire sent to selected employees of FMCG organisations. A basis of the research was formed through a literature review focused on supply chain integration, in particular on the three forward-integration capabilities of customer-closeness, use of integrative technologies, and information and knowledge sharing. The research carried out descriptive analysis and correlational testing between the forward-integrated supply chain capabilities, and operational efficiency and overall organisational performance effects.

Research Findings: analysis carried out suggests that the three forward-integration capabilities contribute positively to process improvement of supply chain integration efficiency and organisational performance. Organisations should increase focus on their relationship with customers, embrace the use of technology and employ information as a strategic resource.

Keywords

Supply Chain Integration, Forward-Integration, Integrative Technologies, Information and Knowledge Sharing, Operational Efficiency

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: _____ Signature: _____

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LIST OF ABBREVIATIONS

Abbreviation	Description
CMI	Co-Managed Inventory
CPFR	Collaborative Planning, Forecasting and Replenishment
CRM	Customer Relationship Management
DC/WH	Distribution Centre / Warehousing
DM	Demand Management
ERP	Enterprise Resource Planning
FMCG	Fast-Moving Consumer Goods
ICT	Information and Communications Technology
IT	Information Technology
ITM	Information Technology Management
L/T	Logistics / Transportation
MFG	Manufacturing
MIS	Management Information Systems
NPD	New Product Development
OM	Operations Management
P&S	Procurement & Sourcing
PoS	Point-of-Sale
R&D	Research & Development
S&OP	Sales & Operations Planning
S&OP	Sales & Operations Planning
SCI	Supply Chain Integration
SCM	Supply Chain Management
VMI	Vendor Managed Inventory

Chapter 1: Introduction to Research Problem

1.1. Introduction – Research Background

Organisations are continuously striving to improve operational performance and increase efficiency in order to gain competitive advantage, and achieve overall organisational objectives, such as financial goals and strategic intent. One way of improving operational performance and increasing efficiency is through an effective and efficient Supply Chain Integration (SCI) strategy aligned with organisational objectives. Morash (2001) states that supply chain capabilities are the building blocks for supply chain strategy and a source of competitive advantage for firm success. Such supply chain capabilities as customised logistics and agility are demand side focused, while cost related and lean supplier networks tend to be more supply-side focused (Morash, 2001). Organisations operate in continuously changing environments such that their strategies constantly require review and adjustment. As the competitive context of business continues to change, bringing with it new complexities and concerns for management generally, it also has to be recognised that the impact on logistics and supply chain management of these changes can be considerable (Christopher, 2005). Some of the most pressing challenges that bring about changing levels of competition are new rules of competition, globalisation of industries, downward pressure on price and customers taking control (Christopher, 2005). By customers' taking control, it implies that customers are an integral part of an organisation's supply chain strategy and an organisation's end-to-end supply chain strategy cannot neglect those customers. One of the components of most business strategies is Customer Relationship Management (CRM), which addresses key customer relationship activities that in order to ensure customers are acquired and retained for a longer period. The organisation's supply chain management should therefore ensure that CRM activities are a key component.

The increasingly dynamic nature of environmental context leads to increasing range of responses by organisations, such as review of strategy (Rose, Mann, & Rose, 2012). Rose et al. (2012) cited Chaharbraghi and Willis (1998), stating that strategy is driven by the need to be competitive, to adapt to change, and to survive and succeed. Adapting to change includes adapting to evolving customer needs, resulting from trends in the markets in relation to the supply of goods and services to customers.

Consumer behaviour also has a major impact on the requirements of organisations within the supply chain. Traditionally, organisations have focused on managing internal resources and capabilities as a basis for organisational strategy, rather than to opportunities arising from identifying consumers' bundling preferences for value creation, that is, viewing strategic opportunities from a demand-side perspective (Priem & Swink, 2012).

1.2. Motivation for the Research

The research aims to explore customer-focused supply chain integration, also referred to as forward-integration, and its impact on organisational and operational performance towards gaining competitive advantage. The research suggests that increased level of customer-focused supply chain integration has a positive impact on organisational and operational performance, which in turn increases an organisation's competitiveness. In addressing this research proposition, the research will attempt to answer three main questions relating to an organisation's forward-integration strategy. These questions will each have supply chain construct variable statements, compiled as part of a survey questionnaire sent out to targeted employees of organisations in order to obtain responses on their views. The first group of questions relate to an organisation's relationship and closeness with its customers. The second group of questions relate to the organisation's use of information technology to enable internal and forward integration of the supply chain. The third group of questions relate to the extent to which the organisation practices information and knowledge sharing, both internally and with customers. Similar types of supply chain integration research have been conducted previously; however, these have mainly been focused on the so-called developed countries such as the North America and Europe, thereby leaving a large gap in knowledge pertaining to the applicability of the SCI construct to other national settings and cultures, such as those classified as developing countries (Childerhouse et al., 2011). Research carried out by Agan (2011) through literature review highlights the importance of supply chain integration on organisational performance, however, that there was a need for a causal model to be developed which will indicate why and how supply chain integration has an effect on operational performance. This research however does not attempt to come up with a model, but tests the level to which organisations have developed customer-focused supplied chain integration capabilities,

and implemented relevant infrastructure and processes to enable supply chain integration.

With the effects of globalisation introducing a different dimension to competitiveness in emerging markets, the intension of this research is therefore to carry out a similar research exercise with a focus on the Fast-Moving Consumer Goods (FMCG) industry in emerging markets, particularly in a South African environment. Part of the research is to test the level of internal integration and demand-side supply chain integration, and their effect on operational efficiency and organisation performance. Researchers in developed markets have carried out research for either horizontal or vertical supply chain integration, or even both. These types of research have mainly been carried out within the manufacturing industry. There are few researches conducted within the FMCG industry in emerging markets. There is also little evidence of research for the impact of supply chain integration on operational effectiveness and organisational performance for FMCGs in emerging markets such as South Africa. The intended outcome of the research is to assist managers of FMCG organisations in South Africa to be able to assess certain aspects of customer-focused supply chain integration in order to improve organisational performance and operational efficiency. In addition, the research should assist in assessing the use of information technology in enabling and improving the performance of supply chain integration, and the sharing of value-adding information and knowledge, both internally and with key customers in order to create customer value, and continuously improve on supply chain capabilities. Both Hua, Chatterjee, and Jingliang (2011), and Cova and Salle (2008) eludes that in interacting with customers, suppliers or manufacturers of goods or services should understand that their relationship with customers in providing these services is not just about selling and buying, it is mainly about creating value with the customer, and how the customer perceives the value created. In the case of this research, which will focus on the FMCG industry in South Africa, the buyer refers to the wholesaler, retailer, or end consumer as the customer and the seller refers to the FMCG manufacturer as the supplier of goods or services. Hence, the research will focus on the supply chain of FMCG manufacturers as the focal organisation, and customer-integration relating to how the FMCG manufacturer integrates with its wholesale or retail customers within its supply chain. The relationship in this case is a business-to-business type of relationship, where the buyer obtains goods and services with the main purpose of reselling to other resellers or end consumers.

The research is also motivated by the need to understand the level of collaboration of efforts across the organisation's functional units and the organisation's customers. Organisations are continuously implementing internal collaboration processes and platforms in order to increase the levels of collaboration both internally and with key partners. Collaboration platforms are mainly technology driven. These platforms are in essence supply chain or customer value chain enablers. According to Arshinder, Kanda, and Deshmukh (2011) supply chains activities involved, such as logistics, inventory, procurement, product planning, cross-functional units, and external supply chain members, introduces a lot of complexity which requires increased levels of collaboration and coordination. Collaboration by these supply chain members can reduce the level of risk, and increase the value add for the customer, including the end consumer. Agan (2011) highlights the importance of collaboration by stating the as supply chain partners collaborate, a great level of understanding, closeness, commitment and trust is created, which reduces the effects of bullwhip. Agan (2011) further states that collaboration brings about information sharing to enable understanding of customer needs, and allows organisations to develop products and services suitable to their customers.

1.3. Research Problem and Scope

The main objective of the research is to test the implementation of forward-integration supply chain strategy within FMCG organisations, in order to improve the organisation's operational effectiveness and overall performance. Forward-integration strategies are mostly suited for organisations that manufacture or design products with the aim of selling them to wholesalers, retailers, or end consumers. Industries such as Financial Services, Telecommunication and FMCG Manufacturing are more inclined to be customer-focused than supplier-focused. However, the FMCG manufacturer's supply chain may have a dependency of suppliers of raw material, their performance and operational efficiency is mainly driven by their relationship with their customers, and the speed at which their products and services are delivered to the customers. Industries such as mining and construction depend mainly on their suppliers for their supply chain to be efficient. The selection of the FMCG manufacturing industry suited the research for customer-focused supply chain integration, due to the nature of relationships required between the manufacturer and the customer, though these

manufacturers also have a dependency on suppliers within their end-to-end supply chain.

The industry scope of the research is thus limited to the South African FMCG, with selected organisations targeted, through key employee contacts, as a sample for the research. The researcher prepared an online questionnaire for those key selected employees who are involved in the organisation's supply chain at different levels of management and different functional areas. The researcher assumes that the activities carried out by these individuals has either a direct or indirect impact on the organisation's supply chain integration, or these employees have some knowledge of the organisation's supply chain and how the organisation is performing overall

A typical FMCG industry consists mainly of suppliers of raw materials, manufacturers, wholesalers, retailers, and consumers. For the scope of this research, manufacturers of the following FMCG products and services categories were considered: Alcoholic Beverages, Foods and Beverages, Home Care, Personal and Health Care. However, the research was not limited to any category.

1.4. Research Report Structure

The structure of the research report is in the following manner. Chapter One introduces the research title, which relates to the implementation of a forward-integrated supply chain strategy within the South African FMCG industry, with the aim of improving operational effectiveness and overall organisational performance. The chapter also outlines the research problem and scope. The context of the research problem centres on the need for organisations to collaborate closely with their key customers using integrative technologies and sharing of information and knowledge. Chapter Two covers a review of mainly academic literature, with definitions of key concepts of supply chain management and supply chain integration. These includes forward-integration by FMCG manufacturers with their key customers, use of integrative technologies to enable supply chain integration, and sharing of information and knowledge across an organisation's functional units and its customers. Chapter Two also highlights the relevance of the research need through arguments made within the referenced literature. Chapter Three presents the three main research questions and their research objectives used to test for the research problem. Chapter Four details the

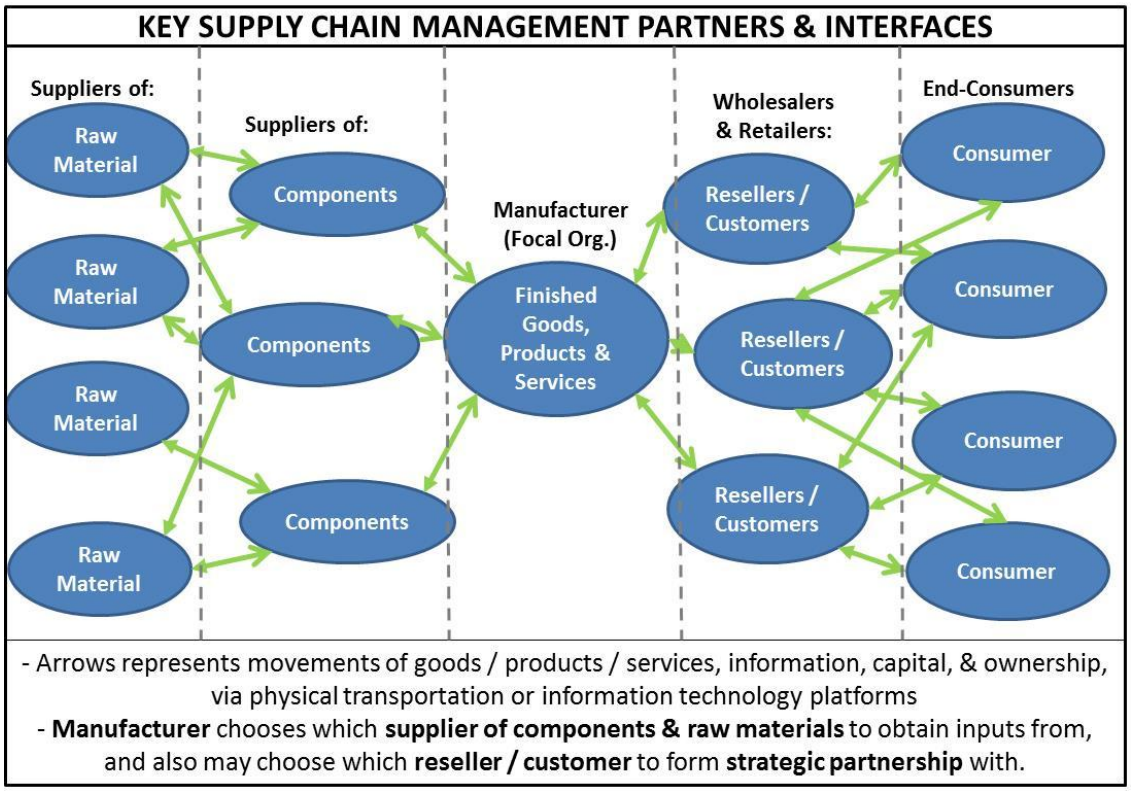
descriptive quantitative research approach taken by the researcher, including the use of research questionnaire, the research sample, and data collection method and data analysis used. Chapter Five then presents the data collected mostly in a descriptive manner, while Chapter Six presents an analysis of the data and the results outlined in Chapter Five. Chapter Seven concludes the research report with a review of the research objectives in light of the analysis carried out, highlighting key positive and non-positive findings. The conclusion makes a recommendation of a forward-integration framework for supply chain. A number of recommendations for key stakeholders regarding the implementation of strategies relating to supply chain integration, particularly those relating to forward integration, are covered in the concluding chapter. The chapter concludes with a list of suggested future research.

Chapter 2: Theory and Literature Review

2.1. Supply Chain Management

Sukati, Hamid, Baharun, and Yusoff (2012) define supply chain as a set of value-adding activities connecting the enterprise's suppliers and its customers. Value-adding activities are those activities carried out in order to deliver a product or service that creates value to a customer or end consumer. In order to understand supply chain integration and the effect of supply chain integration on an organisation's operational effectiveness and overall organisational performance, a review of literature was undertaken to ascertain an understanding of the key concepts of Supply Chain Management (SCM). SCM efforts are described as "cross-functional activities with roots in a wide variety of disciplines," where some of these disciplines, which are all relevant to the decision making process of SCM, including "logistics, purchasing, Management Information Systems (MIS), Operations Management (OM), engineering, accounting, and marketing" (Newman, Hanna, Gattiker, & Huang, 2009, p. 19). Supply Chain Management is further defined as activities that "incorporates the entire exchange of information and movement of goods between suppliers and end customers, including manufacturers, distributors, retailers, and any other enterprises within the extended supply chain" (Gunasekaran, Lai, & Edwincheng, 2008, p. 549). In addition, Supply Chain Management is the "planning, implementing, monitoring, controlling, where possible, and changing, where necessary, all the processes, resources and flows within an extended concept of supply chain which includes all actors in a network, web or system that functions as a whole to provide value from the highest upstream source through various value-adding and modifying nodes, to the end customer" (Rose et al., 2012). Based on the above definitions provided from literature, one can deduce that SCM relates to the management of integrations of the organisation's internal functions and business units, with an extension of the integration to the organisation's suppliers and customers, in order to create value for the end consumer. Figure 1 below illustrates a generic supply chain process, with key supply chain partners and key integration points depicted by the arrows.

Figure 1: Generic Supply Chain Process



As illustrated by Figure 1 above, the arrows indicate movements of goods, products, services, information, financial transactions, and ownership of goods or of products. Movements of goods and products are facilitated by physical transportation mechanisms such as road, rail, air, and sea, which are also key components of the supply chain. Movements of financial transactions, information, and ownership may be facilitated by information technology platforms and systems, integrated as part of the supply chain process, or as separate from the organisation's supply chain process. The manufacturer of goods, products, or services, is the focal organisation of the research. The manufacturer chooses which supplier to obtain raw materials and components from as input into their manufacturing process. The manufacturer may also opt to choose which customers to form strategic partnerships with, or they may open up trade with any customer who requires their goods, products, or services. The relationship between the manufacturer and its partner suppliers and customers, together with internal cross-functional relationships, are determining factors to the performance and success of the manufacturer's supply chain. In addition, the use of information technology to enable the supply chain, and the sharing of information and knowledge both across functional units and with key customers, may have a positive or negative

impact on improving the organisation's operational efficiency and overall performance. Supply chain integration study conducted by Agan (2011) showed that supply chain integration capabilities such as collaboration with suppliers and customers, the use of information technology infrastructure to enable supply chain integration, together with increased focus on the customer environment, are key capabilities in achieving supply chain efficiency and improving organisational performance.

In order for supply chain management to be effective, a supply chain strategy must be in place. A supply chain strategy aligned to the overall organisational strategy can increase the potential of an organisation to achieve its strategic objectives. Defining supply chain strategy, Rose et al. (2012) cited Chopra and Meindl (2007) stating that supply chain strategy is in essence strategic decisions relating to activities made by organisations, spanning across different functions and activities of those organisations. A further definition refers to supply chain strategy "as the deliberate and/or emergent conceptual framework by which a company involves its supply chain and supply chain members in its efforts to reach its own corporate strategic objectives" (Rose et al., 2012, p. 9). Furthermore, the Council of Logistics Management (2000) is cited defining SCM as the systemic, strategic coordination of the traditional business functions and tactics across these businesses' functions within a particular organization and across businesses within the supply chain for the purposes of improving the long-term performance of the individual organization and the supply chain as a whole (Li, Ragu-Nathan, Ragu-Nathan, & Subba Rao, 2006). The above definitions suggest that customers are an integral part of the supply chain process. The understanding of customer related SCM processes and practices have been complemented by overarching planning practices labelled as demand management (Rexhausen, Pibernik, & Kaiser, 2012). However, comparably little work has been conducted in this field. Contributions generally focus only on isolated aspects of demand management, such as forecasting or sales and operations planning, and originate largely from practitioners, as cited by Rexhausen et al. (2012), from Lapide (2006) and Mentzer (2006). Hence, this research will evaluate the role of supply chain integration from the perspective of customer integration, with customer-closeness, the use of integrative technology, and the sharing of information and knowledge as capabilities for supply chain integration. These capabilities, whether combined or on their own, enable an organisation's operational efficiency and overall performance.

2.2. Overview of Supply Chain Integration

Supply chain integration continues to be a key theme amongst those seeking to understand how to harness the potential of the supply chain to create sustainable value (Kannan & Tan, 2010). In a research report outlining challenges and good practices of supply chain integration, a broad definition of supply chain integration is provided as "the *alignment* of supply chain goals and objectives between functions and enterprises, and the *linkage* of these functions and enterprises through information transparency, electronic or people-to-people" (Carter, Monczka, Ragatz, & Jennings, 2009, p. 9). The definition provided by Carter et al. (2009) above highlight the importance of collaboration for both the organisation's cross-functions and the various enterprise members of the entire supply chain through alignment of their goals and objectives. The definition also highlights the importance of enabling supply chain integration by use of information technology and sharing of information. The definition by Carter et al. is further supported by Kannan and Tan (2010) who cited O'Leary-Kelly and Flores' (2002) definition of supply chain integration "as the extent to which supply chain members work cooperatively together to achieve mutually beneficial outcomes." In this definition, "mutually beneficial outcomes" are the same as Carter et al.'s "goals and objectives." According to Childerhouse et al. (2011), supply chain integration is better enabled by the coordination of supply chain members in order to optimise the entire value stream to achieve efficiency and improve performance, rather than optimising individual components of the supply chain.

There are various levels of integration, both internally and externally, covered in literature, with arguments made as to the type of integration and the integration level required. The various levels of external supply chain integration include different tiers of customers and suppliers. In the case of FMCG manufacturers, a tier-1 customer refers to the wholesaler or retailer who obtains goods or products directly from the FMCG manufacturer for reselling to end-consumers, or other resellers. A tier-2 customer would refer to either a reseller who made bulk purchasing from a wholesaler, or a customer purchasing goods for final consumption. Childerhouse et al. (2011) stated that the debates covered by the literature do not focus mainly on full, end-to-end integration, which covers all tiers of suppliers and customers as opposed to no integration at all. The literature rather covers the discussions and research on how much integration is suitable for an organisation, and under what circumstances, which

depends on the nature and purpose of the individual value stream. Childerhouse et al. (2011) further stated that not every supply chain relationship should be fully integrated; however, each relationship type should be matched to the level of supplier and customer dependency. FMCG manufacturers are dependent on their wholesale and retail customers to turn their inventory. The quicker the inventory turns, the better is their operational and organisational performance. How quick the FMCG organisation responds to their customer demands relates to their operational efficiency. Hence, it is important to ensure that FMCG manufacturers value their relationships with their key wholesale and retail customers. One way of improving their relationship is by increasing the level of integration with their customers.

Customer and supplier integration are commonly referred to as external integration, which refers to the degree to which a manufacturer collaborates with its external supplier and customer partners to structure inter-organizational strategies, practices and processes into collaborative, synchronized processes (Stank, Keller, & Daugherty, 2001). Customer integration in particular enables supply chain processes in achieving a deeper understanding of customer requirement, information and related knowledge (Swink, Narasimhan, & Wang, 2007). The scope of end-to-end supply chain integration includes three constructs, namely, supplier-integration, customer-integration, and cross-functional integration. However, for the purpose of this research, the scope was limited to the customer-integration construct and partly cross-functional integration, with an assumption that some level of supplier integration is in place for the organisations surveyed as part of the research sample. The scope of the research is further limited to three supply chain capabilities related to the customer-integration construct. These are customer-closeness, the use of integrative technologies, and the sharing of information and knowledge both across internal functions and key customers. These capabilities are not exhaustive of all the required capabilities necessary for supply chain customer-integration. Other capabilities may be as equally important in enabling supply chain integration and could be explored as further research. In essence, the research sets out to analyse if the organisations have implemented some level of customer-integration and cross-functional integration as enablers of supply chain efficiency and improved organisational performance. Figure 2 below illustrates a typical FMCG supply chain process, with key customer-integration points highlighted.

Figure 2: Generic FMCG Supply Chain - Key Integration Areas

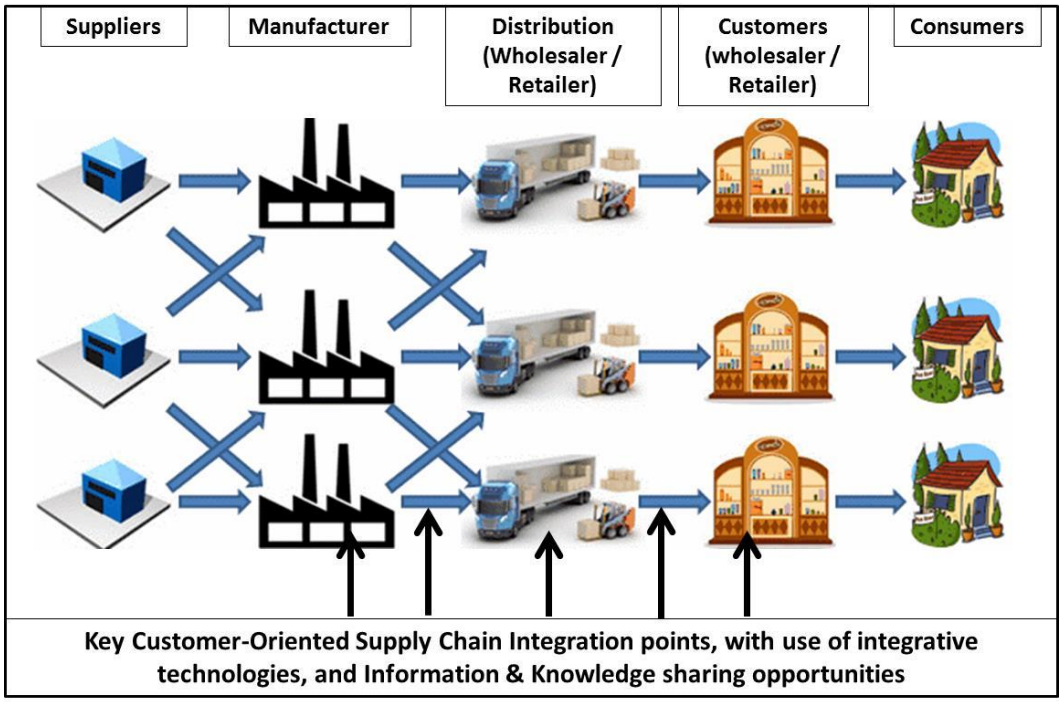
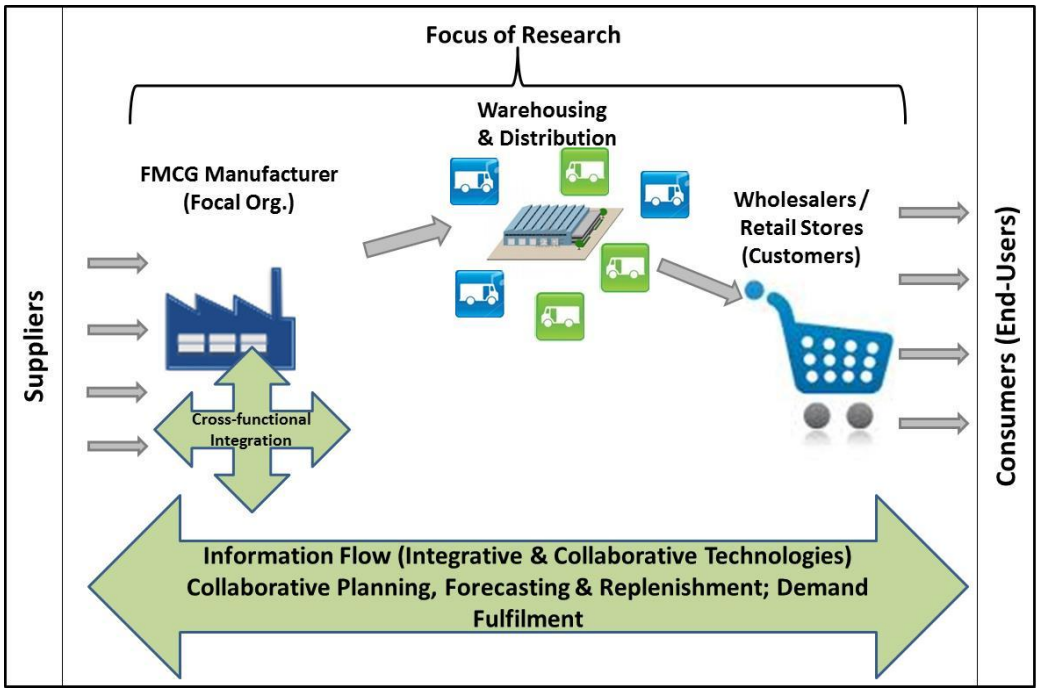


Figure 3 below emphasises the scope of the research to indicate the FMCG manufacturer as the focal organisation and the integration with the wholesaler or retailer via the warehousing and distribution centres.

Figure 3: Scope of Research



In addition to the different levels of external integration, organisations must take cognisance of their internal integration efforts and activities. As highlighted by Figure 3 above, cross-functional integration of focal organisation is as important to external, or partner integration in improving operational efficiency and overall organisational performance. As an organisation is made up of a collection of differentiated and interdependent functional units, cross-functional integration thus entails the streamlining of business processes between all these different but interdependent functional units, resulting in internal collaborative relationships (Berente, Vandenbosch, & Aubert, 2009). According to Berente et al. (2009, p. 122), these business processes and the cross-functional integration efforts "can occur across combination of sequential, parallel or pooled processes" in an effort to execute an organisation's operation, leading to greater operational efficiency and organisational performance. This implies that integration of internal functions such as Research and Development (R&D), New Product Development (NPD), Logistics, Warehousing and Distribution, Procurement, Demand Management (DM), Sales & Operations Planning (S&OP), and Customer Relationship Management (CRM) may result in a more efficient organisation, and improved performance. In addition to creating a platform for cross-functional integration, simultaneous implementation of organisational internal process integration with external partner integration, such as with key customers, accelerates organisational efficiency and overall organisational performance improvement (Droge, Jayaram, & Vickery, 2004).

2.3. Forward-Integration Strategies

Organisations implement and enable forward-integration through supply chain strategies such as Vendor-Managed Inventory (VMI), Collaborative Planning, Forecasting and Replenishment (CPFR), and Customer Relationship Management (CRM). The use of integrative information technologies assist in further enabling these supply chain collaborative strategies. Section 2.5 below covers literature review regarding the use of integrative information technologies in supply chain integration.

VMI, sometimes referred to as Co-Managed Inventory (CMI), refers to the process of placing responsibility of managing and replenishing the customer's stock levels on the supplier (Christopher, 2005, p. 203). According to Attaran and Attaran (2007), VMI was introduced as early as 1992 by Kurt Solomon Associates, and mostly implemented in

retailing even before the use of enabling technologies was in place. In the case of this research, the FMCG manufacturer assumes the responsibility of managing and taking the initiative of replenishing the wholesaler or retailer's inventory levels. To enable this arrangement to work effectively, the customer has to provide the FMCG manufacturer access to key information such as sales, inventory levels, and other customer operational information. The arrangement benefits the wholesaler or retailer as customer in that the customer's responsibility in managing their inventory is reduced, thus freeing up resources to focus on moving inventory through sales. Other benefits that customers experience through VMI arrangements include inventory reduction and increase in fill rates (Attaran & Attaran, 2007). Integrated IT systems such as the Internet and Enterprise Resource Planning (ERP) systems enable the flow of information between the vendor and the customer. This information includes customer sales, inventory levels, inventory forecasting, replenishment plans, orders and order status.

According to Attaran and Attaran (2007), CPFR extends the VMI principles in that with CPFR, both manufacturer and the customer collaborate in the planning, forecasting and replenishment activities of the customer's inventory, in order to satisfy the end-customer's requirements. This notion of CPFR as a collaborative planning effort is further emphasised by Hadaya and Cassivi (2007) in that the initial stages of CPFR relates to formulating an agreement and creating joint business planning efforts between the supply chain partners.

Customer-orientation is characterised by a great deal of customer relationship management. CRM is mainly an effort of engaging customers on a one-to-one relationship by an organisation in order to understand the needs and priorities of each customer, and extracting useful customer and demand information that can be used in shaping supply chain (Collin, Eloranta, & Holmström, 2009). CRM efforts are helpful as input to the shaping of overall supply chain, based on criteria for customer and market segmentation. Information obtained through CRM efforts is important also in selecting and implementing supply chain management technologies.

2.4. Supply Chain Customer-Closeness

Customer-closeness refers to the process of achieving a better understanding of key customers' needs and with their considerations in the organisation's business processes (Thun, 2010). Customer integration involves core competencies derived from coordination with critical customers (Flynn, Huo, & Zhao, 2010). Good relationships with supply chain members, including customers, are essential for successful implementation of SCM programs. Close customer relationship allows an organization to differentiate its product from competitors, sustain customer loyalty, and dramatically extend the value it provides to its customers (Li et al., 2006). In this relationship, the customer may be involved in the focal organisation's activities and processes relating to shaping the production of goods or services (Thun, 2010). Li et al. (2006) cited Tan, Kannan, and Handfield (1998), and Claycomb, Droge, and Germain (1999) when they define customer relationship as comprising an entire array of activities carried out by an organisation in order to manage and build long-term relationships with customers, and improve customer satisfaction. Customer closeness strategies can support business strategies of differentiation through high levels of value-added customer service, proactive quality and collaborative communications and interactions with customers (Morash, 2001).

Rexhausen et al. (2012), cite Lambert and Cooper (2000), and Croxton, Lambert, Garcia-Dastugue, and Rogers (2002) stating that one comparably new SCM dimension that has become increasingly popular in industry, but has not yet been extensively analysed in academic literature with respect to its impact on supply chain performance, is demand management. In its broadest sense, demand management can be interpreted as the ability of a focal organisation to understand key customer demands and requirements, and balance them against the capabilities of its overall supply chain. The definitions of demand management above illustrate the importance of customer integration as a key supply chain capability. An organisation's supply chain performance can be positively impacted by how well the organisation is able to balance its customers' demands and requirements with the capabilities of its supply chain (Rexhausen et al., 2012). An organisation's flexibility in relation to meeting the demands of its customers and its target market as a whole, forms the basis for the organisation's competitive advantage (Hua et al., 2011).

Rexhausen et al. (2012) highlight another capability related to customer integration, which they refer to as distribution management. Together with demand management, distribution management both entail practices and customer-facing processes that are interrelated and may jointly determine supply chain performance (Rexhausen et al., 2012). Both these concepts relates to the level or type of supply chain integration, with specific emphasis on the customer. In further clarifying the scope of the research, a reference is made to Priem and Swink (2012) as they define consumers as those customers who are end users. That is, consumers purchase a value system's product, while intermediate business-to-business purchasers in a value system are customers purchasing to resell, and are not referred to as consumers. Hence, the scope of this research will focus on customer-integration based on the business-to-business supply chain relationship evident between the FMCG manufacturer and the FMCG wholesaler and/or retailer, and not the business-to-consumer, as evident between the wholesaler or retailer and the majority of its end-user customers.

2.5. Use of Integrative Technologies in Supply Chain Management

Organisations are increasingly using Information Technology (IT) to coordinate processes along their supply chains, including procurement processes, cross-functional processes, and customer facing processes, as well as overall information sharing along the supply chain (Dong, Xu, & Zhu, 2009). IT capabilities such as the Internet, ERP software, and Point-of-Sale (PoS) systems, enhances the abilities of organisations to integrate their supply chain from end-to-end, including integrating with their key customers (Agan, 2011), which leads to increased operational performance and customer satisfaction. ERP systems are an organisation's strategic enablers, which are aimed at helping an organisation to improve operational performance and efficiency by integrating all business processes and optimizing available resources (Misra, Khan, & Singh, 2010). Information technology platforms and systems such as the internet and ERP allows organisations to seamlessly link their supply chain members and activities from planning, design, production, and delivery, including tracking and estimating lead times, which in turn enables organisations to efficiently exchange goods, information, transactions collaboratively in order to optimise supply chain operations (Arshinder et al., 2011). In order for information technology to benefit an organisation as a capability of supply chain integration, the systems implemented to enable supply chain

integration should also be integrated themselves, eliminating any duplication of information and processing.

According to Dong et al. (2009), instead of stand-alone systems, IT-enabled supply chain integration is characterized by cross-functional integration, including supplier and customer integration to the degree to which these supply chain partners have compatible information systems that supports the end-to-end integration process. Dong et al. (2009) further stated that the IT-enabled supply chain requires an integrated set of back-end systems to enable the flow of information between various organisational business units and across the entire supply chain process. This notion is supported by Rai, Patnayakuni, and Seth (2006) who stated that supply chain management can be viewed as a "digitally-enabled" cross-functional process capability, in which the integration of the supply chain processes spans across the entire scope of the supply chain. Rai et al. (2006) further unpacks the layers of "digitally enabled" supply chain, by stating that infrastructure integration on its own requires that the individual physical components be well integrated to allow for real-time connectivity of data, applications, and seamless processing. A well-integrated IT infrastructure thus becomes a lower order capability that is leveraged to enable a higher-order capability of supply chain process integration. The research conducted by Rai et al. (2006) suggested a model where the data consistency and cross-functional application integration formed a key part of the IT infrastructure integration capability. IT infrastructure integration enables supply chain process integration, whose key components are the integration of information flow, physical flow of products, and flow of financial capital and information. In turn, supply chain process integration leads to organisational performance (Rai et al., 2006). In a review of literature for research done on the relationship of information and communication technology (ICT) and organisational performance, Zhang, Donk, and Vaart (2011) found that some studies presented a positive relationship between ICT and organisational performance, while others presented less evidence, or did not find any evidence of a relationship between supply chain ICT implementation and organisational performance. Fawcett, Wallin, Allred, Fawcett, and Magnan (2011) supported this finding by stating that organisations made investments in IT in order to achieve improved performance on supply chain, but failed in their efforts. In their research findings, Fawcett et al. (2011) highlighted that IT investments in supply chain yielded the most performance results when the implemented IT infrastructure and IT systems enabled a dynamic supply chain capability. In addition to IT enabling the

supply chain dynamic capability, the organisation must be inclined to open information and knowledge sharing in order to enable enhanced collaboration amongst the various members of supply chain (Fawcett et al., 2011).

2.6. Information and Knowledge Sharing

Supply chain integration research streams, which are mainly supplier-integration, customer-integration, and internal cross-functional integration, are connected by the notion that integration and segmentation initiatives both rely upon an organisation's abilities to acquire and assimilate customer-related information and knowledge into their SCM design and planning processes (Priem & Swink, 2012). Information and knowledge is very important in the daily running of any business. The success or failure of any organisation can be determined by how information and knowledge is shared and utilised internally across functions, and strategically to integrate and collaborate with suppliers and customers. By taking the data available and sharing it with other parties within the supply chain, information can be used as a source of competitive advantage (Li et al., 2006). Supply chain integration extends the need to share certain strategic information and knowledge with the organisation's key suppliers and key customers in order to achieve certain strategic objectives. As evident in literature, effective information sharing is considered essential to the success of supply chain management as partner organisations in a supply chain need timely and quality information to coordinate intra- and inter-organisational business activities to compete in the marketplace (Wong, Lai, & Cheng, 2011). The importance of information and knowledge sharing across supply chain integration constructs is emphasised further in other reviewed literature. Sukati et al. (2012) cited Daugherty et al. (1995) and Aggarwal (1997) who highlighted the positive correlation of information availability and customer responsiveness, which resulted in improving organisational performance. Furthermore, Sukati et al. (2012, p. 228) noted that "the need for flexibility originates from customers, since customers ask for variety, quality, competitive prices, and faster delivery. This has forced companies to make design changes quickly and respond faster to customer needs in order to sustain the company's competitive advantage. As a result, companies need to be flexible enough to react to changes in customer demands."

Information and knowledge sharing is a major building block for inter-organisational and external partner integration. “Internal integration recognizes that different departments and functional areas within [an organisation] should operate as part of an integrated supply chain process. Because internal integration breaks down functional barriers and engenders cooperation in order to meet the requirements of customers, rather than operating within the functional silos associated with traditional departmentalization and specialization, it is expected for internal integration to be related to operational and organisational performance” (Flynn et al., 2010, p. 60). Li et al. (2006) identified quantity and quality as the two key aspects of information sharing, and further cited Monczka, Petersen, Handfield, and Ragatz (1998) who defined the level of information sharing, which is the quantity aspect, as referring to the extent to which critical and proprietary information is communicated to one’s supply chain partners, such as key customers. Key attributes such as accuracy, timeliness, adequacy, and credibility of information exchanged forms part of the quality of information and knowledge shared between the supply chain partners. Li et al. (2006) went on to cite Mentzer, Min, and Zacharia (2000) who stated that shared information can vary from strategic to tactical in nature and from information about logistics activities to general market and customer information. These aspects of information and knowledge sharing may have some form of impact on operational efficiency and organisational performance, as they contribute to the enablement of organisation’s strategy, and its tactical and operational activities. According to Agan (2011), information and knowledge gained from collaborating with supply chain partners, such as customers, are key operational capabilities relevant to supply chain integration. This information and knowledge becomes part of the organisation-wide capabilities as they are transformed into knowledge and skills of employees and functional units.

While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom. Hence, organizations need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion (Li et al., 2006). This research aims to show how the extent of information and knowledge sharing, both internally and with key customers, through the use of information systems, is related to improving operational and organisational performance, which in turn should improve the organisation’s competitive advantage.

2.7. Operational Efficiency and Organisational Performance

Performance measures and metrics facilitate a more open and transparent communication between people, leading to a co-operative supported work environment and hence improved organizational performance (Angappa Gunasekaran & Kobu, 2007). A number of performance measures and metrics have been used in previous supply chain integration performance research. Some of these performance measures and metrics include competitive capabilities such as cost leadership, differentiation, customer service, quality (Mahmood Hosseini, Azizi, & Sheikhi, 2012), cost, responsiveness, security, sustainability, resilience and innovation (Melnyk, Davis, Spekman, & Sandor, 2010). Flynn et al. (2010) cited Van Hoek (1998) and Beamon (1999) suggesting that in addition to financial measures, supply chain performance measurement should include operational indicators, such as customer service and the ability to respond to a changing environment. Furthermore, Flynn et al. (2010) cited Neely et al. (1995) in including cost, time, quality, delivery and flexibility as important measures of operational performance. Many organizations are endeavouring to capture the benefits of shorter lead times, flexibility in production, first mover advantages (shorter product development time) and win-win approaches (Gopal & Thakkar, 2012).

In a literature review research carried out to ascertain if IT has an impact on organisational performance, Jean, Sinkovics, and Kim (2008) found that overall, IT has had a positive impact on business efficiency and effectiveness by improving certain business processes and capabilities. Jeong and Hong (2007) further highlight the importance of customer-oriented supply chain enabled by integrated IT infrastructure. Key characteristics of this integrated IT infrastructure include strong communication capability, customer relationship management, and ability for real-time, quality and prioritised information sharing (Jeong & Hong, 2007). However, Jeong and Hong (2007) emphasises that in order for the integrative IT infrastructures to be effective, they should be driven by strong relationships between the organisation and its customers.

Literature reviewed indicate a general agreement that supply chain capabilities such as customer-orientation, IT, and information and knowledge sharing have a positive impact on supply chain processes and overall organisational performance (Kim, 2006; Jean et al., 2008; Zhang et al., 2011). The aim of this research is therefore to explore

such a shared agreement in the context of South African FMCG manufacturing organisations.

2.8. Competitive Advantage

Competitive advantage refers to capabilities and resources that enable an organisation to perform better than its competitors do. How the different strategies of an organisation fit with each other, such as the fit of the supply chain strategy with the overall strategy of an organisation is crucial in creating competitive advantage. Sustained Competitive Advantage refers to an organisations ability to keep their capabilities and resources from being replicated by their competitors, enabling the organisation to continuous outperform their competitors (Barney, 1991) Strategic fit is defined as the match of the respective functional strategies with each other in order to support an overall corporate strategy and thereby generating competitive advantage (Thun, 2010). Since the expected outcome of the research was to highlight how the integration with customers in an organisation's supply chain plays a significant role in improving operational efficiency and overall organisation performance, which may lead to gaining competitive advantage. The causation of competitive advantage by operational efficiency and improved organisational performance was left out of the scope of the research. To test the causation of competitive advantage by operational efficiency and improved organisational performance would have required in-depth research of the sample organisations, and referencing the sample organisations' annual reports, comparing them against each other and perhaps recording the names of organisations within the report to indicate the performance ranking of the organisations. The questionnaire stated clearly that the information gathered would be kept confidential, and no names of individuals and organisations would be used in the research report.

2.9. Conclusion to Literature Review

The reviewed literature highlighted the concepts of supply chain management, supply chain integration, and customer-integration. As the scope of this research was limited to customer-integration, further literature review sections were included to explore the three selected capabilities of customer-integration, namely, customer-closeness, use of integrative technologies, and information and knowledge sharing. The reviewed

literature highlights the importance of these capabilities, though they do not form a comprehensive list of all the customer-integration capabilities. In addition to the customer-integration capabilities, a review on operational efficiency and overall organisational performance was included. The research to be conducted aimed to analyse the effect of the three customer-integration capabilities on operational efficiency and performance.

Reviewed literature then highlighted that these customer-integration capabilities have a positive impact on supply chain integration, that once implemented should improve an organisation's operational efficiency and overall performance.

Chapter 3: Research Questions

3.1. Research Proposition

The research topic identified is as a result of literature review related to the integration of supply chain activities and processes, and the role of supply chain integration on operational efficiency and organisational performance. The literature reviewed so far has indicated that the primary focus of this type of research has mainly focused on developed nations. There is not enough literature information relating to research conducted on organisations within emerging markets. The focus of this research was on the FMCG industry within emerging markets, particularly in South Africa. The following research proposition was pursued, by way of supporting research questions, as part of the research on the impact of forward-integration supply chain regarding organisation achieving improved efficiency and overall performance.

Research Proposition:

Forward-integrated supply chain has a positive impact on operational efficiency and organisational performance, which in turn may lead to gaining competitive advantage.

In order to test the above proposition, the research attempt to answer the following three supporting research questions by conducting a survey through a questionnaire administered online to employees of selected FMCG manufacturing organisations in South Africa.

3.2. Supporting Research Questions

3.2.1. Research Question 1: Customer-Closeness

The main construct of this research is on customer integration. Customer-focused supply chain integration assumes a certain level of internal, cross-functional integration. Customer integration generates opportunities for leveraging the intelligence embedded in collaborative processes, it therefore enables manufacturers to reduce costs, create greater value and detect demand changes more quickly (Flynn et al.,

2010). Based on the statement by Flynn et al. (2010) above, the survey questionnaire section related to customer-closeness set out to evaluate the level of collaboration of an organisation with its key customers. Such interaction attempts to test customer service, addressing customer expectations, level of communication with key customers and the customer's ability to access assistance from the organisation. The assumption is that visible customer interaction and customer service results in positive or negative customer satisfaction, which would either create or destroy customer loyalty. Customer loyalty may increase the organisation's overall performance. The first research question is as follows:

Research question 1:

Does customer-closeness improve an organisation's operational efficiency and overall organisational performance?

Research objective 1:

The objective of research question one is to establish if increased levels of customer interaction and integration has a positive or negative impact on an organisation's operational efficiency and overall performance.

3.2.2. Research Question 2: Use of Integrative Technologies

Information technology incorporates infrastructure and information systems to provide an IT service to the end-user. Organisations leverage the use of information technology in order to integrate their internal and external supply chain practices. These practices include supply-side integration, cross-functional integration, and customer-side integration. Inter-organizational integration involves standardizing and digitizing information exchange spanning cross-organizational business activities. Such integration makes information available for timely dissemination to relevant supply chain partners for responsive decision-making and market actions (Wong et al., 2011). The use of technology enables an organisation to improve supply chain effectiveness and efficiency. IT also provides the opportunity to integrate the organisation's supply chain with its supply chain partners, such as their key customers. This research

question attempts to assess the level of enabling forward-integrated supply chain using information technology. The second research question is as follows:

Research Question 2:

Does the integration of supply chain with key customers using integrative technologies contribute towards operational efficiency and overall organisational performance?

Research Objective 2:

The objective of research question two is to establish if leveraging information technology to integrate the organisation's supply chain both internally and externally with its key customers has a positive impact on operational efficiency and overall organisational performance.

3.2.3. Research Question 3: Information and Knowledge Sharing

Information integration is characterized by electronic linkages and integrated information sharing within and beyond organizational boundaries to facilitate cross-functional coordination in the supply chain (Kulp, Lee, & Ofek, 2004). By sharing information with members of the supply chain, an organization can respond more quickly to the customer's changing needs (Li & Lin, 2006). Wong et al. (2011) cited Bernstein and Haas (2008) by stating that conceptualization of information integration revolves around the fundamental notion of developing information-sharing infrastructure in the supply chain with electronic linkages to facilitate timely, accurate, and standardized data exchange across internal and external organizational functions. The third research question will attempt to assess the level of information and knowledge sharing both internally across functions and externally with key customers. The third research question is as follows:

Research Question 3:

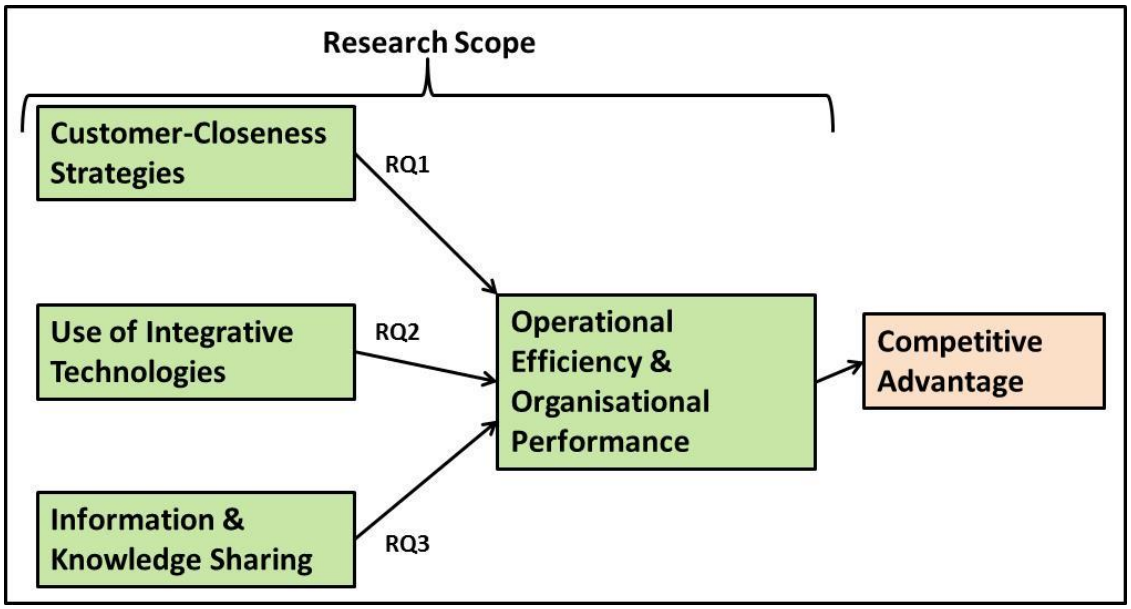
Does the organisation share information and knowledge, both internally and externally with key customers, in order to improve operational efficiency and overall organisational performance?

Research Objective 3:

The objective of research question three is to establish if sharing information and knowledge, both internally and externally with key customers has a positive impact on operational efficiency and overall organisational performance.

The following diagram depicts the three research questions and their link to operational efficiency and overall organisational performance, highlighting the scope of the research. Capabilities of the supply chain included as part of the research scope are highlighted in green, linked to the proposed effect of Operational Efficiency and Organisational Performance. Competitive Advantage is excluded from the scope of the research.

Figure 4: Research scope for supply chain integration



Chapter 4: Research Methodology

4.1. Methodology Overview

An overview of the research methodology approach as detailed in the subsequent sections is outlined in Table 1 as follows:

Table 1: Research Methodology Overview

Methodology Component	Selected Methodology Approach
Research Design	Quantitative
Research Type	Descriptive Correlational
Data Collection Method	Survey Questionnaire
Survey Type	Self-Administered
Survey Tool and Technique	Electronic and Online Tool (Survey Monkey)

4.2. Research Design

The main objective of the research is to ascertain an organisation's implementation of forward-integrated supply chain strategies and their impact on operational efficiency and overall organisational performance. The type of research that was carried out was descriptive and quantitative in nature. Zikmund, Babin, Carr, and Griffin (2010) defined quantitative research method as research that addresses research objectives through empirical assessments that involve numerical measurement and analysis approaches. Zikmund et al. (2010) further stated that the major purpose of descriptive research is to describe the characteristics of objects, people, groups, organizations, or objects. Quantitative descriptive design was selected as the preferred approach as the research aimed to use quantitative data to describe the characteristics of supply chain integration related to operational efficiency and organisational performance. The organisational characteristics being researched were related to the three key capabilities of supply chain forward-integration, which are customer-closeness, the use of integrative technologies to enable supply chain processes, and the sharing of supply

chain related information and knowledge. The research collected data utilising an online questionnaire, and analysed the ordinal format of the data to describe the relationship between the supply chain forward-integration capabilities and the organisation's operational efficiency and performance.

Numerical data was collected using a survey questionnaire, as outlined later in section 4.6 below. The reason for the survey questionnaire is mainly due to ease of distribution to the target sample. Online research questionnaire also lessens the potential for bias towards the researcher.

4.3. Population of Relevance

The population of relevance for this research consisted of fast-moving consumer goods organisations with operations in South Africa. These companies may have other operations outside of South Africa; however, the focus of the research was on their supply chain integration within South Africa. The reason for narrowing the population focus to the South African FMCG sector was to create a level of focus on a specific sector, within an emerging market, South Africa in particular. Another reason was due to the limited research that has been conducted previously on FMCG industry within emerging markets, related to forward-integrated supply chain. Zikmund et al. (2010) define population as a complete group of entities that share some common characteristics; hence, the target population selected in this research was related to South African FMCG manufacturers supplying their goods and products to FMCG wholesalers and retailers.

With globalisation triggering a migration and expansion of organisations into emerging markets in search of growth opportunities, the requirement for organisations to keep a close contact with their customers and improve on their customer relationship management has become increasingly important. Notable emerging markets include countries such as India, Brazil, Russia and China, and most of the countries within the African and South American continents. South Africa is one of the countries classified as an emerging market mainly due to the untapped market opportunities and the potential for economic growth. Organisations expanding to emerging markets have to review their supply chain strategy and associated operational risks as the markets they are entering are different from their existing markets. In addition, established

organisations within emerging markets should continuously review their supply chain strategy due to changing market conditions brought about by globalisation.

The research population of this research included all companies classified as manufacturing, and supplying fast-moving consumer goods to wholesalers and retailers. The reason for the approach was that FMCG manufacturers mostly transact with the same wholesalers and retailers, which creates an opportunity for customer relationship management and customer-focused supply chain integration. These manufacturers mostly compete for the same wholesale or retail customer. Goods or products manufactured by these organisations includes food groceries, soft and/or alcoholic beverages, meat products, fruits and vegetables, bakery products, cleaning products, personal care, and dairy products. These types of products are classified as fast-moving goods due to their short shelf life and high consumer demand.

4.4. Research Sample

The criterion for selecting the research sample was based on accessibility. The researcher first attempted to establish initial contact with employees from sample organisations as per the defined population in section 4.3 above. These employees were contacted telephonically, personally or via email. Zikmund et al. (2010) defines a working population as a list of elements from which a sample may be drawn. Saunders and Lewis (2012, p. 132) defines a sample as “a subgroup of the whole population [and that] the subgroup need not necessarily be a subset of people or employees: it can … be a subset of organisations.” In this case, the sample included list of targeted South African FMCG manufacturing organisations. The target number of sample organisations used for the research was a minimum of five. From each organisation, the aim was to obtain survey questionnaire responses from a minimum of ten respondents who are at different management levels, and from different functional units within the organisation. Therefore, the sample size targeted was a minimum of 50 responses.

The method of sampling employed in the research was non-probability sampling. Non-probability sampling is “a sampling technique in which units of the sample are selected on the basis of personal judgment or convenience; the probability of any particular member of the population being chosen is unknown” (Zikmund et al., 2010, p. 395).

The reason for choosing the non-probability sampling was that the researcher did not have a complete list of the population, and that the sample selected was based on personal access to some of the employees from the selected organisations.

4.5. Unit of Analysis

According to Zikmund et al. (2010) unit of analysis refers to what or who in a research, should provide the data and at what level should the data be aggregated. The unit of analysis used for this research was employees of the selected FMCG manufacturing organisations, who were preferably at management level from different functional units. The selection for this unit of analysis was deemed necessary as the research sought to gather data from multiple sources within any FMCG manufacturing organisation, aggregate and analyse the data in order to identify uniformity in responses. The researcher assumed that managers were also in a position to provide knowledgeable responses with regards to their organisation's level of customer-closeness, their use of integrative technologies, and the extent to which information and knowledge was shared both cross-functional and with key customers.

4.6. Data Collection Instrument

A survey strategy is "a research strategy which involves the structured collection of data from a sizeable population, where data collection may take the form of questionnaire, structured observation and structured interviews" (Saunders & Lewis, 2012, p. 115). A survey questionnaire was selected as a preferred approach for data collection. The survey questionnaire was to focus on gathering data from selected South African FMCG manufacturing organisations.

The researcher compiled a structured survey questionnaire and used as a data collection instrument. Sample questions related to customer-integration, used in similar research surveys, and were adapted to fit this research. These sample questions were adapted from Flynn et al. (2010); Lee, Kwon, and Severance (2007), and (Kim, 2006). The survey questions from the reviewed literature were restructured to suit the objectives of each research question as outlined in Chapter Three.

The questionnaire comprised of the following sections:

- Basic demographic data, in particular the respondent's management level, their functional area, and their gender;
- Organisation's customer orientation relating to the organisation's customer-closeness;
- Organisation's use of integrative technologies that enables supply chain;
- Organisation's information and knowledge sharing internally and externally with customers;
- Organisation's operational efficiency and overall performance;

The questionnaire sections relating to customer-closeness, use of integrative technologies, information and knowledge sharing had five variable statements each. The questionnaire section relating to operational efficiency also had five variable statements and lastly an additional variable statement relating to overall organisational performance. The questionnaire was designed for the respondent to answer close-ended, five-point likert-type questions. The scale and its ordinal coding were as follows: 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Neutral," 4 = "Agree," and 5 = "Strongly Agree".

The survey questionnaire, which is included in Appendix 1, was distributed to potential respondents via a link to an online tool. The researcher first contacted potential respondents from the targeted organisations telephonically or personally to request them to participate in the survey. The researcher then sent a link to the survey via email. The email included an overview of what the survey is about and aims to achieve, contact details of the researcher and supervisor. As part of the email, the researcher included a request to the potential respondent to forward the email and link to their colleagues from different functional units. The reason for using online medium was for ease of data collection, coding and importing into an analysis tool. Another reason for using self-administered online survey was for speed of response capture, low contact with the respondents in order to reduce the level of response bias.

In sending out the questionnaire, the survey was limited to the employees of the targeted FMCG manufacturing organisations. The survey questionnaire was pre-tested by sending the link to colleagues at work and fellow students in my MBA class. Pre-testing was done in order to identify any problems or errors with the survey. These problems may include grammar and spelling, access to the survey link, ease of

responding, understanding of survey questions, and data collection once the response is completed and submitted. Once rectifications were done, the data collection tool was reset to remove all test data before sending out to potential respondents. Appendix 2 outlines a consistency matrix highlighting the literature reviewed for each of the research questions, which sections of the survey questionnaire was used to collect data to analyse for each research question, and the type of analysis carried out on the collected data.

4.7. Data Collection

Originally, the survey questionnaire included collection of other demographics data such as the respondent's organisation name and race / ethnicity. Other sections also included additional variable statements. Initially, there were five demographics required responses and 36 survey variable statements in the rest of the questionnaire sections. The researcher perceived a lack of response that may be attributed to a long questionnaire, and the potential respondents' perhaps not being comfortable with providing their organisation's name. Due to this perception, the researcher decided to trim the questionnaire to three demographic responses requested, and 21 survey variable statements spread across the rest of the questionnaire sections as mentioned in section 4.6 above. At the time of the questionnaire trimming, the original questionnaire had received eight responses, which are included in the analysis. However, only variable statements that are common to the trimmed questionnaire were included in the analysis. The updated questionnaire received 26 responses, together with the eight responses from the initial questionnaire, there were 34 responses included in the research analysis.

4.8. Data Analysis

The relational testing of variables required a deductive research approach. Saunders and Lewis (2012, p. 108) define deductive approach as a "research approach that involves the testing of a theoretical proposition by using a research strategy designed for its testing." The research proposition defined above in Chapter Three was tested using the three supporting research questions, and their variable statements, in order to achieve each supporting research question's objective. On achieving the research objective, the research will then conclude the validity of the research proposition.

The survey questionnaire was designed to collect data relating to the level of customer-focused supply chain integration as per the stated research proposition in section 3.1.

The initial data analysis carried out was descriptive correlational, which aimed to test the relationship, or correlation, of the variables for each supporting research question. The data was analysed using the SPSS statistical tool in order to determine the relationship between those variables. Overall, the research analysis used included descriptive statistics and frequencies, Cronbach's alpha coefficient, and Spearman's Ranked-Order (Rho) correlation tests.

Descriptive statistics and frequencies indicate how frequent each response option has been selected, and include statistics such as the mean (average value), standard deviation, and median. Cronbach's alpha coefficient statistical analysis tests for reliability of the survey. Table 2 below provides a guideline for interpreting the reliability of the survey data using the Cronbach's alpha.

Table 2: Cronbach's Alpha Interpretation Guideline

Cronbach's alpha (α)	Internal consistency
α ≥ 0.9	Excellent (High-Stakes testing)
0.7 ≤ **α** < 0.9	Good (Low-Stakes testing)
0.6 ≤ **α** < 0.7	Acceptable
0.5 ≤ **α** < 0.6	Poor
α < 0.5	Unacceptable

As a guideline for this research, a Cronbach's alpha coefficient of greater than or equal to 0.7 was deemed as indicating an acceptable reliability of the respective survey section.

Spearman's Ranked-Oder correlation tests is used for testing correlation of surveys were the collected data is ordinal, such as data ranging from Strongly Disagree to Strongly Agree as represented by 1 to 5. Spearman's correlation coefficient produced by statistical analysis, is a non-parametric measure of the strength of a relationship between two paired data, or a measure of statistical dependence between two

variables. The result of a Spearman's correlation test is a number between -1 and 1, where an absolute value of the correlation coefficient closer to zero (0) means a "weak" relationship / correlation, and an absolute value closer to one (1) indicates a "stronger" relationship / correlation. A negative value closer to -1 indicates a "perfect negative correlation," whereas a positive value closer to +1 indicates a "perfect positive correlation." As a guideline, Spearman correlation coefficients of less than 0.30 would be deemed of weak or no correlation. Correlation coefficients of between 0.30 and 0.49 would be deemed to have a low positive correlation. Correlation coefficients between 0.50 and 0.69 would be deemed to have a moderate positive correlation. Correlation coefficients of above 0.70 would be deemed to have a high to very high positive correlation. The negative coefficient values would be interpreted as having negative correlations with similar guidelines as per the positive correlation values. As an overall guideline, Table 3 below indicate the various interpretation levels based on the correlation coefficient.

Table 3: Correlation Coefficient Guidelines

Correlation Coefficient Range	Interpretation of Correlation
0.90 to 1.00 (-0.90 to -1.00)	Very Strong Positive (Negative) Correlation
0.70 to 0.89 (-0.70 to -0.89)	Strong Positive (Negative) Correlation
0.50 to 0.69 (-0.50 to -0.69)	Moderate Positive (Negative) Correlation
0.30 to 0.49 (-0.30 to -0.49)	Low Positive (Negative) Correlation
0.00 to 0.29 (0.00 to -0.29)	Weak / No Correlation

Table 4 below summarises the data analysis approach carried out on the different sections of the questionnaire, with the motivation for each approach.

Table 4: Data Analysis Approach and Motivation

Research Reference	Data Analysis Approach	Approach Motivation
Demographics	Descriptive Analysis	The descriptive analysis was conducted on the demographics data in order to ascertain the spread of reponses across different management levels and different functional units of the organisations. This allows for

Research Reference	Data Analysis Approach	Approach Motivation
		testing of concentration of responses from one area, and credibility of the source of the data.
Research Question 1: Customer-Closeness	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation	Descriptive Analysis to test for the mean and std deviation of each variable; Cronbach's Alpha to test for the reliability of the survey section related to customer-closeness; Spearman's Ranked-Order to test for the correlation of customer-closeness to operational efficiency and performance
Research Question 2: Use of Integrative Technologies	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation	Descriptive Analysis to test for the mean and std deviation of each variable; Cronbach's Alpha to test for the reliability of the survey section related to the use of integrative technologies; Spearman's Ranked-Order to test for the correlation of the use of integrative technologies to operational efficiency and performance
Research Question 3: Information and Knowledge Sharing	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation	Descriptive Analysis to test for the mean and std deviation of each variable; Cronbach's Alpha to test for the reliability of the survey section related to information and knowledge sharing; Spearman's Ranked-Order to test for the correlation of information & knowledge sharing to operational efficiency and performance
Operational Efficiency & Overall Performance Corelation	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation	Descriptive Analysis to test for the mean and std deviation of each variable; Cronbach's Alpha to test for the reliability of the survey section related to the operational efficiency and overall performance; Spearman's Ranked-Order test carried out as part of each research question sections

4.9. Research Assumptions and Limitations

The following assumptions were taken into consideration when carrying out the data collection and data analysis.

- The selected sample will be willing to respond to the survey
- The respondents will provide responses to the questionnaire to the best of their knowledge regarding their organisation's supply chain capabilities

Limitations identified for the research are as presented below

- The research scope was limited to the demand side of supply chain management
- Data collection was limited to the FMCG manufacturer as the focal organisation, and no data was collected from the wholesale or retail customers, hence the survey request was not sent to the staff working suppliers or customers of the FMCG manufacturers
- Access to the targeted organisations and the minimum number of 10 responses from each organisation was not guaranteed
- The selected sample and potential responses may be too small to fully meet the objectives of the supporting research questions

Chapter 5: Presentation of Research Results

5.1. Introduction

Chapter Five presents the results of the quantitative research conducted through a survey questionnaire, with responses obtained from individuals within FMCG manufacturing organisations. The presentation is in line with the research questions outlined in chapter three and the research methodology discussed in Chapter Four.

The survey questionnaire used to collect data was divided into five sections as per Appendix 1. The first section had three questions to collect demographic data relating to the respondent's management level, functional area and gender. The second section had five questions relating to the organisation's level of customer-orientation. The third section had five questions relating to the organisation's use of integrative technologies that enables their supply chain processes. The fourth section also had five questions relating to information and knowledge sharing by the organisation, both internally and with their customers. The fifth section had six questions in total relating to the organisation's operational effectiveness and overall improvement in organisational performance. Questions relating to customer-orientation, the use of integrative technologies, information and knowledge sharing, and organisation's operational efficiency required responses using a five-point likert-scale with coded rankings ranging as follows: 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Neutral," 4 = "Agree" and 5 = "Strongly Agree." The respondent's view on the organisation's overall organisational performance required responses based on the following five-point likert-scale: 1 = "Significant Decrease," 2 = "Slight Decrease," 3 = "Unchanged," 4 = "Slight Increase" and 5 = "Significant Increase"

The researcher applied statistical tests on the survey responses using the SPSS statistics analytical tool. The data collected was analysed by carrying out descriptive statistics and frequencies for the demographic data. The Cronbach's alpha coefficient analysis was carried out in order to test the reliability of the survey sections relating to the three research questions, and on the section relating to the organisation's operational efficiency and overall performance.

The Spearman's Ranked-Order (Rho) correlation analysis was carried out in order to test for correlation between responses for the three research questions' sections and the operational efficiency and performance section. The first correlation test was carried out for correlation between customer-closeness and operational efficiency and performance. The second test was carried out to test for correlation of the organisation's use of integrative technologies to operational efficiency and performance. The third correlation test was also carried out to test for correlation of the organisation's sharing of information and knowledge, and the organisational operational efficiency and overall performance.

5.2. Basic Demographics Responses

5.2.1. Management Level

The Management Level question presented the following options: Operational Staff Member, Functional Specialist, Junior Management, Middle Management, Senior Management, and Executive Management. Table 5 below indicates the frequencies and percentages of responses based on the respondents' management level.

Table 5: Management Level Frequencies

Management Level	Freq.	%	Valid %	Cumulative %
Operational Staff Member	1	2.9%	2.9%	2.9%
Functional Specialist	2	5.9%	5.9%	8.8%
Junior Management	4	11.8%	11.8%	20.6%
Middle Management	12	35.3%	35.3%	55.9%
Senior Management	8	23.5%	23.5%	79.4%
Executive Management	7	20.6%	20.6%	100.0%
Total	**34**	**100%**	**100%**	

The table indicates that middle management level provided the most responses with 35% of the responses, followed by senior management and executive management levels with 23.5% and 20.6% responses respectively. The results indicate a cumulative response rate of 79.4% between middle, senior, and executive management, which

provides confidence on the results as the assumption is that higher level management staff understands the organisation's end-to-end supply chain better than lower level management staff. The lower level management and operational staff provided a combined response rate of 20.6%.

5.2.2. Functional Area

Table 6 below indicates the frequencies and percentages of responses based on the respondents' functional area within their organisation. The question provided 12 options as per Appendix 1, however only nine options were selected by a minimum of one respondent are included in the table.

Table 6: Functional Area Frequencies

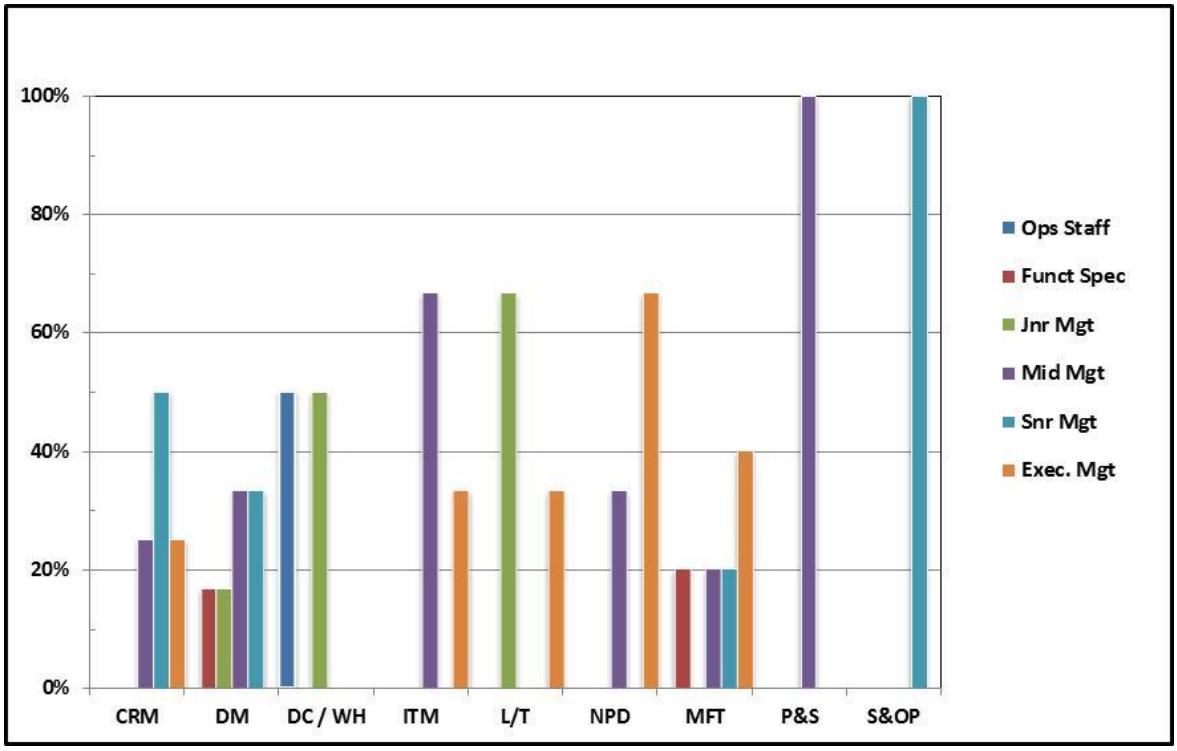
Functional Area	Freq.	%	Valid %	Cumulative %
Customer Relationship Management (CRM)	4	11.8%	12.1%	12.1%
Demand Management (DM)	6	17.6%	18.2%	30.3%
Distribution Centre / Warehousing (DC/WH)	2	5.9%	6.1%	36.4%
Information Technology Management (ITM)	3	8.8%	9.1%	45.5%
Logistics / Transportation (L/T)	3	8.8%	9.1%	54.5%
New Product Development (NPD)	3	8.8%	9.1%	63.6%
Manufacturing (MFG)	5	14.7%	15.2%	78.8%
Procurement & Sourcing (P&S)	4	11.8%	12.1%	90.9%
Sales and Operations Planning (S&OP)	3	8.8%	9.1%	100.0%
Total Valid	**33**	**97.1%**	**100.0%**	
Missing	**1**	**2.9%**		
Total Responses	**34**	**100%**		

The table indicates a response range, based on 33 valid responses, from 6.1% to 18.2%, where the respondents from the Demand Management functional area provided

the most responses, followed by respondents from the Manufacturing functional area with 15.2% responses. Discounting those functional areas that had zero representations, the least number of responses of 6.1% came from the Distribution / Warehousing functional area, followed by responses of 9.1% across four functional areas, namely Information Technology Management, Logistics / Transportation, New Product Development, and Sales and Operations Planning. Out of the 34 responses received via the online survey tool, one respondent did not select an option for functional area. This was due to the original questionnaire where the compulsory option for each question was not set on the online survey tool, which allowed respondents to skip questions, knowingly or unknowingly, without forcing a response.

Figure Five below indicates a spread of management level responses across the different functional areas. In addition to Table 5 indicating most of the responses coming from middle to executive management levels, the Figure Five below shows that the responses are spread across most of the different functional areas within the upper management levels. As an example, all respondents who selected Sales and Operations Planning (S&OP) as their functional area were at senior management level.

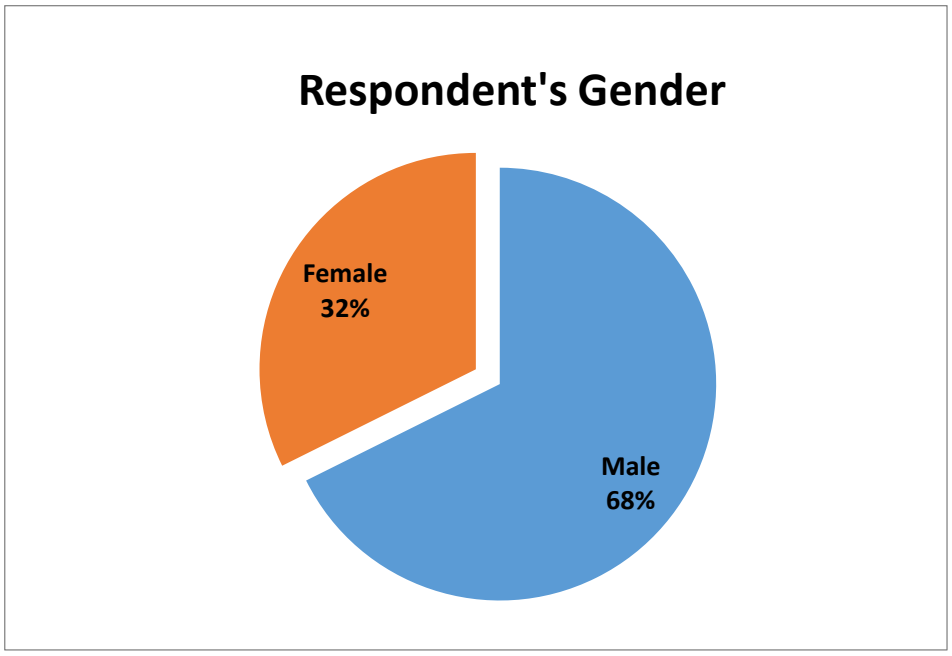
Figure 5: Percentage of Management Level per Functional Area



5.2.3. Gender

Figure 6 below indicates the percentage of responses based on the respondents' gender.

Figure 6: Respondent's Gender Frequencies



The gender chart indicates a dominance of responses coming from males, accounting for 68% of the responses, while females accounted for 32% of the 34 responses received.

5.3. Overall Survey Questionnaire Reliability

A Cronbach's alpha coefficient test carried out on a combined set of all research variable statements yielded a coefficient value of **0.935**, which as per the assumed guideline indicates that the overall survey is reliable. Table 7 below indicates the output of the Cronbach's alpha coefficient test.

Table 7: Cronbach's Alpha for Overall Survey

Overall Survey Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.935	.935	21

5.4. Research Question 1: Customer-Closeness

Research question one, restated from chapter three above states: *Does customer-closeness improve an organisation's operational efficiency and overall organisational performance?* The objective of research question one is to establish if increased levels of customer interaction and integration has a positive or negative impact on an organisation's operational efficiency and overall performance. The survey questionnaire to collect responses related to research question one consisted of five variables as per Appendix 1.

5.4.1. RQ1: Cronbach's Alpha Coefficient Results

Table 8 below indicates Cronbach's alpha coefficient for the customer-closeness capability. The alpha coefficient is **0.767** and as per the assumed guideline stated above, it indicates that the customer-closeness survey section reliability is acceptable.

Table 8: Cronbach's Alpha for Customer-Closeness

Customer-Closeness Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.767	.772	5

5.4.2. RQ1: Descriptive Analysis Results

Table 9 indicates high-level statistics for responses to customer-closeness variables.

Table 9: Customer-Closeness Statistics

Customer-Closeness Variables Statistics			
Independent Variables Statements	**Mean**	**Std. Deviation**	**N**
Interacts with customers to forecast demand	3.88	1.070	32
Shares market information with customers	3.56	0.914	32
Frequently measures and evaluates customer satisfaction	4.00	0.950	32
Shares Risk and Reward with key customers	3.44	0.948	32
Creates personalised profiles of customers rather than aggregate customer segments	3.72	0.851	32
Overall Mean	**3.72**		

5.4.3. RQ1: Spearman's Ranked-Order Correlation Results

Table 10 below indicates Spearman's Ranked-Order correlation results carried out to test for correlation between customer-closeness and organisation's operational efficiency and overall performance survey responses. The test was carried out on 32 responses.

Table 10: Customer-Closeness Spearman's Correlation

Customer Closeness Nonparametric Correlations							
		Offers competitive prices	Offers high quality and highly reliable products	Delivers customer orders on time and as required	Has time-to-market relatively faster than industry average	Has relatively faster product development times	Overall Operational Performance Improvement
Interacts with customers to forecast demand	Correlation Coefficient	.451**	.065	.226	.178	.423**	.354*
	Sig. (1-tailed)	.005	.361	.107	.164	.008	.023
Shares market information with customers	Correlation Coefficient	.139	.107	.162	.261	.301*	.169
	Sig. (1-tailed)	.224	.281	.188	.075	.047	.178
Frequently measures and evaluates customer satisfaction	Correlation Coefficient	.604**	.176	.518**	.391*	.464**	.489**
	Sig. (1-tailed)	.000	.168	.001	.014	.004	.002
Shares Risk and Reward with key customers	Correlation Coefficient	.308*	.246	.529**	.404*	.324*	.263
	Sig. (1-tailed)	.043	.087	.001	.011	.035	.073
Creates personalised profiles of customers rather than aggregate customer segments	Correlation Coefficient	.248	.400*	.376*	.384*	.636**	.335*
	Sig. (1-tailed)	.086	.012	.017	.015	.000	.030
**. Correlation is significant at the 0.01 level (1-tailed).							
*. Correlation is significant at the 0.05 level (1-tailed).							
List-wise N = 32							

5.5. Research Question 2: Use of Integrative Technologies

Research question two, restated from chapter three above states: *Does the integration of supply chain with key customers using integrative technologies contribute towards operational efficiency and overall organisational performance?* The objective of research question two is to establish if leveraging information technology to integrate the organisation's supply chain both internally and externally with its key customers has a positive impact on operational efficiency and overall organisational performance. The survey questionnaire to collect responses related to research question two consisted of five variable statements as per Appendix 1.

5.5.1. RQ2: Cronbach's Alpha Coefficient Results

Table 11 below indicates Cronbach's alpha coefficient for use of integrative technologies. The alpha coefficient is **0.827**, and as per the assumed guideline stated above, it indicates that the use of integrative technologies survey section is reliable.

Table 11: Cronbach's Alpha for Use of Integrative Technologies

Use of Integrative Technologies Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.827	.826	5

5.5.2. RQ2: Descriptive Analysis Results

Table 12 below indicates high-level statistics for responses to research variable statements relating to the organisation's use of integrative technologies in order to enable supply chain integration.

Table 12: Use of Integrative Technologies Statistics

Use of Integrative Technologies Item Statistics			
Independent Variables Statements	**Mean**	**Std. Deviation**	**N**
Uses Enterprise Resource Planning (ERP) systems that are accessible by all internal business functions	4.03	1.045	33
Uses IT Systems to access customers' real-time Point-of-Sale (PoS) and inventory information	3.03	1.287	33
Has integrated IT Systems for production, logistics, distribution and customer information	4.00	1.090	33
Uses integrative technologies to search and retrieve real-time logistics-related operations data	3.48	1.064	33
Has Integrated IT Systems that are also accessible by our customers	2.48	1.004	33
Overall Mean	**3.41**		

5.5.3. RQ2: Spearman's Ranked-Order Correlation Results

Table 13 below indicates Spearman's Ranked-Order correlation results carried out to test for correlation between the use of integrative technologies and organisation's operational efficiency and overall performance survey responses. The test was conducted on 33 responses.

Table 13: Spearman's Correlation for Use of Integrative Technologies

Use of Integrative Technologies Nonparametric Correlations							
		Offers competitive prices	Offers high quality and highly reliable products	Delivers customer orders on time and as required	Has time-to-market relatively faster than industry average	Has relatively faster product development times	Overall Operational Performance Improvement
Uses Enterprise Resource Planning (ERP) systems that	Correlation Coefficient	.288	.283	.574**	.526**	.257	.419**

Use of Integrative Technologies Nonparametric Correlations							
		Offers competitive prices	Offers high quality and highly reliable products	Delivers customer orders on time and as required	Has time-to-market relatively faster than industry average	Has relatively faster product development times	Overall Operational Performance Improvement
are accessible by all internal business functions	Sig. (1-tailed)	.052	.055	.000	.001	.075	.008
Uses IT Systems to access customers' real-time Point-of-Sale (PoS) and inventory information	Correlation Coefficient	.230	.273	.390*	.604**	.371*	.604**
	Sig. (1-tailed)	.099	.062	.012	.000	.017	.000
Has integrated IT Systems for production, logistics, distribution and customer information	Correlation Coefficient	.515**	.390*	.523**	.643**	.489**	.628**
	Sig. (1-tailed)	.001	.012	.001	.000	.002	.000
Uses integrative technologies to search and retrieve real-time logistics-related operations data	Correlation Coefficient	.637**	.370*	.605**	.560**	.627**	.653**
	Sig. (1-tailed)	.000	.017	.000	.000	.000	.000
Has Integrated IT Systems that are also accessible by our customers	Correlation Coefficient	.281	-.008	.273	.229	.188	.391*
	Sig. (1-tailed)	.056	.482	.062	.100	.147	.012
**. Correlation is significant at the 0.01 level (1-tailed).							
*. Correlation is significant at the 0.05 level (1-tailed).							
List-wise N = 33							

5.6. Research Question 3: Information and Knowledge Sharing

Research question three, restated from Chapter Three above is as follows: *Does the organisation share information and knowledge, both internally and externally with key customers, in order to improve operational efficiency and overall organisational performance?* The objective of research question three is to establish if sharing information and knowledge, both internally and externally with key customers has a positive impact on operational efficiency and overall organisational performance. The survey questionnaire to collect responses related to research question three consisted of five variable statements as per Appendix 1.

5.6.1. RQ3: Cronbach's Alpha Coefficient Results

Table 14 below indicates Cronbach's alpha coefficient for use of integrative technologies. The alpha coefficient is **0.808**, and as per the assumed guideline stated above, it indicates that the survey section relating to information and knowledge sharing is reliable.

Table 14: Cronbach's Alpha for Information & Knowledge Sharing

Information & Knowledge Sharing Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.808	.802	5

5.6.2. RQ3: Descriptive Analysis Results

Table 15 below indicates the high-level statistics for research sub-question responses related to information and knowledge sharing within the organisation, and externally with customers.

Table 15: Information and Knowledge Sharing Descriptive Statistics

Information and Knowledge Sharing Item Statistics			
Independent Variables Statements	**Mean**	**Std. Deviation**	**N**
Has highly integrated information system to link internal business functions with customers	3.12	1.111	33
Has access to customers' Point-of-Sale information to enable demand forecasting and planning	2.82	1.103	33
Shares order status information with customers	4.03	.918	33
Shares technical expertise across business functions and with customers	3.30	1.185	33
Shares information on available inventory with customers	3.76	1.062	33
Overall Mean	**3.41**		

5.6.3. RQ3: Spearman's Ranked-Order Correlation Results

Table 16 below indicates Spearman's Ranked-Order correlation results carried out to test for correlation between the use of integrative technologies and organisation's operational efficiency and overall performance survey responses. The test was carried out on 33 responses.

Table 16: Spearman's Correlation for Information & Knowledge Sharing

Information & Knowledge Sharing Nonparametric Correlations							
		Offers competitive prices	Offers high quality and highly reliable products	Delivers customer orders on time and as required	Has time-to-market relatively faster than industry average	Has relatively faster product development times	Overall Operational Performance Improvement
Has highly integrated information system to link internal business functions	Correlation Coefficient	.288	.253	.524**	.484**	.429**	.520**

Information & Knowledge Sharing Nonparametric Correlations							
		Offers competitive prices	Offers high quality and highly reliable products	Delivers customer orders on time and as required	Has time-to-market relatively faster than industry average	Has relatively faster product development times	Overall Operational Performance Improvement
with customers	Sig. (1-tailed)	.052	.078	.001	.002	.006	.001
Has access to customers' Point-of-Sale information to enable demand forecasting and planning	Correlation Coefficient	.224	.095	.254	.523**	.595**	.432**
	Sig. (1-tailed)	.105	.300	.077	.001	.000	.006
Shares order status information with customers	Correlation Coefficient	.291	-.105	.034	.004	.165	.129
	Sig. (1-tailed)	.050	.281	.426	.491	.180	.238
Shares technical expertise across business functions and with customers	Correlation Coefficient	.202	.285	.343*	.418**	.612**	.423**
	Sig. (1-tailed)	.129	.054	.025	.008	.000	.007
Shares information on available inventory with customers	Correlation Coefficient	.430**	.384*	.455**	.546**	.670**	.581**
	Sig. (1-tailed)	.006	.014	.004	.001	.000	.000
**. Correlation is significant at the 0.01 level (1-tailed).							
*. Correlation is significant at the 0.05 level (1-tailed).							
List-wise N = 33							

5.7. Operational Efficiency and Performance

5.7.1. Descriptive Statistics Results

Table 17 below indicates the high-level statistics for research sub-question responses related to operational efficiency and overall organisational performance.

Table 17: Operational Efficiency & Overall Performance Descriptive Statistics

Operational Efficiency & Overall Performance Item Statistics			
Dependent Variables Statements	**Mean**	**Std. Deviation**	**N**
Offers competitive prices	3.97	.951	33
Offers high quality and highly reliable products	4.45	.666	33
Delivers customer orders on time and as required	3.97	.637	33
Has time-to-market relatively faster than industry average	3.15	.972	33
Has relatively faster product development times	2.94	1.088	33
Overall Operational Performance Improvement	3.94	.933	33
Overall Mean	**3.74**		

5.7.2. Cronbach's Alpha Reliability Results

Table 18 below indicates Cronbach's alpha coefficient for use of integrative technologies. The alpha coefficient is **0.875**, and as per the assumed guideline stated above, it indicates that the survey section relating to information and knowledge sharing is reliable.

Table 18: Cronbach's Alpha for Operational Efficiency & Overall Performance

Operational Efficiency & Overall Performance Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.875	.882	6

5.8. Summary of Survey Results

Statistical tests conducted on the survey included descriptive analysis on the demographic data, survey sections relating to each research question, and the operational efficiency and performance section. Cronbach's alpha coefficient analysis was carried out for the overall survey, for each section of the survey corresponding to the research questions, and for the operational efficiency and performance section. Each Cronbach's test resulted in an alpha coefficient value of greater than 0.7, which indicates the overall reliability of the survey. Chapter Six provides a discussion of these results in conjunction with reviewed literature, and present the research findings.

Chapter 6: Discussion of Research Results

6.1. Introduction to Research Findings

The research findings are discussed in the following sections according to each research question, which will either support or not support the stated research proposition in Chapter Three above. The research proposes that *forward-integrated supply chain has a positive impact on operational efficiency and overall organisational performance, which in turn may lead to gaining competitive advantage*, as stated in chapter three above.

In order to test this proposition, three research questions were constructed relating to the three customer-oriented supply chain capabilities. These capabilities are related to an organisation's inclination to closely interact with their customers; the use of integrative technologies, and sharing of information and knowledge both across its functional units and externally with key customers. Each research question consisted of five survey variables statements to collect raw data from potential respondents from FMCG manufacturing organisations.

In addition to collecting data relating to capabilities of supply chain integration, the survey collected data related to an organisation's operational efficiency and overall performance. The aim is to test for correlation between these capabilities and the organisation's operational efficiency and performance. The collected data was analysed using the SPSS statistical analysis tool, and the results presented in Chapter Five. The data was analysed using descriptive statistics for respondents' demographics to ascertain spread of responses across different management levels and functional areas within the organisation, and the gender of the respondents. The different sections of the survey related to supply chain customer-closeness capabilities, use of integrative technologies capabilities, information and knowledge sharing capabilities, and operational efficiency and overall performance were tested for reliability using Cronbach's alpha coefficient. The correlation of these supply chain capabilities with the organisation's operational efficiency and overall performance were tested using Spearman's Ranked-Order correlation analysis.

Chapter Six discusses the research findings in relation to the survey results presented in Chapter Five and the reviewed literature as discussed in Chapter Two.

6.2. Significance of Demographics Data

The aim of the collection of demographics data, in the form of the respondents' management level within their organisation, the respondents' functional area, and the respondents' gender, was mainly to review and assess if different demographics may have a bearing on the outcome of the survey. Managers at different levels and from different functional areas may possess differing levels of supply chain knowledge based on their responsibilities within the supply chain, and their level of integration internally with other functional units and externally with supply chain partners.

As shown in Table 5, more than 79% of the responses received were from middle management to executive management level respondents. This concentration of responses may have a bearing on the reliability of the data provided. The data also indicates an even and acceptable spread of responses across the different functional areas of an organisation's supply chain. The survey had 12 options to choose from for functional area; however, responses came from nine different functional areas. This indicates a spread of about 75% of the original survey list of functional area options.

6.3. Research Question 1: Customer-Closeness Analysis

Research question one as stated in Chapter Three above is as follows: *Does customer-closeness improve an organisation's operational efficiency and overall organisational performance?* The attempt to answer research question one was through a correlation testing of whether customer-closeness has a positive impact on an organisation's operational efficiency and overall organisational performance.

6.3.1. Reliability Analysis: Customer-Closeness

Once the data was collected through a survey, a Cronbach's alpha coefficient analysis for reliability was carried out on the customer-closeness section of the questionnaire. Cronbach's alpha coefficient is a measure of the survey responses' reliability. The alpha results produced by the test, using the SPSS statistical tool, is in essence a

lower bound of the true reliability of the survey. The reliability test for the customer-closeness survey section produced a Cronbach's alpha of 0.767 as shown in Table 8 above, which was greater than the guideline of 0.7 for reliability testing acceptance. The Cronbach's alpha for inter-item reliability test for customer-closeness was 0.772, which was also greater than the acceptable level. Based on these two alpha values, the research accepts that the survey for customer-closeness was reliable enough to continue with further statistical analysis. The Cronbach's alpha test was based on the five variable statements relating to the customer-closeness survey section as per Appendix 1.

6.3.2. Descriptive Analysis: Customer-Closeness

Table 9 above indicates descriptive statistics carried out for the customer-closeness section of the survey. The results indicate the individual mean values for each sub-question. The number of responses used for these descriptive statistics analysis was 32 out of the 34 responses received. This was due to two responses that were excluded from the analysis. One response was incomplete, with the respondent having submitted the survey after completing the demographics section only, and having skipped all the other survey sections. The other respondent omitted the response for the sub-question "Our organisation creates personalised profiles of customers rather than aggregate customer segments." The sub-question that was skipped relates to the customer-closeness survey section. The SPSS statistical analysis option to exclude any incomplete responses was selected; hence, only 32 responses were taken into account for the descriptive analysis. The calculated mean values for all the variables, based on 32 responses ranged between 3.44 and 4.00. The ordinal value 3.00 in the survey represented a "Neutral" response, where the respondent neither agrees nor disagrees with the statement. Ordinal value 4.00 in the collected data represented "Agree" to the survey sub-question. The sub-question with highest mean value relates to the organisations frequent measurement and evaluation of customer satisfaction, with the mean value of 4.00. The respondents' inclination to agree with this statement is supported in literature by Deshpande (2012) eluding that measuring customer satisfaction is a key capability of supply chain. Increased customer satisfaction is a result of organisations engaging or collaborating with their customers in order to understand their customers' needs, creating customer value and loyalty, meeting the customers' quality standards, and being able to differentiate their products to suit the

customer (Deshpande, 2012; Li et al., 2006; & Thun, 2010). The mean for the statement regarding the organisation's interaction with customers to forecast demand was 3.88, which also indicate an inclination to agreeing with the capability. Rexhausen et al. (2012) support this result as indicating an organisation's ability to balance its supply chain capabilities with the demands of the customer, leading to improved organisational performance. Based on the responses received, the overall mean of the five variables (**3.72**) indicates that the respondents' report that their organisations are slightly inclined to interacting with customers as part of their supply chain enablement.

6.3.3. Spearman's Correlation Analysis: Customer-Closeness

The results of the one-tail Spearman's Ranked-Order correlation test for relationship between customer-closeness and organisation's operational efficiency and overall performance are presented in Table 10 above. As per the correlation coefficient guidelines assumed in Table 3, correlation coefficient values highlighted in amber indicate a low positive correlation, and green a moderate positive correlation, for customer-closeness capability in relation to operational efficiency and performance effect. Coefficient values not highlighted indicate a weak to no correlation. An observation of the results indicated that there is no negative correlation between customer-closeness capability and operational efficiency and performance. There is also no strong to very strong correlation between any customer-closeness and operational efficiency and performance variables.

The results indicate a number of low and moderate correlations for the capability of measuring and evaluating customer satisfaction. This capability of "frequently measures and evaluates customer satisfaction" has a moderate positive correlation to "offers competitive prices" (0.604), "delivers customer orders on time and as required" (0.518), and a low positive correlation to "has relatively faster product development times" (0.464) and "overall operational performance improvement" (0.489). Literature reviewed indicated that in a VMI relationship, the manufacturer assumed the responsibility of managing and taking initiative of replenishing the customer's inventory levels (Christopher, 2005). Implementing collaborative supply chain strategies such as VMI and CPFR, organisation can improve operational effectiveness, in particular to areas such as demand planning, order scheduling, logistics, and new product design (Attaran & Attaran, 2007). The low to moderate positive correlation observed between

customer-closeness and operational efficiency results is an indication that organisations represented by the survey respondents have implemented some level of collaborative supply chain strategies, such as VMI or CPFR.

According to Hua et al. (2011), organisations improve their efficiency and performance as they become flexible in meeting their customer demands due to their increased level of customer interactions. The increased level of customer interaction leads to better understanding and profiling of customers. The most notable relationship is a moderate positive correlation between an organisation "Creates personalised profiles of customers rather than aggregate customer segments" capability and having "relatively faster product development times" effect, with a coefficient of 0.636. The second notable relationship is also a moderate positive correlation of 0.604 observed between an organisation that "Frequently measures and evaluates customer satisfaction" and "Offers competitive prices." Overall, the results indicate that 18 of the 30 correlation coefficients indicate a low to moderate positive correlation of customer-closeness capabilities to an organisation's operational efficiency and overall performance, though these are dominated by low positive correlation. Based on the responses received, there is a predominantly low positive correlation relationship between customer-closeness, and operational efficiency and performance.

6.3.4. Conclusion: Customer-Closeness Analysis

The objective of customer-closeness research question was to establish if increased levels of customer interaction and integration has a positive or negative impact on an organisation's operational efficiency and overall performance.

Descriptive statistical analysis carried out on the survey indicates that on average organisations collaborate with their customers as Table 9 showed an overall mean of 3.72 on the customer-closeness survey section. The reviewed literature showed an inclination by organisations to collaborate with customers in order to understand their customers' needs and improve on demand management (Hua et al., 2011; Rexhausen et al., 2012; Childerhouse et al., 2011). The Spearman's correlation carried out however indicated a low to moderate positive correlation, in some cases showing a weak to no correlation between the customer-closeness capability variables and the operational efficiency and performance effect variables. Table 10, which indicates the different correlation coefficients of customer-closeness variables to operational

efficiency and performance variables, showed that there is only positive correlation for the customer-closeness capability, however, that the correlation ranges from weak to moderate correlation. The conclusion is therefore, customer-closeness strategies have a positive effect in enabling a forward-integrated supply chain and in turn improving on an organisation's operational efficiency and overall performance.

6.4. Research Question 2: Use of Integrative Technologies Analysis

The second research question used to testing the research proposition as stated in Chapter Three was as follows: *Does the integration of supply chain with key customers using integrative technologies contribute towards operational efficiency and overall organisational performance?* The attempt to answer this research question followed a similar approach as for research question one, which was through a correlation testing of whether the use of integrative technologies to enable supply chain has a positive impact on an organisation's operational efficiency and overall performance.

6.4.1. Reliability Analysis: Use of Integrative Technologies

A Cronbach's alpha coefficient test for reliability was carried out on the use of integrative technologies section of the survey. The Cronbach's reliability test of the survey section for the use of integrative technologies resulted in Cronbach's alpha of 0.827 as shown in Table 11 above, which was greater than the assumed guideline of 0.7 for reliability testing acceptance. The Cronbach's alpha based on standardised items for use of integrative technologies was 0.826, which was also greater than the acceptable level. Based on these two alpha coefficients, the research accepted that the survey for use of integrative technologies was reliable enough to continue with further survey statistical analysis. The Cronbach's alpha test was based on the five variable statements relating to the use of integrative technologies section of the survey as per Appendix 1.

6.4.2. Descriptive Analysis: Use of Integrative Technologies

Table 12 indicates descriptive statistics carried out for the use of integrative technologies section of the survey. The results indicate the individual mean values for each variable, and an overall mean for the use of integrative Technologies survey section. The number of responses used for the descriptive statistics analysis was 33

out of the 34 received. One response was excluded from the test, as it was incomplete. The respondent only completed the demographics section only. The calculated mean values for all the variables, based on the 33 responses, ranged from 2.48 to 4.03. The overall mean of all the variables was 3.41. The variable with highest mean value relates to the organisations "use of Enterprise Resource Planning (ERP) systems that are accessible by all internal business functions," with a mean value of 4.03, followed by the organisation's integrated IT systems for production, logistics, distribution and customer information with a mean value of 4.00. These variables' mean values of 4.00 and 4.03 are supported strongly by the reviewed literature in that organisations are increasingly integrating and enabling their supply chain processes through the use of information technology (Agan, 2011; & Dong et al., 2009). The enabling of supply chain processes through use of integrative technologies provides an organisation with an opportunity to improve its supply chain efficiency and performance (Arshinder et al., 2011; Misra et al., 2010; Rai et al., 2006). However, high mean values do not necessarily translate to high correlation to operational efficiency and performance. Correlation results are discussed in section 6.4.3 below. Table 12 eludes that even though the organisations are inclined to the use of integrative technologies to enhance their supply chain processes, these organisation may not necessarily allow their customers access to their systems. This is indicates by a low mean value of 2.48 relating to the organisation's integrated IT systems that are also accessible by their customers.. This could mean that customer integration may not be enabled through integrative technologies, but through other channels.

6.4.3. Spearman's Correlation: Use of Integrative Technologies

The results of the one-tail Spearman's Ranked-Order correlation testing for relationship testing between the use of integrative technologies and organisation's operational efficiency and overall performance are presented in Table 13 above. As per the guideline assumed and defined in section 4.8 above, correlation coefficient values highlighted in amber and green indicate a low to moderate correlations for use of integrative technologies capability to operational efficiency and performance effect. Coefficient values not highlighted indicate a very weak to no correlation between the capability and the effect. An observation of the results indicates a very insignificant negative correlation (-0.008) between access of the organisation's integrated IT systems by the customer with the effect of the organisation offering high quality and

highly reliable products. The results indicate a number of notable moderate positive correlations, 13 in all, between the use of integrative technologies capability and operational efficiency and performance effect.

The most notable moderate positive correlation is the organisation's capability to "use integrative technologies to search and retrieve real-time logistics-related operations data" to five of the six operational efficiency and overall performance effects variables. As per Table 13, these dependent variables with their correlation coefficients are: "Offers competitive prices" (0.637), "Delivers customer orders on time and as required" (0.605), "Has time-to-market relatively faster than industry average" (0.560), "Has relatively faster product development times" (0.627) and "Overall Operational Performance Improvement" (0.653). Table 13 also indicates that these variables' correlation coefficients are all statistically significant at the 0.01 level. Their positive correlation and statistical significance is supported by reviewed literature indicating that for organisations' having access to real-time data and information, both within and external to the organisation, has a positive impact on customer delivery performance, and that customer delivery performance is achieve through collaboration with customers (Stank et al., 2001; Swink et al., 2007; Flynn et al., 2010). The second notable independent variable, which also had four out of six moderate positive correlations with operational efficiency and performance effects relates to an organisation having "integrated IT Systems for production, logistics, distribution and customer information." This indicates the key importance of integrated technology, from inter-organisation to external partners. The two correlation results discussed above means that in an effort to enable and improve supply chain efficiency, organisations must start by integrating their internal infrastructure and system supporting the entire supply chains. These include tangible and intangible technology components such as data, applications, technology infrastructure, and processes (Rai et al., 2006). Integrated technologies would in turn enable ease of access to the relevant supply chain data, turning that data into relevant information and knowledge, and then applying the acquired knowledge to improve operational efficiency and overall performance.

6.4.4. Conclusion: Use of Integrative Technologies Analysis

The objective of the use of integrative technologies research question was to establish if leveraging information technology to integrate the organisation's supply chain both internally and externally with its key customers has a positive impact on operational efficiency and overall organisational performance. Research question two is stated in chapter 3 as follows: *Does the integration of supply chain with key customers using integrative technologies contribute towards operational efficiency and overall organisational performance?*

Descriptive statistical analysis carried out on the survey indicates that on average organisations use integrative technologies to enable and enhance their supply chain processes as Table 12 showed an overall mean value of 3.41 for the use of integrative technologies survey section. Though the reviewed literature indicate a strong use of technology for supply chain, some literature studies presented a positive correlation between the use integrative technologies and organisational performance, while others presented less evidence of a positive correlation (Zhang et al., 2011). The Spearman's correlation carried out however indicated a rather more moderate positive correlation in relation to operational efficiency and organisational performance as compared to customer-closeness capability. The results show that, of the 20 notable correlations, 13 were moderately positive, which indicates that in general, the use of integrative technologies to enable supply chain integration has a positive correlation to operational efficiency and overall organisational performance.

6.5. Research Question 3: Information and Knowledge Sharing Analysis

The research proposition as stated in Chapter Three was also tested by attempting to answer the following research question: Does the organisation share information and knowledge, both internally and externally with key customers, in order to improve operational efficiency and overall organisational performance? The attempt to answer this research question also followed a similar approach as for research question one and two, which was through a correlation testing of whether information and knowledge sharing as part of supply chain integration, has a positive impact on an organisation's operational efficiency and overall performance.

6.5.1. Reliability Analysis: Information and Knowledge Sharing

A Cronbach's alpha coefficient test for reliability was carried out for the information and knowledge sharing section of the survey. The reliability test of the survey section for information and knowledge sharing resulted in Cronbach's alpha of 0.808 as shown in Table 14 above, which was greater than the assumed guideline of 0.7 for reliability testing acceptance. The Cronbach's alpha based on standardised items for information and knowledge sharing was 0.802, which was also greater than the acceptable level. Based on these two alpha coefficients, the research accepted that the survey section for testing the information and knowledge sharing capability was reliable enough to continue with further survey statistical analysis. The Cronbach's alpha test was based on the five variable statements relating to information and knowledge sharing section of the survey as per Appendix 1.

6.5.2. Descriptive Analysis: Information and Knowledge Sharing

Table 15 indicates descriptive statistics carried out for information and knowledge sharing section of the survey. The results indicate the individual mean values for each variable statement relating to research question three, relationship of information and knowledge sharing capability on operational efficiency and organisational performance. The number of responses used for the descriptive statistics analysis was 33 out of the 34 responses received. The one response excluded from the analysis was incomplete as the respondent completed the demographics section only, and left out the rest of the survey sections. The calculated mean values for each of the variables, based on 33 responses, ranged from 2.82 to 4.03. The variable with the highest mean value relates to the organisation's sharing of order status information with customers (mean = 4.03), followed by the organisation's sharing of information on available inventory with customers (mean = 3.76). Sukati et al. (2012) highlighted the importance of sharing information such as orders and available inventory with customers, indicating that it creates organisational flexibility, allows organisations to respond quicker, and sustain their competitiveness. The lowest mean value of 2.82 relating to the organisation having access to customers' Point-of-Sale information to enable demand forecasting and planning is almost similar to the mean for the same variable from the use of integrative technologies capability. The variable mean, which represent a somewhat neutral response, implies that the respondents, on average, neither agree nor disagree

that their organisations have direct access to their customers' Point-of-Sale information via the use of integrated technologies. Information for demand forecasting and planning could be obtained via non-integrated IT systems or sources, such as historic order information, email, secured internet access into customer web sites.

6.5.3. Spearman's Correlation: Information and Knowledge Sharing

As in the two capabilities of customer-closeness and use of integrative technologies, a one-tail Spearman's Rank-Order correlation test was carried out on the information and knowledge sharing capability. The objective of the correlation test was to determine the relationship between information and knowledge sharing capability with the organisation's operational efficiency and overall performance effect. Table 16 in chapter five indicates correlation results between the five survey variables of the information and knowledge sharing capability in relation to the six survey variables of the operational efficiency and overall performance effect. The results were based on 33 out of the 34 responses received, due to one response not having completed all questions.

The results showed only one weak, negative correlation (-0.105) as observed between the "Shares order status information with customers" capability variable and "Offers high quality and highly reliable products" effect variable. All other observations range from none or weak, positive correlation (0.004), to moderate, positive correlation (0.670). Table 16 highlights low, positive correlations and moderate, positive correlations. The most notable moderate, positive correlation (0.670) was observed between the "Shares information on available inventory with customers" variable and "Has relatively faster product development times" operational efficiency effect. The second notable moderate, positive correlation (0.612) was observed between the variable "Shares technical expertise across business functions and with customers" and the operational efficiency effect: "Has relatively faster product development times." The same operational efficiency effect variable had a moderate, positive correlation (0.595) with the capability variable: "Has access to customers' Point-of-Sale information to enable demand forecasting and planning." The results also showed a moderate positive correlations between three of the five measured information and knowledge capability to an organisation having "relatively faster product development times" effect. These variables relate to when an organisation "Has access to

customers' Point-of-Sale information to enable demand forecasting and planning" (0.595), "Shares technical expertise across business functions and with customers" (0.612), and "Shares information on available inventory with customers" (0.670).

6.5.4. Conclusion: Information and Knowledge Sharing Analysis

The objective of information and knowledge sharing research question was to establish if sharing information and knowledge, both internally and externally with key customers has a positive impact on operational efficiency and overall organisational performance. Research question three is stated in chapter three as follows: *Does the organisation share information and knowledge, both internally and externally with key customers, in order to improve operational efficiency and overall organisational performance?*

Descriptive statistical analysis carried out on the information and knowledge sharing survey section indicates that on average respondents tend to agree that their organisations have the capability to share information and knowledge, both internally and externally with customers. The overall mean for the information and knowledge sharing capability as shown in Table 15 was 3.41. The spearman's correlation test carried out however indicates an overall low to moderate positive correlation between information and knowledge sharing, and operational efficiency and overall performance. Reviewed literature does not indicate nor dispute a positive correlation between information and knowledge sharing with operational efficiency and overall performance. However, reviewed literature suggests that the significance of information and knowledge sharing depends on what information is being shared, who is it shared with, when and how is the information shared (Li et al., 2006). The results thus suggest that there may be some level of information and knowledge sharing internally across an organisation's functional units, however, the sharing is more prevalent internally than it is with external supply chain partners.

6.6. Summary of Research Results Analysis

The research proposed that forward-integrated supply chain has a positive impact on operational efficiency and organisational performance, which in turn may lead to gaining competitive advantage. In testing the proposition, three research questions were used to test the research proposition. The three research questions were related

to the following forward-integrated supply chain capabilities: Customer-closeness, use of integrative technologies, and information and knowledge sharing. Tests carried out included Cronbach's reliability, descriptive analysis, and Spearman's Ranked-Order correlation. All survey sections showed to be reliable for continuing with further statistical analysis. Descriptive analysis indicated a tendency towards agreeing with organisations having each of the forward-integrated supply chain capabilities, with each of their overall mean values. The research questions were tested for correlation against operational and organisational performance effect. Overall, the correlation between the three capabilities and expected operational efficiency and performance effect showed a low to moderately positive relationship.

Chapter 7: Conclusion

7.1. Introduction

Chapter Seven reviews the main objective of the research in relation to the three research questions and highlights the key findings. Furthermore, the chapter highlights recommendations for FMCG industry stakeholders and makes suggestions for future research.

7.2. Key Research Findings

The main objective of the research was to test the proposition that forward-integrated supply chain had a positive impact on operational efficiency and organisational performance. The proposition was tested by way of three supporting research questions as indicated in Chapter Three. The research questions were formulated around forward-integrated supply chain capabilities relating to customer-closeness, use of integrative technologies, and information and knowledge sharing. The questions asked if these capabilities had an impact on an organisation's operational efficiency and overall performance. Each research question had an objective to indicate whether there is a positive relationship or not between the capability and the operational efficiency and performance effects.

There are a number of key findings observed from the research results, both positive and non-positive.

Key Positive Findings

- The survey responses highlight the importance of frequently measuring and evaluating customer satisfaction. Measuring and evaluating customer satisfaction will ensure that FMCG organisation meets the customer's needs and responds quickly to any concerns raised. Customers raise their satisfaction or dissatisfaction mainly during service level reviews. By constantly engaging with customers during these reviews, manufacturers will acquire valuable input to improving their supply chain processes and supply chain management technologies

- The results highlight a respondents' view of a relationship that exists between the FMCG manufacturer and their customers, which is more than just that of buyer and seller, but characterised by long-term relationships expected of the FMCG industry. However, the true measure and impact of this relationship was limited by the scope of the research, which focused only on the manufacturing organisations, and excluded surveys from the customers, which provides opportunities for further research.

- Organisations are already embracing the use of technology to enable and integrate their supply chain processes, as evident in the responses to the use of, and access to, ERP systems by all internal business functions. The observation suggests that there is high level of automation of end-to-end supply chain processes internally by use of either integrative or enterprise-wide systems.

- The results also indicate evidence that IT systems are integrated, perhaps not fully, which allow for internal access opportunities to information from other business operations, with an assumption that the access is security-enabled. However, the results showed integration that is limited to internal business functions and perhaps a low level of integration for external partners. This presents an opportunity for further research and a suggestion to managers of FMCG manufacturing organisations as a consideration for increased levels of integration.

- The results highlight a concern regarding organisation sharing order status with their customers and the relationship to operational efficiency and performance. Overall respondents agree to sharing order status with customers, however, correlation results showed a very weak correlation of this competency to any of the operational efficiency and performance expected outcomes. In particular, a moderate to strong correlation was expected between sharing of order status to delivering of customer orders on time and as required. The results may be showing that there is a lot of improvement required in meeting customer expectations regarding delivery of their orders,

and one-step in improving that part of the supply chain is to provide visibility of where the customer's order is at any given time.

Key Non-Positive Findings

- The results indicate reluctance by the manufacturers to provide their customers access to their ERP systems, which may be due to security concerns, access to intellectual property, or impact on their competitiveness. This could mean that little VMI or CPFR strategies are in place. Customers may not want to be locked into contracts with one supplier. Possible reasons could be to avoid manufacturers accessing information regarding performance of retail products supplied by competing manufacturers.

- The results also indicate a similar observation regarding the manufacturers having access to their customers' Point-of-Sale information. The overall average showed a neutral to disagreement towards access to the customers' Point-of-Sale information. The possible reasons could also be related to customers wanting to protect their intellectual property, having security concerns, and perhaps not wanting to be locked-in to one particular manufacturing supplier.

- There is a prevalent neutral perception regarding manufacturers having relatively faster product development times than their competitors. This could be due to respondents not having access to consolidated information comparing their organisation's product development times with those of their competitors.

7.3. Recommendations for FMCG Manufacturers

7.3.1. Getting Closer to Customers

The research presents opportunities for managers of FMCG manufacturers to reflect on their relationships with their customers. It is of utmost importance that managers continuously evaluate the level of interaction with their customers, in relation to how the interaction takes place, what business activities takes place during these interactions,

and how the success or failure of these interactions are measured and evaluated. The opportunities for interaction present a platform for FMCG manufacturers to build more knowledge on their customer's changing needs and requirements.

7.3.2. Embracing the Use of Technology

The use of integrative technologies provides opportunities to improve efficiencies of supply chain processes and management. Collaboration between manufacturers and their customers can continuously be improved through implementation of supply chain strategies such as VMI and CPFR. Integrated technology also presents the opportunity to remove challenges associated supply chain inefficiencies, and strengthen an organisation's capabilities for end-to-end supply chain integration.

7.3.3. Information as a Strategic Resource

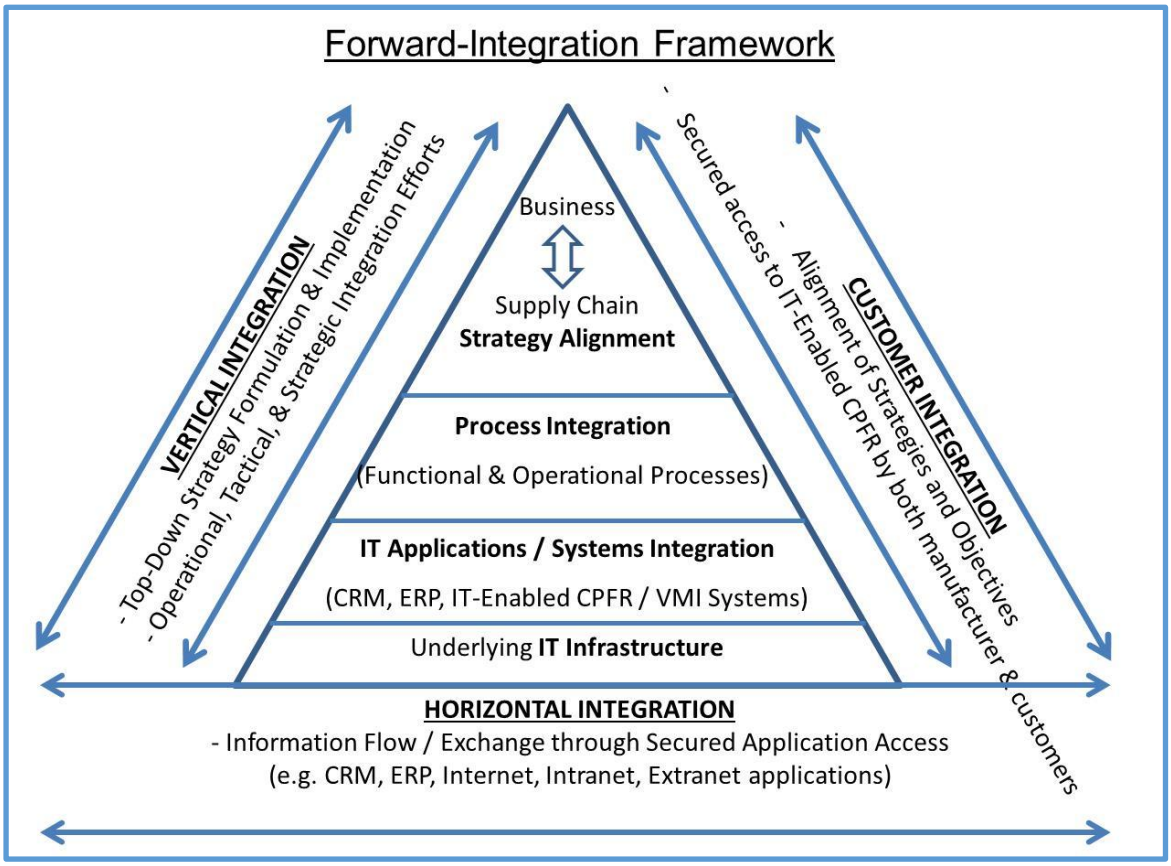
The ability to develop and implement strategies by organisations is mainly driven by the amount and relevance of information available to those organisations. The required information may be obtained from within the organisation; however, most key information for input to strategy formulation is related to the organisation's target market, which is information about its current and potential customers. Supply chain strategies such as CRM, VMI and CPFR, together with their enabling technologies, can present a valuable source of key information as input to strategy formulation and implementation. It is thus recommended to managers of FMCG manufacturing organisations to consider implementing supply chain strategies with their enabling technologies, and ensure full advantage of the functionality offered by these technologies is exploited.

7.3.4. Forward-Integration Framework

The scope of this research was limited to the demand-side component of supply chain, specifically to forward-integration capabilities related to customer-closeness, use of integrative technologies, and sharing of relevant information and knowledge across an organisation's functional units and externally with key customers. The suggested framework below highlights some of the key considerations for forward-integration and the three capabilities covered by this research. The customer-closeness capability is depicted by the alignment of strategies and objectives between the customer and the

focal organisation. The use of integrative technologies is depicted by the underlying infrastructure, integrated IT Applications / Systems, and reference to secured access to these integrated technologies. Information and knowledge sharing is depicted by the horizontal and vertical integration arrows, which indicates flow of information both vertically within the manufacturer, within the customer, and between the manufacturer and its customers. Vertical integration also includes top-down strategy formulation and implementation, and bottom-up operational, tactical and strategic activities and reporting. The arrows indicate integration flows, and information flows, which in turn creates knowledge both for the manufacturing organisation and for its customers. The framework presents opportunity for organisations to identify forward-integration points and integration levels to consider for implementation.

Figure 7: Recommended Forward-Integration Framework



7.4. Recommendations for Future Research

The following recommendations for future research were based on limitations identified during the research, and observations made from analysing the survey responses. The list is not exhaustive as further analysis may uncover other observations.

- Carry out a qualitative research focusing on one successful FMCG manufacturer. Review the manufacturer's supply chain integration efforts, and whether they had an impact on operational efficiency and overall organisational performance

- Limit research to a specific FMCG Supplier category, and carry out quantitative research only focusing on targeted organisations that falls within that category, with an option of formally requesting access to potential survey respondents within each organisation. This will allow for comparison of similar organisations, and acquiring responses from similar management levels and functional areas.

- Extending research survey to common customers (wholesalers and retailers) of the FMCG organisations, and testing for reverse integration where the manufacturer is viewed as the supplier, and the wholesaler / retailer is viewed as the focal organisation.

- Approaching top organisations listed on the Johannesburg Stock Exchange (JSE), and focusing only on those organisations, extending data analysis to their annual financial reports in order to ascertain impact of supply chain integration on organisational performance.

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Appendix 1: Survey Questionnaire

Below is a copy of the email request sent to potential survey respondents, with the link to the online survey.

Good Day

In partial fulfilment of my MBA degree at the Gordon Institute of Business Science (GIBS), I am conducting research on the effect of Supply Chain Forward Integration in relation to Operational Efficiency and Organisational Performance. May you please assist by accessing the link provided, **GIBS MBA Research Survey,** and respond to the survey questionnaire?

The survey should take about 5 minutes of your time. All data will be kept confidential. If you have any concerns, please contact my supervisor or me. Our details are provided below.

Researcher Name: Reginald Sibasa

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Supervisor Name: Dr Dinesh Kumar

Email Address: kumardin@yahoo.com

Phone: 082 717 8725

Please click on the following link to access the online questionnaire: **GIBS MBA Research Survey**.

Regards

Reginald Sibasa

Upon accessing the link, the respondent would continue through the online survey questionnaire presented below.

Section 1: Basic Demographic Data

1. **Management Level**
    - Operational Staff Member
    - Functional Specialist
    - Junior Management
    - Middle Management
    - Senior Management
    - Executive Management

2. **Select your Functional Area within your organisation**
    - Customer Relationship Management
    - Customer Service Management
    - Demand Management
    - Distribution Centre / Warehousing
    - Information Technology Management
    - Inventory Management
    - Logistics / Transportation
    - New Product Development
    - Manufacturing
    - Procurement & Sourcing
    - Risk Management
    - Sales and Operations Planning

3. **Gender**
    - Male
    - Female

Section 2: Organisation's Customer-Closeness

Independent Variables Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Interacts with customers to forecast demand					
Shares market information with customers					
Frequently measures and evaluates customer satisfaction					

Independent Variables Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Shares Risk and Reward with key customers					
Creates personalised profiles of customers rather than aggregate customer segments					

Section 3: Organisation's Use of Integrative Technologies

Independent Variables Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Uses Enterprise Resource Planning (ERP) systems that are accessible by all internal business functions					
Uses IT Systems to access customers' real-time Point-of-Sale (PoS) and inventory information					
Has integrated IT Systems for production, logistics, distribution and customer information					
Uses integrative technologies to search and retrieve real-time logistics-related operations data					
Has Integrated IT Systems that are also accessible by our customers					

Section 4: Organisation's Information and Knowledge Sharing

Independent Variables Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Has highly integrated information system to link internal business functions with customers					
Has access to customers' Point-of-Sale information to enable demand					

Independent Variables Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
forecasting and planning					
Shares order status information with customers					
Shares technical expertise across business functions and with customers					
Shares information on available inventory with customers					

Section 5: Operational Efficiency and Overall Organisational Performance

Dependent Variables Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Offers competitive prices					
Offers high quality and highly reliable products					
Delivers customer orders on time and as required					
Has time-to-market relatively faster than industry average					
Has relatively faster product development times					

Dependent Variables Statements	Significant Decrease	Slight Decrease	Unchanged	Slight Increase	Significant Increase
Overall Operational Performance Improvement					

Appendix 2: Consistency Matrix

TITLE: Implementing forward-integrated supply chain strategy to improve operational efficiency in South African FMCG manufacturers

RESEARCH QUESTIONS	LITERATURE REVIEWED	DATA COLLECTION	ANALYSIS
Research Question 1: Does customer-closeness improve an organisation's operational efficiency and overall organisational performance?	(Thun, 2010); (Flynn et al., 2010); (Li et al., 2006); (Morash, 2001); (Rexhausen et al., 2012);(Hua et al., 2011); (Priem & Swink, 2012)	**Section 2** of the self-administered online survey questionnaire: **Customer-Closeness**	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation
Research Question 2: Does the integration of supply chain with key customers using integrative technologies contribute towards operational efficiency and overall organisational performance?	(Dong et al., 2009); (Agan, 2011); (Misra et al., 2010); (Arshinder et al., 2011); (Rai et al., 2006); (Zhang et al., 2011); (Fawcett et al., 2011)	**Section 3** of the self-administered online survey questionnaire: **Use of Integrative Technologies**	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation
Research Question 3: Does the organisation share information and knowledge, both internally and externally with key customers, in order to improve operational efficiency and overall organisational performance?	(Priem & Swink, 2012); (Li et al., 2006); (Wong et al., 2011); (Sukati et al., 2012); (Flynn et al., 2010); (Agan, 2011)	**Section 5** of the self-administered online survey questionnaire: **Information and Knowledge Sharing**	Descriptive Analysis; Cronbach's Alpha Coefficient; Spearman's Ranked-Order (Rho) correlation