EFFECT OF SUPPLY CHAIN INTEGRAL RELATIONSHIPS ON PERFORMANCE OF COSMETICS MANUFACTURING FIRMS IN NAIROBI COUNTY, KENYA

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Effect of Supply Chain Integral Relationships on Performance of Cosmetics Manufacturing Firms in Nairobi County, Kenya

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

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DEDICATION

The thesis is dedicated to my dear husband Amos Kipsang Boiwo, and to my lovely Daughters Alina Shanale Jemutai and Raissa Victoria Jerotich for their endless continuous support, love, endurance and encouragement, and to my family who also encouraged me during the entire period of the study.

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LIST OF ABBREVIATION AND ACRONYMS

APS	Advanced Planning System
ASC	Agile Supply Chain
CAD	Computer Aided Design
CRM	Customer Relationship Management
DC	Dynamic capabilities
DFM	Demand Forecasting Management
DV	Dependent variable
EDI	Electronic Data Interchange
EPC	Electronic Product Control
ERP	Enterprise Resource Planning
ERP	Enterprise Resource Planning
FMCG	Fast Moving Consumer Goods
GCTS	Geo Coded Tracking System
GPS	Global Positioning System
IS	Information Systems
IT	Information Technology
IV	Independent variable
JIT	Just In Time
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KAM	Kenya Association of Manufacturers
MKIS	Marketing Information System

MMR	Moderated Multiple Regression
MRP	Materials Requirement Planning
PCA	Principal Component Analysis
RBV	Resource Based View Theory
RFID	Radio Frequency Identification
RI	Relationship Integration
RSI	Relationship Specific Investments
RV	Relational View Theory
SC	Supply Chain
SCA	Supply Chain Agility
SCM	Supply Chain management
SCO	Supply Chan Optimization
SCP	Supply Chain Partners
SCT	Supply Chain Technology
SGE	Supply Chain Event Planning
SRM	Supplier Relationship Management
SSP	Strategy, Structure and Performance Theory

DEFINITION OF TERMS

Collaborative Awareness: The process of sharing costs, risks and benefits among supply chain partners. In supply chain collaboration, partners are able to share information and expertise to reduce or eliminate certain types of uncertainty (Simatupang & Sridharan, 2005).

Decision Synchronization: It is joint planning and resolution through the formation of cross functional teams to allow SC partners to jointly develop process improvement strategies in face of SC problems like delays in lead time (Cao & Zhang, 2011).

Idiosyncratic Partner Investment: Are assets that are committed specifically to the relationship at hand. These assets cannot be redeployed easily outside the relationship and their value depreciates in the event the primary relationship is discontinued. Relationship specific investments can take different forms, such as time, people, money, training and technology and have the potential to provide social and economic ties between the cooperating parties (Wilson, 2006).

Cross Functional Information Sharing: Refers to the extent to which critical and proprietary information is communicated among supply chain members with regards to market, product and customer information. The quality of information sharing refers to the extent to which a firm shares a variety of relevant, accurate, complete and confidential information in a timely manner with its supply chain partners (Yen & Chae, 2006).

Supply Chain Integral Relationships: Refers to a creation of a shared mental framework with customers and suppliers regarding inter-enterprise dependency and principles of collaboration. Integrative relationships with supply chain members can provide benefits such as: reduced cost, reduced cycle time in order fulfilment, lower inventory levels, high visibility and reduction in the time required to bring new products to the market (Stank *et al.*, 2007).

Performance: Refers to the actions, outputs and outcomes, or results of an organization as measured against its intended outputs or goals and objectives. It deals with doing things in the best way. It could be expressed in terms of effectiveness, efficiency or even productivity (Scotti, 2004)

Technological Engagement: It is a system that is used in coordinating and integrating information flows electronically from the source to the end customer in order to generate effective and efficient business transactions, to enable quick information access, allow better service to customers, increase productivity and save time (Nor & Zulkifli, 2009).

ABSTRACT

Global competition within firms has forced most manufacturing industries to become more innovative and strategic in their supply chain practices. One of the ways to survive this intense competition is to have an integrated supply chain. The level of uncertainty in the business environment continues to increase and one of the greatest challenges to a firm is responding to uncertainty caused by high volatile demand and short product life cycles. Implementation of supply chain integral has been advocated as the means of increasing competitiveness of firms. The study focussed to assess the effect of supply chain integral relationships on the performance of cosmetic manufacturing firms in Nairobi County, Kenya. The study specifically addressed key variables that included: Collaborative Awareness, Cross Functional Information Sharing, Decision Synchronization, Idiosyncratic Partner Investment, Technological Engagement and Performance. Resource Based View Theory, Relational View theory, Supply Chain Network Theory and Contingency theories were adopted in the study. The study adopted Positivism Research Philosophy. Cross-sectional survey research design was used in the study. The unit of analysis was 714 employees working in the procurement departments in cosmetic manufacturing firms in Nairobi County, Kenya. A sample of 256 was selected from the target population using a Multi Stage Sampling Technique. Primary data was collected using self-administered semi-structured questionnaires which were dropped and picked later. Both descriptive and inferential statistics were used to analyse the collected data. Moderated Multiple Regression (MMR) was used to analyse the relationship between the predictor variables and performance. Pilot study reliability results showed that all our Cronbach's alpha coefficients were above 0.7, implying that the research instruments were reliable. The findings of the study showed that technological engagement moderates the relationship between the predictor variables and performance of cosmetic manufacturing Firms ($r = .588$, $p < 0.01$). Results indicated there is a positive and statistically significant correlation between cross functional information sharing and performance ($r=.582$, $p<0.01$), a positive and statistically significant correlation between decision synchronization and performance ($r=.516$, $p < 0.01$), a positive and statistically significant correlation between idiosyncratic partner investment and performance ($r=.529$, $p<0.01$), while the correlation between collaborative awareness and performance was also positive and statistically significant ($r=0.505$, $p<0.01$). The study concludes that collaborative awareness, cross functional information sharing, decision synchronization and Idiosyncratic Partner investment positively affect the performance of cosmetics firms. The study recommends that collaborative awareness should be improved and executed in such a way that is well synchronized with other activities and connected with long-term goals of the partners. The study recommends that cosmetic firms should implement cross-functional information sharing and keep each other informed about changes and unforeseen challenges. Cosmetics firms should also focus more on decision synchronization, because it is key in building and maintaining mutual partnerships of the supply chain firms. The study recommends that cosmetics firms should engage idiosyncratic partner investments, and make major investments, in time and effort to learn about the business practices of their suppliers, specifically for relational exchange. The results of the study will contribute to greater understanding of the supply chain integral factors that leads to outstanding performance of firms.

CHAPTER ONE

INTRODUCTION

The chapter covers an overview of the Background of the study, Statement of the problem, Research Objectives, Research Hypotheses, Significance, Scope and Limitations of the Study.

1.1 Background of the Study

The turbulent market conditions in the 21st century have heightened the need for more competitive strategies to be developed for growth (Sanchez & Perez, 2007). Business, economics and the political environments are increasingly subjected to unexpected shocks and discontinuities. Many strategic issues that confront business today stem from: the new rules of competition, globalization down pressure on price and the customer taking control. As a result of the recent economic meltdown, companies around the world are confronted by a perfect storm: frozen credit market and long global recession.

The Cosmetic industry in Kenya is a very lucrative, innovative, fast-paced industry. In today's competitive economy, focus has steadily increased on delivering value to the customers. Globalization, technological change and demanding customers make the marketplace more fiercely competitive than ever before (Fawcett *et al.,* 2007). Concurrent to the focus on customer value, the marketplace in which businesses operate today is widely recognized as being complex and turbulent (Christopher, 2000).

Hence, organizations are urged to improve their operations, by becoming more interconnected and interdependent than before. The expansion of supply chains, while enhancing profitability, customer responsiveness and the ability to deliver value to the customers, has at the same increased the interconnections and interdependencies among organizations. The global marketplace has become very volatile, with customers demanding lower prices, faster delivery, and higher quality and increasing variety

(Kisperska-Moron & de Haan, 2011). Hervani *et al.* (2005), pressure from competitive forces may force organization's to reinvestigate how their supply chains are structured and managed, in order to respond to the increasing market complexity, turbulence and uncertainty.

In many industries, complexity and uncertainty have increased to the point that competing autonomously is no longer an option. The characteristics of products produced and processes involved in manufacturing contribute to the complexity of the relationship. Speed, quality, and flexibility are being emphasized as means of responding to the unique needs of customers and markets. However, the core resource competencies required to realize the extended range of objectives are often difficult to mobilize and retain by individual companies (Gunasekaran & Yusuf, 2002).

Thus, in an agile supply chain, a high degree of cooperation between members of the supply chain is required. It is recommended that the key to survival for organization's dealing with more innovative products such as cosmetics is creation of responsive or agile supply chains. According to Yusuf *et al.* (1999), agility is a system with extraordinary capabilities to meet the rapidly changing needs of the marketplace. Supply chain agility is the ability to respond rapidly to changes in customer demand, both in product volume and variety (Christopher, (2000); Van Hoek *et al.*, 2001). It is a system that responds quickly to new product models or between product lines, ideally in real-time response to customer demand. Numerous researches have been conducted on why organizations need to adopt supply chain agility. At the global scene, Cecere (2012) sought to establish the perception of manufacturing firms in the adoption of agile supply chain. The researcher found that while 89% of the companies surveyed acknowledged the value of the agile supply chain strategy, a small number understood ways in which it led to enhanced performance of the supply chain.

According to Gligor *et al.* (2015) researched on the performance outcomes of SCA and established that effective deployment of resources enhances firms supply chain agility and by extension of the firms bottom line operations. Vasquez-Bustelo *et al.* (2007)

worked on the agile capabilities of Spanish Manufacturing firms. The investigations resulted in the development and testing of an agile manufacturing model, which illustrates how agility impacts manufacturing strength of a company. Heim (2011) study on agile supply chain strategy on supply chain performance revealed that agile strategy had a positive impact on supply chain performance. However, the study was only based on 205 Peru firms and hence the results could not be generalized to African Countries.

Inda Sukati *et al.* (2012) carried out a study on the effect of organizational practices on SCA, an empirical investigation on Malaysia Manufacturing Industry. A sample of 150 executive officers and senior staff from 40 manufacturing firms in Malaysia was conducted. Results of the study showed a correlation between organizational practices that encompasses internal firm integration with supplier and integration with the customers are related to supply chain agility components. Gunasekaran (1999) asserts that four main principles underpin agility: delivering value to the customers, being ready for change, valuing human knowledge and skills and forming virtual partnerships. Supply chain agility refers to the sensing and responding capabilities within the supply chain to address market changes and reduce uncertainty (Ngai *et al.*, 2011); DeGroote and Marx (2013). These capabilities and the ability of an organization to synthesize its resources to work together with supply chain partners form the constructs of Mavengere (2013) strategic agility model. These capabilities are relevant to the integration of supply chain processes, as the process-level is where value is created and performance improves (Raschke, 2010).

Literature has identified the antecedents and constituents of an agile supply chain. Studies have identified the antecedents that enable supply chain agility as the following but not limited to: collaboration, market sensitive, virtual, network-based, process integration and collaborative relationships (Lin *et al.*, (2006); Wang *et al.* (2006); Ngai *et al.* (2011); Nazir and Pinsonneault (2012); *White et al.* (2005); Overby *et al.* (2006). These factors denote a shift in focus from an intra-organizational emphasis to the inter-organizational collaborative role in supply chain agility.

However the causality relationship of the ways in which these antecedents and constituents enable supply chain agility needs to be explored more instead of the interrelationships between the derived variables of an agile supply chain as witnessed in the model of Agarwal *et al.,* (2007). Events are moving so rapidly that it is almost impossible to access the implication of the meltdown for the days ahead, let alone the years to come (Njoroge, 2009). Premkumar *et al.,* (2005), asserts that testing the information processing theory in a new context is a great opportunity due to the dramatic developments in the information processing capabilities of inter-organizational interactions such as integration.

1.1.1 Global Perspective of Supply Chain Integral Relationship

There is growing recognition that in agile supply chains, individual organizations no longer compete as stand-alone entities, but rather as whole supply chains. In agile supply chain, a confederation of partners is linked together as a network. Gradually, it is becoming an era of "network competition," where the orders will go to those organizations who can better structure, coordinate, and manage the relationships with their partners in a network committed to better, closer, and more agile relationships with their final customers (Andersen *et al.,* 2009).

In today's challenging global markets, the route to sustainable advantage lies in being able to leverage the respective strengths and competencies of network partners in the supply chain to achieve greater responsiveness to market needs. Relationship management is vital, as supply chains are generally complex, with numerous activities usually spread over multiple functions or organizations. Sometimes, these activities can even be spread over lengthy time horizons (Burgess *et al.,* 2006); Mahapatra (2011). Therefore, it is necessary to overlay a coordination system with alliance partners.

Buyers rely on strategic partners to achieve and sustain a competitive position (Wagner & Boutellier, 2002). The concept of collaborative relationships is simple: that buyers and suppliers working together as a team can drive down total cost, improve quality and

speed products to the market, far more effectively than the same people working as adversaries. Partnership can be considered as the preferred relationship strategy where there is a high level of beneficial mutual interdependence.

According to Lambert and cooper (2000), operating an integrated supply chain requires continuous information flow. The success of the individual SC partners depends upon the overall success of the supply chains in which the partners participate. The theoretical proposition is that success at the SC level will result in success at the organizational level. Seamless flow of physical and non-physical assets amongst companies would lead to pooling synergy and optimization of tangible and intangible assets that are potentially available to the individual companies.

According to Sajad Fayezi and Maryam Zomorrodi (2015), on the role of relationship integration in supply chain agility and flexibility development, an Australian Perspective, contributed into an understanding of the manufacturing companies' implementation of relationship integration with respect to decision trade-offs involved in contract design. The findings revealed the significant perceived importance and the impact of relationship integration on supply chain agility and flexibility development. Further, it was found out that practitioners perceive both supplier and customer relationships as important factors affecting performance of their firms.

Dotun Adebanjo (2017) sought to investigate the relationship between supply chain relationships integrations, innovative capabilities and manufacturing performance. The study adopted Institutional theory and Resource Based View theory to access the relation in 171 organizations drawn from 3 rapidly developing countries; Brazil, India and China. The study found out that supply chain relations and integrations relate positively to both product and process innovative capabilities relate positively to manufacturing performance.

The findings provide new insights into manufacturers in the three countries and shows that the SC relationships they build with their customers have encouraged them to

develop new innovative capabilities. These new capabilities in turn have enabled them to reap benefits of improved manufacturing performance.

In Thailand, Wong, Boon-Itt and Wong (2011), argue that under environmental uncertainty, the relationships between supplier/customer integration and delivery and flexibility performance and those between internal integration and product quality and production costs are high. The supply chain of Chinese companies transcends different countries in different continents making this country one of the increasingly focal point of manufacturing. As a result of this development in the supply chain processes, manufacturing firms in the country are heavily reliant on access to timely and accurate market information (Zhu & Sarkis, 2006).

1.1.2 Regional Perspective of Supply Chain Integral Relationship

In Ghana, Otchere, Annan and Anin (2013) argued that supply chain integration creates a competitive advantage among the cocoa manufacturing firms. They argued that since suppliers and retailers have knowledge in different domains, the combination can create unique knowledge that can be applied to improve business knowledge. Better relationships between retailers and their suppliers also improve prospects of new product acceptance. They argued that effective use of relevant and timely information by all functional elements within the supply chain is key to any organization and also provides a distinguishing factor for that particular organization.

Among South African firms, Laursen and Salter (2006), argued that strategic partnering has become key in the current global market. Organizations have been forced to collaborate with other firms through joint supply chains that focus on joint planning, coordination, and process integration between the organization, its suppliers, its customers, and other supply chain partners. Supply Chain Integral relationships offers the South African firms advantages of business expansion to other areas, increased return on assets, improved customer service, reduced lead times, increased reliability and responsiveness to market trends, and a shorter time to market.

1.1.3 Local Perspective of Supply Chain Integral Relationship

Organizations globally have begun to embrace the strategy of integrated supply chain management. Integrated Supply Chain is a seamless supply chain of close collaborative relationships with unified data and business processes. These are internal incorporation, customer incorporation, relationship incorporation, technology and planning incorporation, measurement incorporation and supplier incorporation. This approach not only seeks to coordinate and harmonize all elements of a supply chain from raw material to finished product but also aims at achieving higher levels of overall performance as well as cut on costs.

According to Kemunto (2014), asserts that in Kenya there are about 226 Multinational Corporations according to Kenya Beaural of Statistics. Majority seem to have integrated the supply chain. Despite these benefits, many firms in developing countries are striving to cope with management of individual functions instead of integrating activities into key supply chain processes. In addition, only a few firms have adopted and successfully implemented the concept of integral relationships in Kenya (jointly planning, controlling, and designing a supply chain (Cook, Heiser & Sengupta, 2011). In Kenya for instance there are many times when there are sudden increases especially in fuel and sugar prices due to shortages. This is a direct effect of poor integration of supply chain systems. According to Katua (2014), the manufacturing firms in Kenya have sought to adopt better supply chain practices to significantly enhance supply chain coordination. It is on this background that these firms have considered application of SC integral relationships as a means of attaining superior performance with regard to supply chain process.

Application of Supply Chain Integration by the manufacturing companies in Kenya has spurred accomplishment of the organizations' strategic goals, decrease in risks as well as enhancement of internal and external synchronization of management process. According to Chirchir (2015), supply chain integration relationships among commercial banks in Kenya has seen adoption of practices such as information sharing so as to

respond to customer requirement, enhance the product availability, and efficiently coordinate processes in order to lower the costs, offer better customer service, improved revenues, and have properly guided capacity plans.

According to Kibera Lucy Wairimu (2016), sought to establish the implementation of integrated supply chain in manufacturing company in Kenya (Bidco Oil Refineries). The study found out that supply chain integral relationships helps improves firms capability because it provide a systematized way to keep up with processes, it provides cost savings, improves efficiency. In addition, it enhances flexibility and tight inventory management that eventually leads to higher profits margins and competitiveness.

1.1.4 Concept of Technological Engagement

The competitive environment critically impacts firms' operations, and elements relative to that environment are important factors when analyzing a firm's capabilities. Because technological and marketing capabilities have varying values according to environmental turbulence, their proper fit with the environment determines their performance implications. Technology in any organization can be a tool to achieve competitiveness, something that is generally acceptable in most literature and empirical studies. Technology has become the major facilitator of business activities in the world today Morone (1989).

The efficiency of technology has an impact on production success and greater profitability in any business, Morone,(1989); Nor and Zulkifli (2008). Technological engagement is a system that helps in coordinating and integrating information flows electronically from the source to the end customer in order to generate effective and efficient business transactions, enable quick information access, allow better service to customers, allow better flow of information, reduce paperwork, increase productivity and save time.

Farooq and O'Brien (2010), re-emphasized that Technology focused on SCM is also a catalyst of fundamental change in SC strategy. Supply Chain Technology (SCT) is a business enabler that has led to the growth of e-supply chains as it enables firms to collaborate and compete with each other. Technology helps to coordinate the production and operations activities, logistics and processes within supply chains. This technology can be either functional SCT that supports specific functional areas of the firm's supply chain; or the integrative SCT that allows the firm to interact with all its partners in the supply chain. Both the integrative and functional SCTs play a key role of linking all aspects of supply chain Power and Simon (2004); Nor and Zulkifli (2008); Mukhtar *et al.* (2009); Patterson *et al.* (2003). The most common functional and integrative SCT include: E-business; Electronic Data Interchange; Bar code; point-of-sale; Radio Frequency Identification; Warehouse Management Systems; the internet; E-Procurement; E-marketplaces and reverse auction (Patterson *et al.,* 2003).

Owing to the important roles of technology, there is need to explore the moderating effect of technological engagement on supply chain integral relationship and performance of selected cosmetic firms in the Kenyan context. Rapid and significant technological changes in an industry reflect technological turbulence. Firms facing significant and persistent technological changes can adapt by utilizing their technological capabilities. However, under low technological changes, they do not face such serious demands to respond to technological changes. Thus, technological capability in a low technological turbulence context has less value than it has in a high technological turbulence context (Patterson *et al.,* 2003).

Technological turbulence negatively impacts marketing capability performance. First, frequent and significant technological changes occur under high technological turbulence, so rather than pursue marketing activities, the firm's dominant mission is to track technological changes and to absorb and exploit new technologies. Second, frequent and significant technological changes weaken the effects of marketing activities by shortening their lifecycle, reducing their economic return, and further depressing their contributions to firm performance (Kandemir *et al.,* 2006).

Furthermore, previous researches have attempted to compare high and low technology groups in many aspects. According to Hatzicgronoglou (2007), firms which engage technology intensively innovate more, win new markets, and use available resources more productively. Some researchers proposed about the role of technology in supply chains management. Autry *et al.*, (2010), supply chain technologies could be implemented as the tools or techniques in order to effectuate integrated supply chain management within or across organizational boundaries.

The range from low-level operational technologies such as bar coding, through mid-range tactical technologies (warehouse management systems, transportation management systems) are designed to enhance logistics and supply chain functionality through strategic level. These technologies and systems could further establish long-term supply chain process integration and planning, and inter-firm relationships (Autry *et al.*, 2010).

Assessing the impact of specific technology engagement is important for improving plant operations because building technology-based competence is an ongoing process that requires incremental investments in new technology applications in order to improve the effectiveness and efficiency of operational processes at different levels (Heim & Peng, 2010). Moreover, Wilbon (2002), asserts that technology literacy at the executive level is not only critical to increase operational efficiency but also to firm survival hence supply chain agility.

1.1.5 Cosmetic Manufacturing Firms in Kenya

Today is an exciting time in the world of the Internet of Things as the technological capabilities, and supporting infrastructure evolve quickly resulting in massive potential for all industries. In an era of shifting consumer behaviours and rapidly evolving digital trends, the cosmetics industry as a whole has been slow to adapt. To keep up with the pace of change, businesses need to be responsive to opportunities and trends, as well as

innovating and inspiring the future. Cosmetics, as products, are consumer merchandise with a great variety of impact to retail industry (Economic Survey, 2015).

The cosmetics markets are continuously growing despite ongoing criticism and challenges from consumer advocates, media campaigns and regulators. Consumer attraction contradicts the industry's public challenges. Cosmetic industry in Kenya falls under fast moving consumer goods (FMCG) industry which is an important sector that makes a substantial contribution to the country's economic development. Cosmetics have the potential to generate foreign exchange earnings through exports and diversify the country's economy.

This sector has grown over time both in terms of value and quantity of imports. (Economic Survey, 2015). In Kenya, the imports of essential oils and perfumes grew from 9,755 million in 2010 to 13,510 million shillings in the year 2011, representing a 38.5% growth. In terms of quantity it grew from 26,923 tons in 2010 to 33,518 tonnes in 2011, this is 24.5% growth (Economic survey, 2015). The cosmetic industry is a very lucrative, innovative fast paced industry. Innovation is the key to success, as product life cycles tend to be short hence companies should adopt best practices in order to remain competitive and to ensure on-time supply (short life cycle) of products. The industry on its side is continuously working on deflating criticism by converting ingredients from artificial and processed chemicals to using so-called natural -even organic-ingredients. These factors are raising issues of requirements for an understanding of the technologies constituting cosmetics especially product design (formulation), supply chain relationships, and stakeholder's influence on product management.

The study is considering cosmetics to be a technology exposed to short as well as long term change requirements both related to the functional characteristics and to boundary and non-functional product and process circumstances. A number of cosmetic companies in Kenya and around the world are also competing against one another to capture a share of the multi-billion dollar cosmetic market. There are 271 companies and

beauty shops operating in Kenya, but market has been dominated by a few large multi-national companies.

These include: Beiersdorf International a German company with headquarters in Hamburg, Johnson and Johnson is an American multinational with headquarters in New Jersey, Unilever is Anglo Dutch multinational with headquarters in London Rotterdam, P&G is an American multinational with headquarters in Ohio USA and PZ Cussons which operates in Africa and commonwealth nations with headquarters in England (KAM, 2014). The indigenous markets are Buy line industry limited which deals with Luron products and is located along Mombasa road, Inter consumer product limited which sold 10% of its shares to L'Oreal group a French company in April 2013, Haco tiger brand (k) company with product range from hair care and skin care among other household products, Style industry limited which specialize in Darling hair assortment. The cosmetic industry is amongst the fastest growing in the country and it is estimated that Kenyan's spend about four billion shillings each month on beauty and its associated products. This translates to fifty billion shillings each year although there are serious concerns about increasing importation of competitor products. (KAM Report, 2015).

The Kenyan government lowered the rate of tax on cosmetic products in the annual budget speech for 2010-11 fiscal years. The excise duty on cosmetics and skin care products was reduced from 10 per cent to 5 per cent. This has led to a strong growth of the cosmetics industry in Kenya in the recent times. The Internet of Things allows brands to personalize their outreach to customers to enrich user experience. This is particularly beneficial for cosmetic brands as it creates a direct channel to their customers as well as vital customer feedback on efficacy and their experiences.

With permission, brands can track and analyze consumer usage and relay that information back into the organization, gaining valuable insight into consumer behaviour. This allows brands to provide personalized advice to the user and can inform product development and future marketing strategies. In order to collect this data, users need to be encouraged to share their data and to fully understand the benefits for doing

this. This requires brands to add value to the sharing of data and explain that by doing so it will add value to their experience and is not just for sales or marketing purposes (KAM Report, 2015).

1.2 Statement of the Problem

As the level of competition in the 21st Century intensifies and markets become more global, so do the challenges associated with getting a product and service to the right place at the right time and at the lowest cost also continue to be on the increase. Consequently, the whole process of understanding and practicing supply chain management has become an essential prerequisite for staying competitive in the global race and for enhancing performance. Cosmetics industry is one of the fastest growing industry in Kenya. It is estimated that Kenyans spend up to 4 Billion Shillings each month on cosmetics and its related beauty products. The industry compete in a market where rivalry is intense with a plethora of brands and sub brands occupying both the lower and upper tiers of the price continuum. Despite its fast growth, past research done on this sector reveals that there are quite a number of supply chain challenges, which includes: securing a reliable internal operation capabilities, supply chain disruptions, complexities in the supply chain, inconsistencies of quality supplies, poor visibility of demand, lack of cooperation among supply chain members, conflicts among supply chain members, short product life cycles and competition from other supply chains (Gordon, 2011; Betty, 2014; Anderson, 2012).

The level of competition in the cosmetics industry has reached a high level, and there is therefore the need for these firms to explore other avenues from which their performance can be increased. One of the strategies being employed by firms is integral relationships and supply chain agility, both upstream and downstream in order to enhance their level of competitiveness and eventually firm performance. This will require the development of an effective integration between the players in the supply chain. From the reviewed studies, it is evident that little to none has been done to establish performance from the point of view of addressing this gap of supply chain integral relationships. Further,

reviewed studies reveals little to none has been done regarding the effect of supply chain integral relationships on performance, taking into account a moderating effect of technological engagement. This becomes essential to be addressed as integral relationships often enable processes across supply chain and their implications for agility must be fully recognized and examined in a developing economy. The study therefore was designed to fill this knowledge gap by assessing the effect of supply chain integral relationship on performance of cosmetics manufacturing firms in Nairobi County, taking into account the moderating effect of technological engagement.

1.3 Research Objectives

The objectives of the study consisted of General and Specific Objectives.

1.3.1 General Objective

To assess the effect of Supply Chain Integral Relationship on Performance of Cosmetics Manufacturing Firms in Nairobi County, Kenya.

1.3.2 Specific Objectives

The study was guided by the following specific objectives:

i) To determine the effect of Collaborative Awareness on Performance of Cosmetics Manufacturing Firms in Nairobi County.
ii) To examine the effect of Cross Functional Information Sharing on Performance of Cosmetics Manufacturing Firms in Nairobi County.
iii) To establish the effect of Decision Synchronization on Performance of Cosmetics Manufacturing Firms in Nairobi County.
iv) To assess the effects of Idiosyncratic Partner Investments on Performance of Cosmetics Manufacturing Firms in Nairobi County.

v) To assess the Moderating effect of Technological Engagement on Supply Chain Integral Relationship and Performance of Cosmetics Manufacturing Firms in Nairobi County.

1.4 Research Hypotheses

The study was guided by the following research hypotheses:

Ho_1: Collaborative Awareness has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

Ho_2: Cross Functional Information Sharing has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

Ho_3: Decision Synchronization has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

H_{o4}: Idiosyncratic Partner Investment has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

Ho_5: Technological Engagement does not significantly Moderate Supply Chain Integral Relationship and Performance of Cosmetics Manufacturing Firms in Nairobi County.

1.5 Significance of the Study

Policy makers- The findings of the study will assist corporate managers in making sound and informed management decisions and enable them to focus on their customers more efficiently. The findings will give policy makers a glimpse of how supply chain integration affects the performance level of cosmetics firms and consequently identify mechanisms that can be harnessed by the regulators to achieve improved performance of their firms. The findings of the study will enable the management of the various cosmetics firms to identify the key factors to consider in supply chain relationships to

achieve superior firm performance. With such exposition, managers will understand how firms can perform better and add value to the shareholders under Supply Chain Management orientation. Increased supply chain agility as a result of implementing relationship integration will tend to improve the performance of the organization. In addition, the study will be helpful to the government and policy makers for improvement on their systems and better decision making.

The study will avail information to the Kenya's cosmetic regulatory authorities whose interest is to ensure supply of quality and safe cosmetic products to the Kenyan public. The study will also help Managers, especially those dealing with Purchasing and Supply Chain Management on the importance of supply chain integral relationship, and how it enhances performance of their firms, thus achieving competitive advantage. To the Academic Scholars, the study will be useful in enriching the body of knowledge. It will help to expand their knowledge further about supply chain integral relationships, and how it affects performance of a firm.

1.6 Scope of the Study

The study was carried out in Kenya specifically in the County Government of Nairobi. The target population of the study was 714 employees working in these Cosmetic Manufacturing Firms. The study was carried out between November, 2016 and March, 2017.

1.7 Limitations of the Study

A limitation is an aspect of research that may influence the result negatively (Mugenda, 2008). The researcher encountered some limitations especially when obtaining information from the selected sample. This was because most of the respondents were not willing to disclose information. The study overcame this limitation by having an introduction letter from JKUAT to assure the respondents that information provided was to be used for academic purposes only. The second limitation was delay in returning the questionnaires. To overcome this limitation, ample time was given to the respondents. Frequent calls, mails, texts were also given to facilitate the response rate.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The Chapter presents a review of related literature on the subject under study. The chapter covers: Theoretical Review, Conceptual Framework, Empirical Review, Critique of existing Literature, Summary of Reviewed Literature and Research Gaps.

2.2 Theoretical Review

The section presents theories that were used to guide the study and formed the basis for testing the hypotheses. Theories are significant in any study since they provide the basis for the conceptualization of the variables under study. The theories utilized in this study included: Resource Based View Theory, Relational View Theory, Supply Chain Network Theory and Contingency Theory.

2.2.1 Resource Based View Theory (RBV)

The origins of the Resource Based View (RBV) theory can be traced to strategic management. It was introduced by (Barney, 1991). The premise of RBV is that firms that are able to accumulate resources and capabilities that are rare, valuable, non-substitutable, and difficult to imitate, will achieve a competitive advantage over competing firms (Wernerfelt, 1984). Resource rareness refers to the perceived scarcity of the resource within markets. Value is the extent to which the resources are aligned with the external environment to exploit opportunities and reduce threats. Substitutability indicates the extent to which competitors can create equivalent resources.

The degree to which competitors cannot obtain or replicate the resources, or can only do so at a significant cost disadvantage, denotes inimitability (Hoskisson *et al.,* 1999). According to RBV, firms seek to identify resources that will most likely make them more competitive in the market, and then employ these resources to exploit their value (Sirmon *et al.,* 2007). Resources and capabilities are often times used interchangeably within RBV research, and, collectively refer to the tangible and intangible assets firms use to develop and implement their strategies (Ray *et al.,* 2004).

However, a distinction can be made. Resources are more accurately described as "stocks of available factors that are owned or controlled by the firm", whereas capabilities "refer to a firm's capacity to deploy resources, usually in combination, using organizational processes, to effect the desired end" (Amit & Schoemaker, 1993). Examples of tangible resources include manufacturing plants, raw materials, logistics networks and technology (Mentzer *et al.,* 2004). Examples of intangible resources and capabilities include proprietary knowledge, relationships, customer loyalty, corporate culture and philosophies, and supply chain competencies (Hult *et al.,* 2002).

The possession of resources alone is not sufficient to create superior firm performance (Sirmon *et al.,* 2007). Resources must also be effectively managed and exploited (Fawcett *et al.,* 2012). Through a systematic review of empirical research that used RBV as the theoretical base. According to Newbert (2008), combinations of resources is more likely to explain higher performance in firms than resources used in isolation. Combining resources that are dependent on other resources through causal relationships can create value for the firm above and beyond the value created by individual resources.

According to the RBV, the unique capability of a firm, which can be transferred from various tangible and intangible resources, is the primary driver of organizational performance and competitive advantages (Wernerfelt, 1984). Despite its explanatory power, the RBV is considered to be essentially static in nature and inadequate to explain firms' competitive advantage in changing environments (Priem & Butler, 2001). One of

the most influential extensions to RBV, the dynamic capabilities perspective, has been proposed to fill that gap (Teece *et al.*, 2007).

Dynamic capabilities are defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments" (Teece *et al.*, 2007). In his highly referenced framework, Teece (2007), separates dynamic capabilities into three categories: Sensing capabilities for recognizing and dealing with opportunities and threats, seizing capabilities for exploiting the sensed opportunities and fending off threats, and reconfiguring capabilities for maintaining competitiveness through enhancing, combining, protecting, and modifying operational capabilities.

Sensing new opportunities is accomplished through scanning and search processes. The sensing capability is similar to the alertness dimension of agility. Seizing represents how organizations address the sensed opportunity. It is accomplished by conducting activities such as delineating the products and services and defining the most suitable business model for exploiting opportunities (Teece, 2007). Seizing also refers to taking advantage of investments realized in the sensed opportunities (Helfat & Peteraf, 2009). Reconfiguring allows organizations to continuously realign the operational capabilities with the seized opportunities.

RBV provides support for considering SC integral relationships as an antecedent to the development of firm supply chain agility, thus Performance of the firm. According to RBV, firms that are able to accumulate resources and capabilities that are rare, valuable, non-substitutable, and difficult to imitate will achieve a competitive advantage over competing firms (Barney, 1991). Research indicates that supply chain agility, in combination with SC integral relationships can contribute to the creation of a unique set of resources that can give rise to a high performance for firms (Hult & Ketchen, 2001).

It is the premise of this research that firm SC integral relationships is one of the unique resources. In conclusion, this theory leverages upon the fact that in order to drive performance, an organization needs to develop a distinct competency that will push their

competitiveness. One of the ways of achieving this is through SCA and integral relationship. Firm performance in the most recent time has been studied using Resource Based View theory. RBV Theory is therefore the only theory that supports and integrates strategy and firm performance to business performance. According to Zott (2002) the RBV focusses on the performance implications of the firm's utilization of internal resources. The process of managing the firm's unique operations and processes is a critical success factor in creating competitive advantage and thus superior performance.

2.2.2 The Relational View Theory (RVT)

Unlike the resource-based view of the firm (RBV) which proposes that a firm's superior performance originates from its own resource-based advantages (Barney 1991), the Relational View (RV) theory suggests that a firm's sources of competitive advantage may extend beyond firm boundaries. Researchers have proved that superior performance can be achieved via relation-specific investments and collective efforts of the SC partners (Dyer, 1996). They further argued that firms having strong ties with SC partners have better prospects for achieving competitive advantage compared to firms operating in isolation. The view in RV theory supports that competitiveness emerges from inter-firm sources of advantage rather than from within-firm sources (Mesquita *et al.*, 2008).

Relational View theory supports shift of focal point from the firm level to chain level of competition, and is an important extension to the RBV (Choi, 2015). Therefore, supply chain agility is an essential practice that supply chain partnering firms should build and maintain. Performance cannot be achieved without SCA, while Supply Chain Agility cannot be developed without collaborating with the supply chain partners (Braunscheidel & Suresh, 2009). Superior performance is an outcome of firms' relational specific investments with supply chain members.

Relational competencies influence the patterns of SCM practice and can improve the performance of a supply chain (Paulraj *et al.,* 2012). Particularly, the importance of three relational competencies has been highlighted in prior research: communication, cooperation and integration (Omar *et al.,* 2012). There has been a growing trend for organizations to create external linkages based on the sharing of information (Barratt & Oke, 2007). This is the realm of communication. Communication, which can be viewed as a transmission process, refers to the flow of explicit information (Modi & Mabert, 2007). This includes the formal as well as informal sharing of meaningful and timely information (Anderson & Narus, 1990).

Effective communication between firms can be characterized as genuine, frequent and involving personal contacts (Chen & Paulraj, 2004). Cooperation entails the active participation by the actors involved toward sustaining the relationship (Morris & Cartr, 2005). Therefore, cooperation goes beyond the flow of Information inherent to communicative relationships. To go even further, typically the goal is to create and coordinate processes seamlessly across the supply chain (Flynn *et al.,* 2010).

This is the focus of SC integration, as integration refers to the process of combining efforts to integrate supplier and customer information and inputs into internal planning (Swink *et al.,* 2007). Integration supplements the psychological level of cooperation by a level that is focused on the coordination of systems (enterprise resource planning) and processes (inventory management) between partners. Studies show that partners who are willing to make relation-specific investments and combine resources in unique ways (Idiosyncratic Partner Investment) can achieve superior levels of performance (Asanuma, 1989).

Companies no longer compete against each other as autonomous entities; instead competition has shifted to supply chain against supply chain (Stank *et al.,* 2005). The identification of complementary resources and capabilities can help supply chain members combine their resources to more effectively respond to changes (Gligor & Holcomb, 2012). Establishing knowledge-sharing routines across supply chain members

is essential for a coordinated agile response (Christopher *et al.,* 2004). Further, agility research shows that shared information between supply chain partners can only be fully leveraged through process integration.

This means collaborative working between buyers and suppliers, joint product development, and common systems (Christopher, 2000). This is consistent with the RV theory and suggests that in order to ensure a high degree of process integration, investments in relation-specific assets might be necessary. Despite the different applicability between the relational view and resource-based view, both theories state that idiosyncratic capabilities increase the barriers for competitors to duplicate these competences, thus giving an advantage over competitors in the form of differentiation.

Furthermore, Individuals are assumed to eagerly learn from each other in an alliance, developing competences and increasing their skill set. Unfortunately, this might not always be the case. Individuals can behave differently in the sense that they are not interested to learn but pursue other self-interests in the alliance relationship. Furthermore, the forming of alliances is irrelevant in the context of perfect mobility where resources can be traded and accessed on the market, without joining networks (Christopher, 2000).

Alliances serve to access resources that are difficult to obtain on the market, which is characterized by high barriers to trade/access unique resources (imperfect mobility). Finally, the relationships in the relational view are assumed to be ongoing, since they are not subject to time. The relational rents that are extracted from joint efforts to create an idiosyncratic relationship require a significant amount of time to develop but this is not mentioned as a constraint. In reality, firms agree to enter in relationships for a fixed amount of time and renegotiate about prolonging the partnership when this period expires (Stank *et al.*, 2005).

The study finds support in the RV theory which recognizes that competitiveness does not arise from within-firm, but inter-firm sources of advantage (Mesquita *et al.,* 2008). The RV theory supports the transition in unit of analysis from firm to supply chain, and is considered a vital extension to the RBV (Fawcett & Waller, 2011). Firms may not be able to develop supply chain agility in isolation from their supply chain members. Supply chain agility accrues from the focal firm investing in specific relationships with its supply chain members. Therefore, it is logical to consider SC Integral Relationship a competitive advantage within the RV theory.

While offering different perspectives on sources of competitive advantage, the RV and RBV's dynamic perspective are not self-exclusive. Combined, they offer stronger theoretical support for considering firm SC Integral Relationship as a source of competitive advantage. Aside from firm-level resources, organizations can also transform extant supply chain resources into distinctive capabilities (Allred *et al.,* 2011). Supply chain relationships are a potential source of vital complementary resources that the focal firm can access (Ketchen *et al.,* 2007).

Firm supply chain performance results from the firm's ability to reconfigure firm-level and supply chain-level resources. The identification and evaluation of potential complementary resources and capabilities across supply chain members, the collaborative awareness, the creation of knowledge-sharing routines, and the investment in supply chain relation-specific assets can contribute to the creation of firm supply chain agility and hence performance of the firms.

2.2.3 Supply Chain Network Theory

According to Hearnshaw and Wilson (2011), a supply chain can be modelled as a network by a set of "nodes" that represent autonomous business units as firms who are able to exercise sovereign choices, and a set of "connections" that link these firms together for the purposes of creating products or services. The linkages between firms represent exchange relationships and the underlying contract if present. The critical

connection types are the presence of contracts and various flow types such as material flows, information flows and financial flows.

Network theory is descriptive in nature and has primarily been applied in SCM to map activities, actors, and resources in a supply chain. The focus has been on developing long-term, trust-based relationships between the supply chain members. Examples of issues include buyer-supplier relationships, third party logistics, and management roles in supply networks (Gunasekaran, Lai & Cheng, 2008). Supply management has become more critical because there is an increasing dependence on suppliers. The dependence makes companies highly exposed to supply risks. Tang, (2006) supply management should have a positive impact on the mitigation of the supply chain risks.

The performance of a firm depends not only on how efficiently it cooperates with its direct partners, but also on how well these partners cooperate with their own business partners. NT can be used to provide a basis for the conceptual analysis of reciprocity (Oliver, 1990) in cooperative relationships. Here, the firm's continuous interaction with other players becomes an important factor in the development of new resources (Haakansson & Ford, 2002). Relationships combine the resources of two organizations to achieve more advantages than through individual efforts.

Such a combination can be viewed as a quasi-organization (Haakansson & Snehota, 1995). The value of a resource is based on its combination with other resources, which is why inter-organizational ties may become more important than possessing resources alone. Building collaborative supply base with supplier is the key element in supplier strategy. Chopra *et al.* (2010) referred to trust, mutuality, information exchange, openness and communication as important ingredients in buyer-supplier partnership. The authors further asserts that a supply contract specifies what governs the buyer-supplier relationship as it guides the behaviour and performance of all the parties.

Long-run collaborative relationships with key supplier contribute to firm's financial performance. The network theory (NT) contributes profoundly to an understanding of the dynamics of inter-organizational relations by emphasizing the importance of "personal chemistry" between the SC parties, the build-up of trust through positive long-term cooperative relations and the mutual adaptation of routines and systems through exchange processes (Chopra *et al.*, 2010). Through direct communication, the SC relationships convey a sense of uniqueness, ultimately resulting in supply chains as customization to meet individual customer requirements. The parties gradually build up mutual trust through the social exchange processes.

2.2.4 Contingency Theory

Lawrence and Lorsch, (1967) proposed a contingency theory of organization in which they argued that an organization must establish a "fit" between its internal structure and its external environment. This theory postulates that there is no one universally applicable set of management principles by which to manage organizations under all conditions. Organizations are individually different, face different situations (contingency variables), and require different ways of managing. Wren, (2005) observes that contingency theory is a class of behavioral theory that claims that there is no best way to organize a corporation, to lead a company, or to make decisions. Instead, the optimal course of action is contingent upon the internal and external situation. The essence of the contingency theory implies that fitting the characteristics of the organization (i.e., technology, organization size, and strategy) to contingencies that reflect the situation of the organization leads to high organization performance (Donaldson, 2001).

Burns and Stalker, (1961) argued that different kinds of management systems are appropriate to different kinds of technical environments. For instance, the flexible and decentralized structure (organic structure) is more suitable to a dynamic environment, while a centralized structure (mechanistic structure) is more appropriate under a stable environment. Chandler (1962) argues that structures follow strategy in organizations.

The strategy is the determination of long-term goals and objectives, courses of action and allocation of resources. The structure is the way the organization is put together to administer the strategy, with all the hierarchies and lines of authority that the strategy implies. As different strategies create different administration needs, organizational structure will eventually change to accommodate these needs. Mintzberg (1981) argues that the key to organizational success is matching or fitting the parts and characteristics of organizational structures to one another. The authors of these theories argued that Marx Weber's bureaucracy and Fredrick Taylor's scientific management theories had failed as they neglected environmental influences and that there is not one best way to manage an enterprise (Azjen, 2005).

Contingency theory is about the need to achieve fit between what the enterprise is and wants to become (its strategy, culture, goals, technology, staff and external environment) and what it does; how it is structured and the processes, procedures and practices it puts into effect (Purcell, Kinnie, Hutchinson, Rayton & Swart, 2007). Thus, organizations are required to formulate different strategies in order to remain agile and achieve their performance. This is because a single strategy may not be appropriate due to the environmental influences.

The contingency theory states that there is no universal principle to be found in the management of enterprises but one learns about management by experiencing a large number of case problem situations and determines what will work for every situation (Wren, 2005). This is true because different manufacturing firms have different unique challenge from one another. This theory is important to the manufacturing firms because it requires managers to adopt different managerial skills in order to be responsive and improve their firm performance. Managers in the manufacturing firms should implement predefined contingency plans to provide a quick response with appropriate mitigation measures that enable them to recover fast by minimizing the negative disruption consequences.

Further, managers should enhance agility and flexibility through higher supply chain visibility from effective communication and information sharing in real-time among supply chain partners (such as demand and inventory levels) in order to proactively sense threats and initiate response mechanisms with improved speed (Purcell, 2007). Chopra and Sohi, (2014) recommend managers to segment (based on volume, product variety and demand uncertainty) and regionalize supply chains to reduce costs and increase responsiveness for mitigating the supply chain, hence high firm performance.

Thus, contingency theory emphasizes the importance of managers in the manufacturing firms to use strategies that are appropriate to the circumstances of the organization, including SC integral relationships so as to achieve organizational performance. This is supported by Braunscheidel and Suresh, (2009) who asserts that by enhancing SC integral relationship, firms are able to improve their performance.

2.3 Review of Variables

The section reviews the key variables of the study that attempts to assess the effect of supply chain integral relationships on the performance of Cosmetics Manufacturing Firms in Nairobi County, Kenya. These includes: Collaborative Awareness, Cross Functional Information Shairing, Decision Syncronization, Idiosyncratic Partner Investment, Technological Engagement and Performance.

2.3.1 Collaborative Awareness and Performance

According to Barnes and Liao (2012), collaborative awareness is the study of relationship with organizational awareness and supply network competency. This relationship, exploits both the tacit and explicit knowledge of the networked firms resulting in creation of strategic incentive alignment. Collaboration allows firms to partner by combining core competencies and expertise without the additional investment of intensive vertical integration (Cao & Zhang, 2011).

Collaboration has been defined by various authors (Daugherty *et al.,* 2006; Simatupang & Sridharan, 2005), but the idea that flows through almost all definitions is that collaboration is to devise a set of strategies in which two or more independent external (firms) and internal (within firms) actors with different complementary capabilities achieve their common aspirations and goals in a competitive environment that cannot be achieved individually (Kumar, 2012). While in collaboration, resources and capabilities of supply chain partners are leveraged to create new capabilities to respond to dynamic market needs (Fawcett *et al.,* 2012). Collaboration is mainly grouped under three categories: vertical, horizontal and lateral collaboration (Barrat, 2004). Vertical collaboration is formed when members of a supply chain collaborate to achieve a greater success. Horizontal collaboration is formed when a firm collaborating with its competitors or non-competitors (in a different supply chain) to achieve greater innovativeness. Lateral collaboration can be observed when firms are involved in a combination of both vertical and horizontal collaboration to gain more flexibility.

In general, firms should derive more benefits from working together (efficiency, knowledge gain, cost reduction, performance improvement) than individual firms can gain on their own. Additionally, supply chain collaboration may be one way for firms to cope with uncertainty (Davis, 1993). It refers to the process of sharing costs, risks, and benefits among supply chain partners (Simatupang & Sridharan, 2005). Successful partnerships require participants to share gains and losses equitably, so that the collaboration outcomes are quantifiably beneficial to all (Manthou *et al.,* 2004).

Supply chain members must align incentives which match its investment in order for the collaboration to work. It helps in motivating the members to act in a manner consistent with overall objectives such as revealing confidential and relevant information. It secures sufficient levels of cooperation and commitment (Harland *et al.,* 2004) and would allow the chain members to accept the importance of the potential rewards that can be achieved through collaboration even if the costs are to be shared (Simatupang & Sridharan, 2005). The interaction of incentive alignment with other features of collaboration has also been acknowledged to be significant as it motivates the chain

members to align their actions to the mutual purpose of collaboration that would also enhance their individual profitability. According to Fisher (1997), and Lee (2002), discussed collaborative strategies in the face of supply and demand uncertainty. Greater supply chain collaboration should help mitigate supply and demand uncertainties as partners' knowledge and resources are shared to remain efficient and responsive (agile) to customer needs (Fawcett & Magnan, 2004). Numerous benefits have been outlined in the literature that rationalize the choice to engage in collaborative relationships.

Firms participating in collaboration have an opportunity to be more efficient (Kalwani & Narayandas, 1995); more customer focussed by exchanging information about customer needs (Myers & Cheung, 2008) and more successful overall than those not participating (Simatupang & Sridharan, 2004). Sales growth, market share and satisfaction often increase and working closely together makes firms more likely to extend their partnerships into the future (Gunasekaran, 2014). Supply chains may even become more resilient by managing risks as a network rather than at the firm level (Christopher& Peck, 2004).

Despite these benefits, many firms have struggled to engage collaboration due to struggles with partner selection and matching the needs and goals of independent organizations (Daugherty *et al.,* 2006). Firms have also struggled to identify who to collaborate with, and a lack of trust between partners have been an issue (Barrat, 2004). Additionally, the decision to engage in collaborative relationship requires commitment from all involved parties since collaboration efforts can lose momentum when faced with resistance (Fawcett *et al.,* 2015). In supply chain collaboration, partners are able to share information and expertise to reduce or eliminate certain types of uncertainty. However, there is a large financial cost as well as a number of characteristics (trust, desire and ability to share information, willingness to change processes) that need to occur for collaborations to be successful (Whipple *et al.,* 2010). Collaborative awareness looks at trusting, long-term relationship with the supplier. Trust leads to commitment among collaborating members and commitment further leads to improvement in effectiveness of relationship among the collaborating partners thus supply chain agility.

The key factor informing supply chain collaboration is the trust between all parties that is suppliers, manufacturers and customers.

Further, trust leads to other factors such as mutual help, openness, and common development of interest and resource synchronization. Trust is not only a desired characteristic but a necessity for collaborative arrangement. Due to trust, coordination improves, process become reliable and quality of information is improved as a result of which purchasing cost decreases (Zaheer *et al.*, 1998). In addition to trust, according to Moorman *et al.* (1992) commitment is an "enduring desire to maintain a valued relationship." Grifix *et al.* (2004), asserts that shared goals, open communication and a commitment of sharing information, joint problem solving and rapid response to failures to meet expectation were the main drivers for successful collaboration in supply chain.

According to Morgan and Hunt (1994), negative influence of commitment in a relationship reduces collaboration and success. Thus, it can be contented that both commitment and trust leads to increasing collaboration but trust is crucial factor for the development of commitment. Trust is an important element for inter-organizational supply chain collaboration because trust can provide a foundation between collaborative partners for sharing critical information (Lejeune & Yakova, 2005). There is little doubt that collaboration is critical for a successful supply chain, yet few firms have realized real collaboration, suggesting that collaboration capability is rare, valuable and hard to replicate (Fawcett et al., 2009). It also suggests that much has to be explored through different perspectives which can help firms in implementing collaboration. By stressing on joint planning, information sharing, problem solving, performance measurement and leveraging resources and skills, (Min et al., 2005) gives a roadmap for supply chain collaboration. A body of literature (Barrat, 2004; Whipple & Lynch 2010) is inclined towards social factors mainly trust and commitment.

2.3.2 Cross Functional Information sharing and Performance

Central to collaboration is the exchange of large amounts of information along the supply chain, including planning and operational data, real time information, and communication. Information is seen as the 'glue' that holds together the business structures that allow supply chains to be agile in responding to competitive challenges. The backbone of the supply chain business is IT which is used to acquire, process, and share information among supply chain partners for effective decision making (Sanders & Premus, (2002); Paulraj *et al.,* (2008).

The idea that information technology (IT) is a source of competitive advantage and fundamental to a firm's survival and growth is well-established (Prajogo & Olhager, 2012). Through information technologies, coordination costs and the risks associated with inter-organizational relations can been reduced. Information technology allows buyers and suppliers to communicate directly over data-rich, easy-to-use information channels that reduce coordination costs (Lewis & Talalayevsky, 2000). Indeed, many organizations feel it necessary to engage in information technologies system such as B2B, e-commerce. If they do not, those competitors that do make use of such technologies threaten to outpace them in efficiency gains and hence jeopardize their market position (Kaefer & Bendoly, 2004). The strategic supply chain information allows supply chain partners in making strategic decision in their operations (Li *et al.,* 2006). Information sharing becomes crucial in these turbulent economic times as it drives the firm into becoming a collaborative structure.

It requires firms to exchange strategic supply chain information apart from transactional data, leading to improvement in the relationship and integration between the SC partners (Hsu *et al.,* 2008). According to Klein & Rai (2009), buyer and supplier strategic information flows positively impact the relationship-specific performance of both sharing and receiving parties. Moreover, quality of information sharing refers to the extent to which a firm shares a variety of relevant, accurate, complete and confidential information in a timely manner with its supply chain partners (Yen & Chae, 2006).

While information sharing is important, the impact of it on SCM depends on the quality with which it is shared (Holmberg, 2000). Given these predispositions, levels of information sharing as well as quality of information shared become critical aspects in deciding the supply chain success. The success of a company's SCM depends upon the accuracy and speed of the information provided by each business partner (Chong *et al.*, 2009). Information Sharing (IS) refers to the extent to which critical and proprietary information is communicated among supply chain members with regards to market, product and customer information (Mentzer *et al.*, 2001). The Resource-Based View of the firm emphasizes on the ability of firms in generating new knowledge and ability in facilitating information sharing. Knowledge acquisition, assimilation, transformation and exploitation which are termed as absorptive capacity in literature are important dimensions of organizational capability. Therefore, cross functional information sharing with partners is considered as important elements of supply chain capability. Wu *et al.*, (2006) conceptualized information exchange as one of the constructs representing supply chain capabilities.

The effort in providing information and making it visible to other parties in the supply chain allows for faster and accurate business decisions that translates as a source of competitive advantage (Moberg *et al.*, 2003). This implies that a successful sharing of useful information between the supply chain partners can result in a reduction in inventory and manufacturing cost, better understanding of customer needs, and faster response to market changes (Li *et al.*, 2006). Cross functional Information sharing requires firms to exchange strategic supply chain information apart from transactional data, leading to improvement in the relationship and integration between the SC partners.

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as it drives the firm into becoming a collaborative structure. According to Klein & Rai (2009), buyer and supplier strategic information flows positively impact the relationship-specific performance of both sharing and receiving parties. Integration Relationship is therefore heavily dependent on the mutual exchange of sensitive information among trading partners (Norrman, 2008). When organisations share the knowledge about the current state of affairs with respect to demand, order and inventory, they are in a far better position to harmonise their service and activities (Simatupang & Sridharan, 2005).

They further assert that Information sharing can have not only operational but also tactical and strategic benefit, potentially improving supply chain managers' understanding of the extended supply chain and mitigating uncertainty within and between organisations. The authors further asserts that self-interest may stop an organisation from sharing information if they are anxious about opportunistic behaviour on the part of their partners. Among the benefits of sharing information are that all the supply chain partners can develop more opportunities such as matching the available information to modify their courses of actions and future planning, which can have positive and direct effect on the company and its supplier relationships (Hsu *et al*., 2008).

When buyers and suppliers share important information relating to materials and product design issues, they are likely to improve the quality of their products, reduce customer response time, and increase cost savings through greater product design and operational efficiencies. Some of these cost savings are then passed on to the customers in the form of higher perceived value and lower prices (Carr & Pearson, 1999). Moreover, the operational benefits of information sharing between supply chain members are established and numerous: it can mitigate the bullwhip effect (Chatfield *et al*., 2004), improve new product design (Brown & Eisenhardt, 1995), improve cost (Choi *et al*., 2008), and enhance competitiveness in the marketplace on a variety of dimensions, including delivery, quality, and cost (Li *et al*., 2006). Moreover, quality of information sharing refers to the extent to which a firm shares a variety of relevant, accurate, complete and confidential information in a timely manner with its supply chain partners (Yen & Chae, 2006).

While information sharing is important, the impact of it on SCM depends on the quality with which it is shared (Holmberg, 2000). Given these predispositions, levels of information sharing as well as quality of information shared become critical aspects in deciding the supply chain success. In general, SCM involves the flows of material, information, and finance in a network consisting of customers, suppliers, manufacturers, and distributors. Material flows include both physical product flows from suppliers to customers through the chain and reverse flows via product returns, servicing, recycling, and disposal.

Information flows involve order transmission and delivery status. Financial flows include credit terms, payment schedules, and consignment and title ownership arrangements. These flows cut across multiple functions and areas both within a company and across companies (Menzter, 2001). Numerous success stories imply that a tightly integrated supply chain can lead to superior chain performance and improved competitiveness for each of the involved channels.

Integration of these flows within and across companies is critical to effective SCM. A truly integrated supply chain does more than reduce costs. It also creates value for the company, its supply chain partners, and its shareholders (Lee, 2000). The author further asserts that supply chain integration constitutes the following three dimensions: information integration, coordination, and organizational linkage. Information integration exchanges information and knowledge through information sharing, collaborative planning, forecasting, and replenishment.

Information technology plays a key role on the various integration processes as synchronizing suppliers in the network by providing real time information. A bulk of literature has addressed the benefits of IT on SCM from direct operational benefits to the creation of strategic advantages. However, the integration processes in supply chains can be hampered by the fragmented IT infrastructure, which enables information flows and coordination activities across functional units and network partners. A well-integrated

IT platform is not only the individual physical parts as it requires the standards for integration of data, applications, and processes to realize the information flow.

The two construct important to IT infrastructure are data consistency which should enable the process integration including the information flow by defining key entities to realize information sharing, and cross-functional application integration. This enables the management of the supply chain-related processes and realizes the ability to interface with supply chain applications among partners in real time. Lack of information sharing and sparse information prohibits the supply chain coordination and lead to greater operational inefficiencies (Patnayakuni *et al.,* 2006).

Therefore, through the agile capability to realize operation on actual demand, information should be instantly available through information sharing and exchange and organizations are designed for maximum efficiency during integration processes. A key characteristic of supply chain agility is the instant availability of information to manage an 'on demand' business operation. IS integration provides the basis for information sharing and exchange of organizations (Auramo *et al.,* 2005).

Cross functional information sharing requires the integration of communication, data and application (Muller *et al.,* 2007) to enable consistent and real-time connectivity among function units across supply chains (Rai *et al.,* 2006). Information sharing integration within and among organizations enables them to capture data on demand, leading to customer-focused supply chains (Christopher, 2000). Firms are more likely to gain competitive advantage through fast delivery and product variety rather than price. Therefore, the effectiveness of supply chains can be measured by its responsiveness (Lee & Billington, 1992).

2.3.3 Decision Synchronization and Performance

Decision synchronization refers to the process where supply chain partners orchestrate decisions in supply chain planning and operations that optimize supply chain agility

benefits (Simatupang & Sridharan, 2005). It is the Joint decision making by SC partners with regards to the planning and operating context. It is also referred to as a form of non-equity governance agreed by involved partners in order to pursue certain super-ordinate objectives which, if attained, can benefit all of them (Lejeune & Yakova, 2005).

Decision synchronization can be within different areas of supply chain management such as procurement, order entry procedures, delivery schedules, product/service design, and quality monitoring/improvements (Biehl, Cook & Johnston, 2006). Joint planning and resolution (through the formation of cross-functional and organizational teams) allow SC partners, for instance, to jointly develop process improvement strategies in face of SC problems like delays in lead-time. This joint effort may result in better commitment of partners towards the implementation of these strategies as they are collectively discussed and agreed upon.

Empirical study by Biehl *et al.* (2006) shows the positive role of joint decision making (as a key attribute of collaborative SC relationships) on the better SC performance. In order to achieve a desirable set of objectives, firms engage in planning to determine a best way to utilize its resources. Decisions in supply chain involve planning and scheduling, procurement, and distribution management. Therefore, planning jointly helps in aligning partners and to coordinate decisions on inventory replenishment, order placement, and order delivery.

This calls for congruence among supply chain partners to act in an agile way. When there is an alignment between the goals of the supply chain and that of the partners, it would lead to a higher level of partnership and thus performance (Eliashberg & Michie, 1984). Goal congruence or mutual goals are the degree to which partners share goals that can only be accomplished through joint action and maintenance of the relationship (Wilson, 1995; Cavusgil & Deligonul, 2012). Goal congruence is the extent to which supply chain partners perceive their own objectives are satisfied by accomplishing the supply chain objectives (Cao & Zhang, 2011). It is the degree of goal agreement among supply chain partners (Angeles & Nath, 2001).

In the case of true goal congruence, supply chain partners either feel that their objectives fully coincide with those of the supply chain, or, in case of disparity, believe that their goals can be achieved as a direct result of working toward the objectives of the supply chain (Lejeune & Yakova, 2005). Decision synchronization among supply chain partners provides strong reason for relationship continuance. Wilson *et al.* (2006) suggest that mutual goals influence performance satisfaction, which, in turn, influences the level of commitment to the strategic alliance. Strategic alliances are known to be risky.

Potential partners may be a lot better or worse than the company at the strategic alliance formation (Cavusgil & Deligonul, 2012). Goal assessment is seen as important criteria in choosing partners besides complementary skills and cooperative cultures (Brouthers *et al.,* 1995). The needs and expectations of the partners have to be incorporated in the operations and strategies of a supply chain to enhance each chain member's profit, return- on- investment, and cash flow (Simatupang & Sridharan, 2005).

One way to judge decision synchronization is the responsiveness of the supply chain partners in filling customer demands and the effectiveness of joint decisions in enhancing supply chain profitability (Corbett *et al.,* 1999). Harland *et al.,* (2004) in their study implied the level of synchronization in the decision making process as a key element of supply chain coordination and agility, as a way of building and maintaining mutual partnerships. Very often, supply chain partners have conflicting goals that guide decision making, which lead to solutions that are less than optimum (Lee *et al.,* 1997).

The supply chain members may have conflicting objectives and disagreements over domain of supply chain decisions and actions. It must be noted that a typical supply chain also deals with human systems, and hence, which may pose following challenges and difficulties in coordinating supply chain members. The individual interest, local perspective and opportunistic behaviour of supply chain members results in mismatch of supply and demand, hence supply chain agility (Fisher *et al.,* 1994). The traditional

performance measures based on the individual performance may be irrelevant to the maximization of supply chain profit in a coordinated manner.

Similarly, the traditional policies, particularly rules and procedures, may not be relevant to the new conditions of inter organizational relationship. There has been over reliance on technology in trying to implement IT (Lee *et al.*, 1997). At the same time, literature reports that it is usually observed that supply chain partners have different decision rights and expertise (Simatupang & Sridharan, 2005). If a company believes it must change all of its key operations and systems to attain the benefits of supply chain integration, then it becomes a great challenge because it is very difficult to make individual trading partners in the supply chain, each with their own goals, function as a synergistic whole. Thus, supply chain partners should coordinate critical decisions that affect the performance of their firms.

2.3.4 Idiosyncratic Partner Investments and Performance

Relation-specific investments Relation-specific (or idiosyncratic) investment is a key concept in business relationships and supply chain management literature. It represents those investments that have been made by cooperating actors and are sticky to the given relationship. These investments cannot be mobilized and transferred easily to other relationships (Williamson, 1985; Anderson & Weitz, 1992). It is also important to note that collaborative relationship between supply chain partners can be strengthened and supported via financial investments in the relationship (Min *et al.*, 2005). These investments represent a "non-retrievable commitment of a firm's resources to joint investments that will have joint worth, but only while the relationship continues" (Wilson, 2006). Relationship-specific investments can take different forms, such as time, people, money, training and technology and have the potential to provide sociai and economic ties between cooperating parties hence supply chain agility.

The idiosyncratic investment of exchange partners for a specific business relationship, which is irrecoverable, is termed as Relationship-specific investments (Ganesan, 1994). Buying firms trust selling firms that invest in that specific relationship (Palmatier *et al.*, 2007) as seller RSIs send positive signal to the customer that by providing tangible evidence the supplier is believed and cares about the relationship. Idiosyncratic investments are very difficult to be transferred (Skarmeas *et al.*, 2002) and have little salvage value in another exchange context (Williamson, 1981) and hence switching cost is high.

When a party in an exchange relationship employs RSIs, then the party shows commitment to the exchange relationship and the other party shows greater confidence in that party (Anderson & Weitz, 1992). An exchange partner's RSIs create barriers to exit the existing relationship with the other partner and make the investor more dependent and hence committed on the other partner (Ganesan, 1994). Skarmeas *et al.* (2002), RSIs create a locked-in condition hence relationship specific investment is a valuable precursor of both trust and commitment. Idiosyncratic investments are assets that are committed specifically to the relationship at hand. These assets cannot be redeployed easily outside the relationship and, therefore, their value depreciates in the event the primary relationship is discontinued (Bensaou & Anderson, 1999). According to Powers and Reagan (2007), there are costs that are associated with ending the relationship and starting a new one with another partner. Both heaviness and commitment help the partners to sustain and competitively develop ongoing business relationships. Long lasting relationships tend to strengthen interaction, making relational bonds richer and supporting more complex and innovative types of cooperation (Zhao *et al.*, 2014).

Overall, the literature suggests that an increase in relation specific investments (idiosyncratic), is expected to positively influence performance, hence supply chain agility (Dyer, 1996). Matsuno (2006), defines specific investments as financial, time and other resource allocations that are made in a manner that can be used only in conjunction with a relationship partner. Buvik and Reve (2001), concurs by stating that buyer or

supplier specific adaptations refer to the investments made by the buyer or supplier, in physical assets, production facilities, tools, and knowledge tailored to a specific relationship.

When an organization or supplier makes idiosyncratic investments, a lock-in situation is established as they not only create value for all the actors involved, but also build the costs of switching from that relationship. This helps increase the level of obligation between the involved parties (Nahapiet *et al*., 1998). Competitive pressures in the global market, shortened product lifecycles, rapid technological change, increased demand for innovations, and the changing nature of industry have forced companies to rethink their strategic position and focus on leveraging their supplier relationships (Leek *et al*., 2003). Moreover, stiff competition, rapidly changing technologies and increasing customer expectations have seen strategic relationships between a buyer and its suppliers become vital to a competitive advantage (Monczka *et al*., 2002). Rowley (2003), stresses the role of relational embeddeness in deepening and strengthening inter-firm relationships. Consistent growth theory recognizes that no relationship starts out as a strong tie, but inter-firm embeddedness works as a priming mechanism through which small initial offers of trust and assistance strengthen into a resilient tie, provided that they are reciprocated.

Inter-firm relationship acquires a social character above and beyond the technical characteristics of the exchange at hand (Heugens & Zyglidopoulos, 2008). Williamson's (1983) discussion of four distinct types of relationship-specific investment is very helpful for identifying and measuring variations in the importance of asset specificity. They are: First, Site specificity. The buyer and seller are in a cheek-by-jowl relationship with one another, reflecting ex-ante decisions to minimize inventory and transportation costs. Once sited, the assets in place are highly immobile.

Second, is Physical Asset Specificity. When one or both parties to the transaction make investments in equipment and machinery that involves design characteristics specific to the transaction. Third, is human asset specificity. Investments in relationship-specific

human capital that often arise through a learning-by-doing process. Finally, dedicated assets. These refer to General investments by a supplier that would not otherwise be made but for the prospect of selling a significant amount of product to a particular customer. If the contract were terminated prematurely it would leave the supplier with significant excess capacity. The idiosyncratic investment of exchange partners in supply chain helps increase the level of obligation between the involved parties, hence improved performance of the firm.

2.3.5 Concept of Performance

Organizational performance comprises of the actual output or results of an organization as measured against its intended outputs or goals and objectives. According to Richard and Devinney (2005) organizational performance encompasses three specific areas of firm outcomes: financial performance (profits, return on assets, return on investment); product market performance (sakes, market share) and shareholder returns (total shareholder return, economic value added). Non-financial measures are at the heart of describing strategy and developing a unique set of performance measures that clearly communicate strategy and help in its execution (Kalpan & Norton, 2001).

Researchers have argued that internal integration of various activities in an organization will be able to enhance economic performance (Flynn, Huo & Xhao, 2010). The authors further asserts that internal integration of organizational processes is a recipe for moderated corporate performance. The primary goal then of organizational performance is to increase organizational effectiveness and efficiency so as to improve the ability of the organization to deliver goods and services to its customers (Kalpan & Norton, 2001).

The two essential requirements for supply chain performance are proper integration in the partnerships with suppliers and the effective utilization of information technology. It is argued by most researchers that active involvement and support of all the supply chain entities can create competitive values. The ultimate judge of supply chain performance is the customer in terms of effective and timely responses to their ever changing tastes and

preferences. The main focus today for most large scale firms is on becoming efficient and flexible in their manufacturing methods (Awino & Gituro, 2011). Different strategies are therefore needed to manage the flow of goods from the point of production to the end user in order to handle uncertainty in the business environment.

Various performance metrics have been developed to measure, evaluate, and monitor the operation of the entire supply chain (Ugur & Erman, 2013).The supply chain operations reference (SCOR) model was introduced in 1996 by the Supply-Chain Council, which is a global organization of firms interested in SCM. According to Theeranuphattana (2011), the SCOR model offers users standard descriptions of management processes that make up the SC, a framework of relationships among the standard processes, standard metrics to measure process performance, management practices that produce best-in-class performance, standard alignment to software features and functionality that enable best practices.

Supply Chain Council (2012) presents five attributes of SC performance which are SC reliability, responsiveness, flexibility, costs and asset management. SC reliability is the performance of the SC in delivering the correct product to the correct place, at the correct time, in the correct condition and packaging, in the correct quantity, with the correct documentation, to the correct customer. SC responsiveness is the speed at which a SC provides products to the customer. SC flexibility is the agility of a SC in responding to marketplace changes to gain or maintain competitive advantage. SC costs are the costs associated with operating the supply chain. Supply Chain asset management is the effectiveness of an organization in managing assets to support demand satisfaction. This includes the management of the both assets: fixed and working capital. These measures are also consistent with studies done by ilkka, (2010) and Ugur & Erman., (2013). Margaret (2013) used sales maximization to measure supply chain performance of the large manufacturing firms in Kenya.

Supply chain performance affects the ability to provide customer value, especially in the most basic dimension of the availability of products. Improved firm performance can facilitate a number of desirable outcomes related to economic development, growth and resilience (Barkhamet *et al.*, 2006). Supply chain integration can help a firm produce and deliver products or services to the customers at lower cost and higher speed through the improvement in supply chain performance (Kim, 2009)

2.3.6 Moderating Effect of Technological Engagement

The technologies in supply chains represent one of the fundamental elements that link the organizations of a supply chain into unified and coordinated system (Handfield & Nichols, 2007). The introduction and utilization of integrated technologies for managing the supply chain would not only enhance quality as well as reduce delivery times and costs, but also enhance the company's competitive position (Yusuf *et al.,* 2004); Swafford *et al.* (2008); Narasimhan *et al.* (2009). Raymond (2005), asserts that technology plays an increasingly critical role in businesses large and small.

Research in the past has shown a positive impact on technology adoption on small businesses, by helping firms enhance their operational efficiency. Technology adoption drives business growth and integrates business' operations with strategies (Swafford *et al.,* 2008). Technological engagement in the organizational context may be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning and market share (Guan & Ma, 2003; Chen & Paulraj, 2004).

At its simplest, the technology that can support SC operations is one that leads to improvements in productivity, routine operations, and logistical activities in the SC network. This productivity is measured in terms of the level of network optimization, while routine operations within the network covers the management of the supply chain inventory and capacity. There are various forms of technologies that have been adopted over the years by different members and partners in a SC network. Each of these

technologies along the SC is expected to improve the firm's operational performance and overall performance if well aligned with the strategic goals.

Technology is a SC enabler linking all aspects of SC network (Damanpour, 1991); Patterson *et al.* (2003). A technological innovation in a SC network should be any idea, program, product/service, production practice or object that is perceived as new by the supply chain partners, which should entail the generation, development and implementation of new ideas or behaviors (Premkumar & Robert, 1999).Currently, with the advent of technological innovations in supply chain management, firms are no longer competing for the end customers instead they compete with each other for position in competitive SC networks.

Hence the technology to be used by firms in any SC should be carefully selected although the focus in the technology selection frameworks and process focuses on the financial aspects like cost and capital outlays and not strategic issues in relation to the use of technology ((Damanpour, 1991). There is limited empirical research to show the operationalization of the technology selection processes (Farooq & O'Brien, 2010). This creates the need for a study that incorporates key strategic issues in the technology selection for a modern SC strategy in relation to firm competitiveness. Many researchers have made efforts to identify supply chain technologies (SCT).

Forger (1998), identified five key SCTs as enterprise resource planning (ERP), supply chain planning (SCP) systems, manufacturing execution systems (MES), warehouse management systems (WMS) and transportation management systems (TMS). Dawson (2002), identified two more SCTs; Extranets and radio frequency identification systems (RFID). These types of SCT are in line with Patterson *et al.*, (2003) grouping of SCT into functional technologies and integrative technologies.

To extend the list, Patterson *et al.* (2003) established more SCTs such as product data management, customer relationship management, automated quality control system, computer-aided design systems, WMS, MES, TMS, RFID, geo-coded tracking systems

(GCTS), bar-coding technology, e-commerce technologies, supply chain event management (SCE), demand forecasting management (DFM), ERP and SCP systems. Developments in SCT also include: developments related to warehouse management systems, TMS and ERP. E-business has replaced the manual and physical business processes with electronic ones.

Electronic data interchange (EDI) has enabled exchange of business documents by means of computer-to-computer connections; Bar code and point-of-sale data had enable firms to create instantaneous record of sale; Radio frequency identification (RFID) technology has enabled firms to use radio waves in sending product data from an item to a reader (Patterson *et al.,* 2003). The internet has enabled firms to communicate with their customers, suppliers, shippers and other supply chain partners instantaneously either locally or globally. E-Procurement has embraced swift movement of a product from the suppliers directly into production process via the internet.

E-markets are equally the backbone of conducting business-to-business activities. The reverse auction has enabled firms to post orders on the internet for suppliers to bid on them (Patterson *et al.*, (2003); Helo and Szekely, (2005). According to Chopra and van Miegham (2000), the above specific technologies in supply chains have led to efficient flow of goods, services, information, communication and collaboration either between or within an organization. These technologies if well utilized within a sound supply chain strategy can lead to superior performance along the supply chain network particularly in vendor managed inventory (VMI), collaborative planning, forecasting and replenishment (CPFR) and efficient consumer response (ECR).

In order to integrate technology adoption and the SCM discipline, Patterson *et al.*, (2003) highlighted that SCT can be categorized into functional technologies and integrative technologies. Nor and Zulkifli (2009), asserts that functional SC technologies are used to accomplish a particular functional area such as warehouse management systems (WMS) and transportation management systems (TMS). Integrative SC technologies refer to activities relating to coordinating and integrating information flows

and activities within and/or between firm boundaries. The innovative opportunities coming to the forefront with electronic commerce (e-commerce), especially through the internet, have increased the interest in IT. The primary goal of technology in the supply chain is to link the point of production seamlessly with the point of delivery or purchase. The idea is to have an information trail that follows the product's physical trail. This allows planning, tracking and estimating lead times based on real data. The data should be accessible in the system from a single point of contact.

Managers analyze, plan activities and make decisions based on information from the entire supply chain. Clear communications and quick responses to those communications, are key elements of successful SCM. Information Technologies in SCM, such as EDI, ERP and CRM systems can improve supply chain performance and enable great opportunities, ranging from direct operational benefits to the creation of strategic advantage. A common view is that Technology has a profound impact on managing supply chains.

Some of Technology benefits in supply chains are providing accurate information and helping supply chain members to share information in real time, improving planning and control of operations for the organizations, as well as indirectly increasing customer satisfaction (Spathis & Constantinides, 2004). Technologies of the internet and the web can enhance effective communication. Software that uses internet sources can help members of the SC review past performance, monitor current performance and predict when and how much of certain products need to be produced.

However, although IT is an enabler and integrator of SCM, organizations need performance measurements and key practices in place to have an effective system. The increasing rate of changing technologies, innovation, customer expectations, competition, and risk involved with new product entry and at the same time keeping the product design process cost efficient, is a challenging job. Kim & Oh (2005), presented systems dynamics approach to coordinate supplier and manufacturer decisions regarding improvement in quality and the new product development.

According to Petersen *et al.* (2005) presented the findings from an empirical survey about the capabilities of suppliers required in coordinating the product design process with supplier. The coordination at design stage may result in better design and improved financial performance if the supplier has sufficient knowledge required to design the product. The cosmetics industry is embracing new technologies, as it attempts to attract a new wave of digital natives. The rise of online shopping has transformed the way we buy everything from groceries to clothes but, when it comes to cosmetics, online shopping has hit the buffers.

This is because consumers still want the same 'real-life' experience online as they do in-store. They want to know what a product will look like, or smells like, in order to make a decision. Cosmetics companies need to use the most advanced technology available to introduce products to digital consumers. Recent research from the Future Foundation found that in-store experience needs to work ever harder to excite and 'close the deal' while the customer is on site. Two L'Oreal brands have launched partnerships with technology companies to allow customers to use the latest technology to 'trial' cosmetics before they buy.

L'Oréal Company in Paris has launched a 'Make-up Genius' app to allow customers to see how make-up will look on their face before buying it. Both of these initiatives are designed to enhance the process of buying cosmetics, allowing customers to experience products in a way that previously wasn't possible. Rather than replacing the experience of trying on make-up in a shop, these initiatives aim to add a new dimension for people who want to try out a new look. Similarly, Zhou *et al.,* (2005) asserts that firms can take advantage of technological advances to significantly alter the components of an existing SC.

A focal firm should integrate more with those suppliers that are able to cope with technological changes and provide critical components of products/services. It should not lock itself in with suppliers that are unable to do so and, if needed change those suppliers in order to obtain the technological developments required to retain the chain's

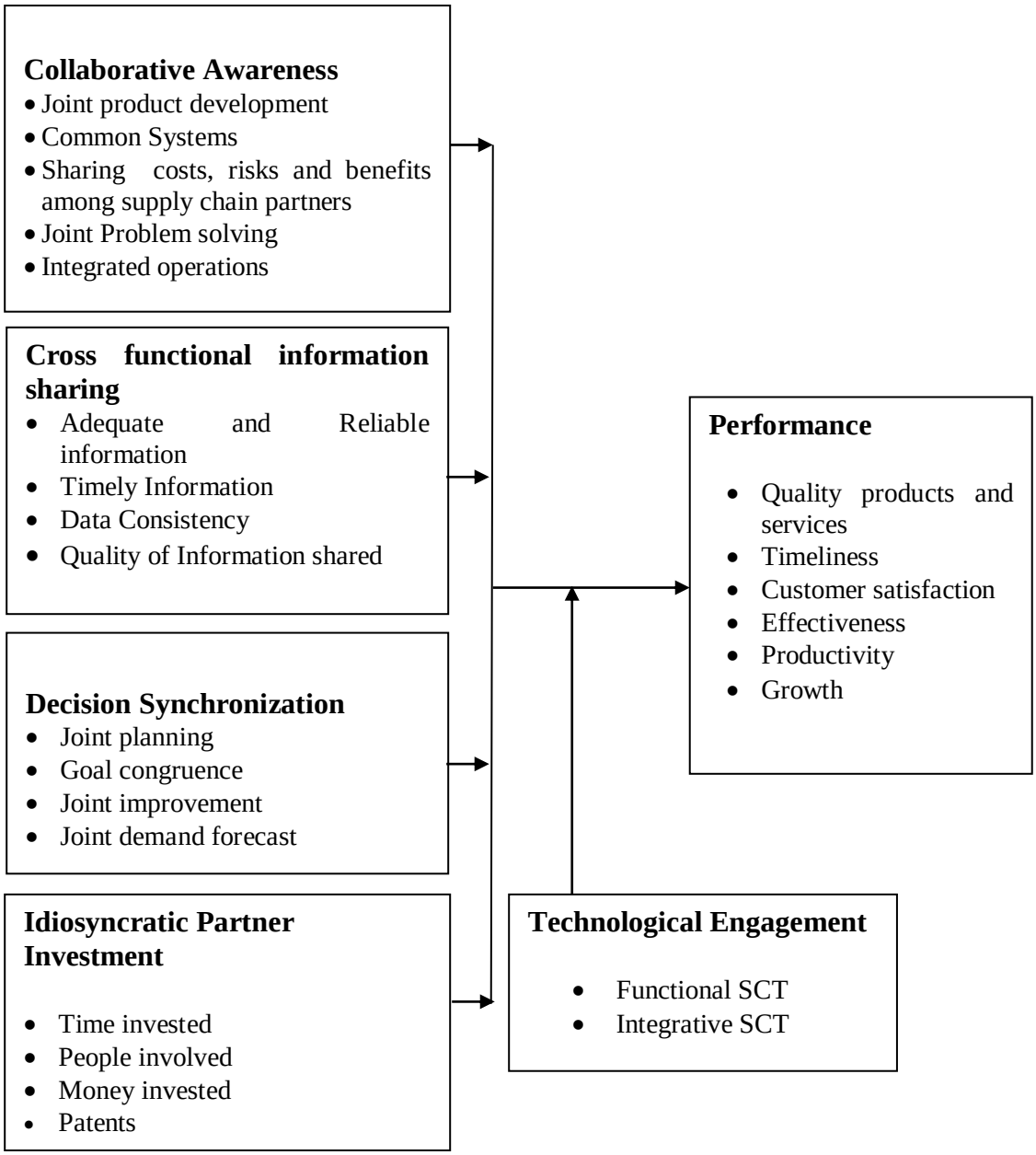
competitive advantage and reduce the risks (Zhou *et al.*, 2005). Further, it should be emphasized that not only the different units of a focal firm but also different suppliers operate in markets with different technological turbulence and therefore different strategies should be employed.

Fast changing market in terms of technology might incline firms to coordinate their efforts (integral relationships) to reduce uncertainty and respond to changes in demand (supply chain agility). To survive in this extremely dynamic environment, that is to be able to respond to competitive challenges and to sustain their competitive advantage in order to reach the success; manufacturing companies are required to be agile (Zhou *et al.*, 2005).

However it is possible to state that running a sustainable business and making it future-proof in the increasingly turbulent business environment of today requires certain capabilities including operating in an agile and proactive manner so as to be able to respond to market needs and changes. Such capabilities are however needed to exist within the whole supply chain considering the accepted fact that success of any business is dependent on the effective integration of parties working together in supply chains Zhou *et al.* (2005).

2.4 Conceptual Framework

The conceptual framework consists of Independent Variables, the Moderator and the Dependent Variable. The independent Variables of the study include: Collaborative awareness, Cross Functional Information Sharing, Decision Making and Idiosyncratic Partner Investment. The Dependent Variable on the other hand is Performance. The Moderator for the Study is Technological Engagement.



Independent variable **Moderating Variable** **Dependent variable**

Figure 2.1: Conceptual Framework

2.5 Critique of the Existing Literature

A number of studies that argue relationship integration with key input suppliers, are invaluable for improving Performance (Kisperska-Moron & Swierczek, 2009). Asset specific-commitment (idiosyncratic investments) by suppliers has been shown to act as a primary building block of trust in relationships (Handfield & Betchel, 2002). Similar findings have been presented with regard to relationship integration and collaboration, which substantially embraces agility maintenance and development across the supply chain (Yusuf *et al.,* 2004).

The strength of both inbound and outbound supply chain linkages are crucial to relationship development (Braunscheidel & Suresh, 2009). It is acknowledged within the literature that highly agile organizations are capable of leveraging their supplier's abilities for greater customer satisfaction, (Power *et al.,* 2001). Critically, these studies provide little information concerning how these integral relationship factors might benefit manufacturing companies with respect to supply chain performance.

Further, none of these studies included a moderating effect, specifically technological engagement. Moreover, it should be acknowledged that elements common to a relationship do not exist in the same way in supply chains. To maximize supply chain performance, firms or organizations need to carefully manage the relationships that are legally separate, but operationally interdependent, including the customers, suppliers and manufacturers. Firms need to understand the imperfect nature of supply chain interactions (Ngai *et al.,* 2004).

According to Brindley and Ritchie (2004), relationship integration is an important enabler of key processes in an organization and its supply chain. Harland (1996) and Christopher (2005) emphasize this point further, defining supply chain management in terms of the importance of relationship integration. Recent research has yielded numerous contributions to the theoretical development of supply chain integral relationships and agility and understanding of its antecedents, practices and

consequences (Gligor & Holcomb, (2012); Aravind Raj *et al.,* (2013); Blome *et al.* (2013); Qrunfleh and Tarafdar (2013); Yang, (2014).

Both internal (cross-functional) and external (with suppliers/customers) integration have been found to significantly influence an organization's ability to act in an agile manner across its supply chain (Braunscheidel & Suresh, 2009). The literature review reveals a tendency to focus on market sensitivity, virtual organization and process integration. Research on aspects of supply chain agility that draw on integral relationships dynamics has been limited, despite the fact that relationships often enable processes in the organization and supply chain, hence their performance (Brindley & Ritchie, 2004).

According to Baramichai *et al.* (2007) envisage an agile supply chain as a system of multiple long-term relationships with corresponding agile partners. Furthermore, Kisperska-Moron and Swierczek (2009) argue that the idea of an agile supply chain as a confederation of partners linked together as a network provides the crucial ingredient of agility. Accordingly, in order for performance to be achieved, organizations need to manage constituent parts (suppliers, customers and manufacturers) that are legally separate but operationally interdependent (Lin *et al.,* 2006; Ngai *et al.,* 2011; Yusuf *et al.,* 2004). A holistic, relationship-oriented research is lacking in the literature (Fayezi *et al.,* 2014). The reviewed literature reveals a number of hurdles that block the path of firms implementing an integrated SC practices and processes. Fawcett *et al.* (2008) reviewed recent scientific literature on the potential barriers to SC. The authors classified the barriers into two categories namely inter-firm rivalry and managerial complexity. They noted the following barriers under inter-firm rivalry category, in order of significance; internal and external turf wars, poor SCM planning, lack of vision of SCM, lack of trust, executive commitment and poor SCM understanding.

All these barriers work against performance in SC and management should reduce their impact. However the worst barrier, internal and external turf wars needs urgent attention by SCPs as its negative impact is fast and severe leading to the disruption of the SC hence not attaining its performance. Poor planning and lack of vision are symptoms of

failure by SCs, though their effects may be slow to appear their eventual impact is disastrous. Managerial complexity includes misaligned SC processes, structures and major differences in SCPs' business culture (Fawcett *et al.*, 2008). Furthermore, researchers have investigated and discussed a number of ways through which agility can be built across the supply chain. Essentially, empirical evidence surrounding the role of integral relationships with partners and associated factors in developing agility in supply chains remains limited (Fayezi *et al.*, 2014).

2.6 Summary of Reviewed Literature

From the systematic review of the literature, supply chain integral relationship has been recognized as a capability that firms must possess in order to provide a real time response to customers' unique and changing. The literature on supply chain agility offers additional support linking market orientation to firm supply chain agility. Before a firm can respond to changes in demand, it must first identify the changes. Christopher (2004) considers that agile supply chains are market sensitive. Part of being market sensitive is the ability to read customer demand in real time.

This ability has been recognized as a necessary condition for agility by a plethora of research. Firm supply chain agility is a dynamic capability that results from the firm's ability to reconfigure firm-level and supply chain-level resources. The relational view (RV) theory suggests that a firm's sources of competitive advantage may extend beyond firm boundaries. While RBV helps examine within-firm determinants of supply chain agility, the Relational View helps explain the role of inter-firm resources in achieving supply chain agility.

From the reviewed literature both commitment and trust has been identified as key variables for collaboration. Trust has a positive influence on commitment. Cross functional information sharing with partners is considered as important elements of supply chain capability. On the other hand, Decision synchronization is the joint decision making by SC partners with regards to the planning and operating. Thus supply

chain partners should coordinate critical decisions that affect the way they increase performance and a way to judge decision synchronization is the responsiveness of the supply chain partners in filling customer demands and the effectiveness of joint decisions in enhancing supply chain profitability. It is also important to note that collaborative relationship between supply chain partners can be strengthened and supported via financial investments in the relationship. Relationship-specific investments can take different forms, such as time, people, money, training and technology and have the potential to provide social and economic ties between cooperating parties. Similarly, technologies in supply chains have led to efficient flow of goods, services, information, communication and collaboration either between or within an organization. These technologies if well utilized within a sound supply chain strategy can lead to superior performance along the supply chain network particularly in vendor managed inventory (VMI), collaborative planning, forecasting and replenishment and efficient consumer response (ECR).

2.7 Research Gaps

Supply chain integral relationships have the potential to enhance supply chain responsiveness in terms of agility and flexibility. However, a review of the literature reveals gaps with respect to academics and practitioner understanding of the effect of integral relationship in supply chains on firm performance (Braunscheidel & Suresh, 2009; Swafford *et al.*, 2008). A review of the literature clearly showed that little research has been done on the effect of relationship integration and performance. Sajad Fayezi Maryam Zomorrodi (2015), conducted a research on “The role of relationship integration in supply chain agility and flexibility development" A case of Australian Manufacturing Firms, but he viewed his research in conjunction with process integration. This is particularly concerning for companies operating in Asia, as most agility and flexibility research has been concentrated in the USA (Yusuf *et al.*, 2014). When it comes to developing countries, like for instance Kenya, little or none research has been done on the effect of SC integral relationship on performance of manufacturing firms. Although a number of studies have been done within the context of cosmetic

industry in Kenya, (Gordon Otieno & Otila, 2005), “Supply chain management practices used in the cosmetic industry in Kenya”, Hilda Mwale (2012). “Supply chain management practices and organizational performance of large manufacturing firms in Nairobi, Kenya”. Little to none has been done regarding the effect of SC Integral Relationships on the performance of cosmetics manufacturing firms in Nairobi County, taking into considering a moderating effect of technological engagement.

Further, minimal information is available on the relationship factors that companies consider important, and how these factors might help companies to manage responsiveness more effectively (Gligor & Holcomb, 2012). It is therefore vital for further studies to capitalize on the potentials of SC integration to support the change ability of organizations, particularly through integral relationships. Further, a review of the literature on supply chain agility highlights the lack of attention given to integration relationship dynamics.

Only a small number of studies have explored the dynamics that underpin supply chain relationships in relation to performance (Kisperska-Moron & Swierczek, 2009; Yusuf *et al.,* 2004). While a number of studies in the literature emphasize that an organizations relationships with its partners is the cornerstone to effective supply chain management, this has proved to be problematic in terms of time and cost (Barrat, 2004; Ellram & Cooper, 2014). This highlights the importance of supply chain integral to organizational performance (Ngai *et al.,* 2011). However, within the literature (Squire et al., 2009; Swafford *et al.,* 2006), much of the focus centres on process integration (material and financial flows) rather than actual integral relationships (relationship and information flows). This is in spite of the fact that integral relationships can enable processes to be successfully executed both within and between the organizations and the supply chain (Brindley & Ritchey, 2004). A lack of focus on SC integral relationship factors such as collaborative awareness, cross-functional information sharing, decision synchronization and idiosyncratic partner investment, and how they affect the development and maintenance of agility within supply chains has resulted in poor supply chain integration and therefore performance (Clements, 2007).

Thus, an important gap in the supply chain agility literature centres on the fact that SC integral relationship oriented research focus has not been fully developed and explored (Fayezi et al., 2015). More importantly, little to none research has been explored on the moderating effect of Technological engagement on SC integral relationships and performance. This therefore presents an important gap in the literature. This serves as a reminder that the complexities surrounding the successful implementation of supply chains are frequently associated with poor SC integral relationships (Clements, 2007). By ignoring supply chain relationships (collaborative awareness, cross-functional information sharing, decision synchronization and relationship specific investments), it is possible to undermine business responsiveness by over-simplifying decision making. Thus, firms need to build stronger and fully integrated relationships with both customers and suppliers so as to alleviate supply chain tensions thus attaining firm performance.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter discusses the methodological approach that was used to provide answers of the research hypothesis. The main focus of the chapter was collection of the data that concerned the variables under study and the analysis to verify whether hypotheses have been supported. The chapter in particular covers; Research Design, Target Population, Sampling frame, Sample Size and Sampling Technique, Research Instruments, Pilot Testing, Data Collection Procedure, Data Processing and Analysis and Assumptions on the Model.

3.2 Research Design

According to Cooper and Schindler (2008), research design is a planned and structured investigation conceived to obtain answers to a research question or problem. It is a statement of essential element of a study and constitute the blue-print for the collection, coding and analysis of data. It is a logical and systematic plan prepared for directing a research study. Cross-sectional survey research design was used in the study. Cross sectional survey design enabled the researcher to collect data once over the same period of time, analyze and make a report.

A cross-sectional study design is used when the purpose of the study is descriptive, often in the form of a survey (Crewell, 2003). Descriptive survey design is designed to collect primary or secondary data from a sample with a view of analysing it statistically and generalizing the results to a population (Cooper & Schindler, 2011). It determines and reports the way things are. It describes such things as possible behaviour, attitudes, values and characteristics. According to Saunders & Lewis (2009), survey is a popular and common method in business and management research. It is used to answer who, what, where and how questions. Further, survey design allows for collection of large

amount of data from a sizeable population in a highly economical way. Similar, previous studies that used the same design include: Stephen *et al.* (2012); Alame and Noor, (2009); Tan *et al.* (2009); Bagchi and Udo (2007); Harindranath *et al.* (2008).

3.2.1 Research Philosophy

A research philosophy is a belief about the way in which data regarding a particular phenomenon should be collected and analysed. It is defined as the general belief, concepts and attitudes of an individual or a group (Mertens, 2010). The two main philosophical frameworks that guide any scientific research are positivism and interpretivism (Collins & Hussey, 2014). Positivism philosophy is an epistemological position that advocates the application of natural sciences to the study of social reality and beyond (Bryman, 2012).

Under this paradigm, knowledge is only valid if is based on values of reason and facts, gathered through direct observations and experience, measured empirically using quantitative methods and statistical analysis. Theoretical models can be developed that are generalizable to explain cause and effect relationships. Constructivism philosophy is underpinned by the belief that social reality is not objective but highly subjective because it is shaped by the researcher's perceptions. The findings are not derived from statistical analysis (Collins & Hussey, 2014). Constructivism therefore lacks objectivism of natural science. This implies that knowledge is constructed through real-life experience.

The study adopted positivism philosophy because the study variables were based on facts derived from empirical literature review and the theoretical premises discussed in chapter two. Its results are quantitative and explain the relationship between the variables in a quantitative manner. The respondents to the questionnaire were procurement employees whose knowledge on the variables under study were based on facts gathered through direct observations and experience. This was then measured empirically using quantitative methods and statistical analysis.

3.3 Target Population

Population refers to a group of people or study subjects who are similar in one or more ways and which forms the subject study in a particular survey (Leedy, 1993). A target population is a complete set of individuals, cases, or objects with some common observable characteristics. The study targeted 10 cosmetics manufacturing firms in the Nairobi County, comprising of: Buyline Industries Cosmetics, Haco Industries Cosmetics, Triclover (k) Industries, Nightrose Cosmetics, Unilever Industries, Johnsons CS Industries, Clique Limited Cosmetics, Interconsumer Products Cosmetics, Oasis Limited Cosmetics and Ariman Cosmetics.

Supply chain managers or the procurement employees were considered key informants and respondents to the questionnaire due to their knowledge and skills in the area of study, and thus provided reliable information. The target population of the study consisted of 714 employees working in the procurement departments in the cosmetic manufacturing firms in County Government of Nairobi.

3.4 Sampling Frame

Sampling frames refers to the physical representativeness of all the elements in the population from which the sample is drawn (Sekaran & Bougie, 2010). A sampling frame includes a numerical identifier for each individual, plus other identifying information about characteristics of the individuals, to aid in analysis and allow for division into further frames for more in-depth analysis. Kothari (2004) also noted that the sampling frame must be representative of the population.

Table 3.1: Sampling Frame

Cosmetics Firms	No. of Proc. employees	Unit of Analysis (35%)	%
Ariman Technologies Cosmetics	41	14	5
Buyline Industries Cosmetics	23	8	3
Clique Limited Cosmetics	70	25	10
Haco Industries Cosmetics	150	54	21
Inter-consumer Products Cosmetics	100	36	14
Johnsons CS Industries	60	22	8
Nightrose Cosmetics	80	29	11
Oasis Limited Cosmetics	20	7	3
Triclover (k) Industries	50	18	7
Unilever Company	120	43	17
TOTALS	**714**	**256**	**100**

Source: Kenya Association of Manufacturers, (2015)

3.5 Sample size and Sampling Technique

The section entails determining the Sample Size and the Sampling Technique that was used in the study.

3.5.1 Sample Size Determination

Kombo and Tromp (2009), describe a sample as a collection of units chosen from the universe to represent it. It is therefore important to determine an appropriate sample size (Orodho & Kombo, 2002). A sample must be carefully selected to be representative of the population and the researcher needs to ensure that the subdivision entitled in the analysis were accurately catered for (Saunders, Lewis & Thornhill, 2003). There are several approaches to determining the sample size. These include: Imitating a sample size of similar studies, using published tables, and applying formulas to calculate a sample size. According to William, Barry and Mitch (2013), at least 10 % of the target population is important for the study. The study therefore applied a sample size of

similar studies by adopting a 35% proportion of the universe to determine the sample size. This gave a sample size of 256 respondents.

3.5.2 Sampling Technique

Since arriving at the 10 Cosmetic Firms involved stages, a two staged sampling technique was used. First-stage sampling involved getting a list of all Cosmetic Manufacturing Firms found in Nairobi County, from the Kenya association of Manufacturers. From the list, a sample of 10 cosmetic manufacturing companies were selected via simple random sampling technique. Simple random sampling method was used since it reduced bias by giving equal and independent chance to every member of the population (Kumar, (2005); Lohr (2009). This method offered the most generalizability for the findings (Sekaran & Bougie, 2010).

In the second stage of sampling, the researcher purposively selected the procurement departments to pick the subjects of the study and were given the research survey instrument to fill up. Purposive sampling involved a deliberate selection of particular units of the universe (Miller & Yang, 2008). It enabled the researcher to select specific subjects that provided the most extensive information about the phenomenon being studied (Kombo & Tromp, 2009).

3.6 Research Instruments

Data collection is a specific, systematic method of gathering information relevant to research purpose, or of addressing research objectives, and hypotheses (Burns & Grove, 1993). Creswell (2003), defines data collection as a means by which information is obtained from selected subjects of investigation. This involved the techniques to be adopted by the researcher in the data gathering phase of the work in order to meet research objectives of the study. Dawson (2009) describe questionnaire as a list of questions that assist the researcher in gathering the intended information. Self-administered questionnaires were the main research instruments of collecting primary

data (Eriksson & Kovalainen, 2008). Self-administered questionnaire has a higher response rate (Benchhofer & Paterson, 2008).

The likert scale was used in the study. A likert scale is a psychometric scale commonly involved in research that employs questionnaires (Burns *et al.*, 2008). It is the most widely used approach to scaling responses in survey research. It is commonly used in similar research, which allows respondents to express either a favourable or unfavourable attitude toward the object of interest (Cooper & Schindler, 2006). The scale is also easy to develop, reliable and applicable to both in respondent-centred and stimulus-centred studies (Emory, 1985). For the purpose of identifying critical antecedents of integral relationships, a Five-Point Likert Scale was used. The likert scale is the most widely used method of scaling in the social sciences today Further, the use of a Likert-type scale is recommended for research involving Supply Chain Practices concerns and Performance Measurement (Tan, 2002); Yusuf *et al.* (2004); Swafford *et al.* (2006). With the exception of a respondent's profile, all variables were measured on a five-point Likert Scale.

The questionnaire was open and closed ended. When responding to a likert questionnaire item, respondents specify their level of agreement or disagreement on a symmetric agree-disagree scale for a series of statements. The range captures the intensity of their feelings for a given item (Norman, 2010). The scale normally ranges from 'Strongly Disagree'= 1.'Disagree' = 2, 'Neutral'= 3, 'Agree' = 4,'Strongly Agree'= 5, In this way, the variability of the responses was captured more accurately and the questionnaire became more sensitive to responses.

3.7 Pilot Testing

Pilot study was carried out to test the adequacy of research instruments. Pilot testing also called pre-testing means small scale trial run of a particular component. Kombo and Tromp (2009) describe a pilot test as a replica and rehearsal of the main survey. Dawson (2002), states that pilot testing assists researchers to see if the questionnaire will obtain

the required results. Polit and Beck (2003) describes a pilot study as a small scale version or trial run done in preparation for a major study. Creswell (2003) and Cooper & Schilder (2011) agree that the respondents used in pilot test should constitute 10 percent of the sample used in data collection.

The proportionate sample size of 256 respondents was used for the study. Thus 25 questionnaires were administered in pilot testing to test the degree of accuracy of the instrument. The purpose of a pilot test is to enable validity and reliability of research instruments to be determined (Cooper & Schilder, 2011). It therefore provides the opportunity to see the acceptability of the wording of the questions in the local cultural context and also to discover participants' reaction to the questions.

3.7.1 Validity of the Questionnaire

Validity refers to the ability of a research instrument to measure what it is purported to measure (Cooper & Schindler, 2011). Zikmund *et al.* (2010) describes validity as the accuracy of data collecting instruments. It helps in determining whether the respondents understood the direction and instruction on questionnaires (Cooper & Schilder, 2011). Firstly, face validity is concerned with whether a test looks as if it measures what it is purported to measure. A test may look as though they measure something and not really measure it at all (Philip, 2007).

Secondly, content validity of the measuring instrument is the extent to which it provides adequate coverage of the investigative question guiding the study and if the instrument contains a representative sample of the universe of subject matter of interest, then content validity is good (Cooper & Schindler, 2008). Thirdly, construct validity is concerned with the ability of an instrument to confirm a network of related hypothesis generated from a theory based on the concepts (Zikmund, 2003). It is the degree to which an instrument measures the trait or theoretical construct that it is intended to measure.

It is assessed by seeing whether scores on a test which purports to measure a given trait, are associated with behavioral differences which a theory says should be associated with the trait (Philip, 2007). The importance of ensuring the validity of the constructs has been emphasized by a number of authors, to address the issues of weak validation experienced by many research studies (Churchill, 1979); Malhotra (2004); Gallagher *et al.* (2008); Hair *et al.* (2010). Therefore, to evaluate the validity of data collection instrument, the study used content validity.

A judgment procedure of assessing whether a tool is likely to provide contents valid data is to request opinion of expert with considerable experience in survey development in a particular field to review it and give suggestions on content improvement (Mugenda, 2008). Opinion of three experts was sought to review data collecting instruments. This helped to improve the questionnaires before proceeding to the field for final data collection. Based on their suggestions, the wording of some items was revised.

This step ensured that each respondent was able to answer the questions included in the questionnaire, and also to refine question wording, to ascertain whether the respondents felt there was a relationship between the issues covered by the questionnaire and to verify the relevance and completeness of the questionnaire items. However, the researcher was able to make corrections or adjust the instruments accordingly with consultation of the supervisors before proceeding to the field.

3.7.2 Reliability of the Questionnaire

Reliability refers to the extent to which data collection techniques and analyses procedures will yield similar findings by other observers. There are three aspects of reliability, namely; equivalence, stability, and internal consistency. Equivalence refers to the amount of agreement between two or more instruments that are administered at nearly the same point in time. It is measured through a parallel form procedure in which the data collection instruments of same measure are administered to either same group or different group of respondents (Cohen *et al*., 2000). The equivalent forms method was

not used because it requires a lot of time. In addition, questionnaire will be too long because the questionnaire in this method comprises of two forms. Therefore participants may not answer in truthfulness. Degree of stability can be checked by making a comparison of the results repeated measurement.

To determine reliability, the study used internal consistency technique. Internal consistency reliability is the most commonly used psychometric measure assessing survey instruments and scales (Zhang, Waszink & Wijngaad, 2000). Cronbach alpha (α) is the basic formula for determining the reliability based on the internal consistency. Cronbach's alpha reliability coefficient ranges between 0 and 1. Reliability coefficient of 0 implies that there is no internal reliability while 1 indicated perfect internal reliability.

The standard value of alpha is 0.7 recommended by Nunnally (1978) and Malhotra (2004). Constructs used in the study was tested for internal consistency reliability where values greater than 0.7 indicated the presence of a strong internal consistency in the measurement, thus the researcher should report the reliability results in alpha coefficients basing on the threshold value. The recommended value of 0.7 was therefore used as a cut-off of reliability (Sekaran, 2009).

3.8 Data Collection Procedure

The study used self-administered questionnaires to collect data from the respondents. The structured and unstructured questionnaires were administered on the basis of 'drop and pick later'. The researcher herself distributed the questionnaires. The researcher agreed with the respondents when the research instruments were to be administered and specific dates of collecting the questionnaires. Adequate time was provided for the respondents to respond.

The questionnaires were accompanied by a cover letter from JKUAT which explained the purpose of the study and as well assure confidentiality and anonymity of the data. The questionnaires were administered during working hours. Contact mobile number and email address of the researcher was given to the respondent as for any clarification. Follow up telephone calls were made after two weeks and at every end of the fourth week to find the progress of the filling up of the questionnaires.

3.9 Data Processing and Analysis

Data analysis entails statistical analysis of data gathered to see if the hypotheses have been supported (Uma & Roger, 2011). The data that were obtained from the questionnaires were both quantitative and qualitative. Before processing the responses, every filled questionnaire was tallied for every response per question. The responses were first edited, coded and cleaned for analysis. Qualitative data was condensed by editing, paraphrasing and summarizing in order to derive meaning from it. Using the content analysis technique, the data was coded and thereafter put into theme categories and tallied in terms of the number of times it occurs.

Data was then tabulated into respective themes**.** This process according to Frankel and Wallen (2000) involves reading through the questionnaires, transcripts and other sources of data, developing codes, coding the data, and drawing connections between the various discrete pieces of data. Quantitative data were analyzed using both descriptive and inferential statistics. Descriptive statistic such as, mean, standard deviation and variance were used to give a glimpse of the general trend (Mugenda, 2011). Inferential statistics was also applied in the study. Inferential statistics techniques allowed the researcher to use a sample size of 256 respondents to make a generalization about the entire population (Cooper & Schindler, 2011). SPSS was used to conduct both descriptive and inferential data analysis of each variable.

To assess the factorability of items, two indicators were examined: Kaiser Meyer-Olkin measure of sampling adequacy and Barletts Test of Sphericity (Pallant, 2010). These tests were generated by SPSS and helped to assess the factorability of data or suitability of data for structure detection (Pallant, 2010). Kaiser-Meyer-Olkin (KMO) test was used to assess sampling adequacy. Bartlett test of sphericity was performed to assess the appropriateness of using factor analysis (Hair *et al.,* 2013).

Regression analysis was used to explain the nature of the relationship between the dependent variable and the independent variables. R^2 was used to show the proportion of variation in dependent variable explained by independent variables. T-statistics provided information on the significance of each of the variables. T-statistics value was used to test whether the variables were significant by comparing the variable output (t-calc) with the conventional critical value of -1.96 or 1.96 at 0.05 significance level. This made the null hypothesis to be accepted or rejected. Correlation analysis was used to determine the nature of the relationship between variables at a generally accepted conventional significant level of $P \geq 0.05$ (Sekaran, 2003). Correlation measures the extent of interdependence where two variables are linearly related (Lucy, 1996). If variables are correlated then a change in one variable is accompanied by a proportionate change in another variable. If the value of R is close to one, then it shows there is a strong association between the variables. If the value of R is close to zero, then the association is weak. The overall suitability of the model was tested via F-test. This study used this test because it allows one to test for the general suitability of the model. ANOVA is a powerful tool for determining if there is a statistically significant difference between two or more sets of data (Pattern, 2002).

Since the study had a moderating variable, moderated multiple regression (MMR) analysis was also used to test the moderating effect of technological engagement on the integral relationship and supply chain agility of cosmetics manufacturing firms in the County Government of Nairobi. To determine the interaction effects using moderated multiple regression, ordinary least square (OLS) equation and MMR model equations were created. This involved scores for independent variable x, dependent variable y and

score for variable z hypothesized to be a moderator (Aguinis & Gottfredson, 2010). The moderating effects of the hypothesized relationships were tested using the following regression equations.

Equation 1: Comparing OLS and MMR Models

Involved forming MMR by creating new set of score for the four independent variables x and z (moderating variable) in the equation as follows;

OLS Equation $Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$**……. (3.1)**

MMR Equation $Y = \alpha_0 + \beta_1 X_1 Z + \beta_2 X_2 Z + \beta_3 X_3 Z + \beta_4 X_4 Z + \varepsilon$**…… (3.2)**

Where; **Y** = Supply Chain Agility

α_0= Constant or coefficient of intercept

X_1 = Collaborative Awareness

X_2 = Cross Functional Information Sharing

X_3 = Decision Synchronization

X_4 = Idiosyncratic partner investments

ε = error term

β_1, β_2, β_3, and β_4 = the corresponding coefficients for the respective independent variables i.e. the slope representing the degree of change in independent variable by one unit variable, (the change induced by Y on each X).

Z = Corresponding coefficients for the moderating variable

ε = Err or term (Disturbance factors) which represents residual or values that are not captured within the regression model.

3.10 Assumptions on the Model

Multiple regression analysis is a tool used to predict a dependent variable from multiple independent variables (Harlow, 2005; Stevens, 2009). The independent variables are usually not under experimental control and the variations observed in them are to be accepted for what they are. The focus of multiple regression is to investigate which, if any of these predictor variables can significantly predict the dependent variable. The correct use of multiple regression model requires that several critical assumptions be satisfied in order to apply the model and establish its validity (Poole & O'Farrell, 1971). Inferences and generalizations about the theory are only valid if the assumption in an analysis have been tested and fulfilled.

Assumptions are critical in statistics because if the underlying assumptions are not valid, then the process is unreliable, unpredictable and out of the researchers control (Stevens, 2009). This could lead to the researcher to draw conclusions that are not valid or scientifically unsupported by the data. The assumptions of multiple regression include: Outliers, Linearity, Normality, Independence of errors (Autocorrelation), Homoscedasticity and Multicollinearity.

3.10.1 Outliers

An outlier is any observation that is long away from the general pattern of distribution of variables (Crewell, 2003). In a specific regression case of regression model, outliers are observations that are long away from the fitted line. Outliers might increase as the sample size increase. The results of a regression analysis may be strongly influenced by individual members of the sample that have highly unusual values on one or more variables under analysis, or a highly unusual combination of values. If the outlying values are as a result of measurement or coding error, such as a typographical mistake,

or the result of the inclusion of a case that is not a member of the intended population, then the results of a regression analysis will obviously be deleteriously be affected (Stevens, 1984).

3.10.2 Linearity

Relationships between variables are considered linear when they are consistent and directly proportional to each other (Stevens, 2009; Tabachnick & Fidell, 2006). Linearity defines the dependent variable as a linear function of the predictor (independent) variable (Darlington, 1968). Multiple regression can accurately estimate the relationship between the dependent variable and the independent variables when the relationship is linear in nature (Osborne &Waters, 2002). Violation of this assumption may result in the estimates obtained from the analysis, such as regression coefficients, standard errors and statistical significance being biased therefore not portraying the accurate or true population values (Keith, 2006). The results from the analysis will under-estimate the true relationship between the independent variables and the dependent variable if the relationship is not linear (Hoxx, 1995). This under-estimation of the results could lead to two areas of concern: first, an increased risk of Type II error could occur for that predictor variable, and second, an increase risk of Type I error (an over-estimation) for the predictor variables that share same variances with that predictor variables could occur (Osborne & Water, 2002).

3.10.3 Normality

Multiple regression assumes that variables have normal distributions (Osborne & Waters, 2002). This means that errors are normally distributed, and that a plot of the values of the residuals will approximate a normal curve (Keith, 2006). The assumption is based on the shape of normal distribution and gives the researcher knowledge about what values to expect. Screening for normality is an important early step when conducting multiple regression, as residuals are normally distributed is assumed (Stevens, 2009; Tabachnick & Fidell, 2006).

Non-normal distributions that are positively or negatively skewed, contain large kurtosis, or have extreme outliers that can distort the obtained significance levels of the analysis resulting in the standard errors becoming biased and the overall accuracy of the results (Osborne & Waters, 2002). Though multiple regression is generally considered to be quite robust to violations of normality, a small sample size can actually increase the seriousness of non-normality of a distribution. Outliers may have a stronger influence on normal distributions when the sample size is small, whereas standard errors for both skewness and kurtosis decreases with large sample samples, as there will most likely be only minor deviations (Tabachnick & Fidell, 2006).

3.10.4 Independence of errors (Autocorrelation)

Independence of errors refers to the assumption that errors are independent of one another, implying that subjects are responding independently (Stevens, 2009). Having no serial correlation between the residuals implies that the size of the residuals for one variable has no impact on the size of the residual for another variable. Therefore, the independence assumption requires that the variables and the residuals are independent and the subjects are responding independently of each other. When data are not drawn independently from the population, the result is a risk of violating the assumption that the errors are independent (Keith, 2006).

When independence of errors is violated, standard scores and significance tests will not be accurate and there is increased risk of Type I error. This means that there will be under-estimation of standard errors and label variables as statistically significant when they are not, resulting in the risk of falsely rejecting the null hypothesis several times greater than the level of error assumed for the test (Stevens, 2009). In the case of multiple regression, effect sizes of other variables can be over-estimated if the covariate is not reliably measured (Osborne & Waters, 2002). Violation of this assumption therefore threatens the interpretation of the analysis (Keith, 2006).

3.10.5 Homoscedasticity

The assumption of homoscedasticity refers to constant variance or errors across all levels of the independent variables (Osborne & Waters, 2002). This means that the researchers assume that errors are spread out consistently between the variables. This is evident when the variance around the regression line is the same for all the values of the predictor variable. Homoscedasticity is related to the assumption of normality because when the assumption of normality is met, the relationship between the variables is homoscedastic (Tabachnick & Fidell, 2006). Heteroscedasticity occurs when the variance of errors differs at different values of the independent variables. Slight heteroscedasticity has little effect on significance tests, however, when heteroscedasticity is marked, it can lead to serious distortions of findings and seriously weaken the analysis, thus increasing the possibility of Type I error for small sample size (Osborne & Waters, 2002). However, it is good to note that the regression is fairly robust to violation of this assumption (Keith, 2006).

3.10.6 Multicollinearity

Collinearity, also called multicollinearity, refers to the assumption that the independent variables are uncorrelated (Keith, 2006). The researcher is able to interpret regression coefficients as the effects of the independent variables on the dependent variables when collinearity is low (Poole & O'Farrell, 1971). This means that the researcher can make inferences about the causes and effects of variables reliably. Multicollinearity occurs when several independent variables correlate at high levels with one another, or when one independent variable is a near linear combination of other independent variables.

The more variables overlaps (correlate), the less able researchers can separate the effects of variables. In multiple regression, the independent variables are allowed to be correlated to some degree (Darlington, 1968; Hoyt et al., 2006; Neale et al., 1994). The regression is designed to allow for this, and provides the proportions of the overlapping variance (Cohen, 1965). Ideally, independent variables are more highly correlated with

the dependent variables than with other independent variables. If this assumption is not satisfied, autocorrelation is present (Poole & O'Farrell, 1971).

Multicollinearity can result in misleading and unusual results, inflated standard errors, reduced power of the regression coefficients that create a need for larger sample sizes (Taccard *et al.,* 2006; Keith 2006). Interpretations and conclusions based on the size of the regression coefficients, their standard errors or associated t-tests may be misleading because of the confounding effects of collinearity (Mason & Perrault Jr. 1991). The result is that the researcher can underestimate the relevance of a predictor, the hypothesis testing of the interaction effects is hampered, and the power for detecting the moderation relationships is reduced because of the intercorrelation of the predictor variable (Jaccard, *et al.,* 2006; Shieh, 2010).

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents data analysis, presentation, interpretation and discussion of the findings. Since the research aimed at determining the effect of supply chain integral relationships on the performance of cosmetics manufacturing firms in Nairobi County, Kenya. It sought to determine the effect of; Collaborative Awareness, Cross Functional Information Sharing, Decision Synchronization, Idiosyncratic Partner Investment and Technological Engagement on Performance. The chapter discusses the Response rate, Reliability test results, Background Information, Descriptive Statistics and Inferential Statistics. Results were presented using tables. The analysed data was arranged under themes that reflect the research objectives.

4.2 Response Rate

The researcher administered questionnaires to 256 respondents who were sampled out as per the methodology described in the previous chapter. 210 duly filled questionnaires were returned. This represents a response rate of 93.75 %. According to Sekaran, (2006), a response rate of 30% is considered acceptable for surveys. Thus, the response rate achieved in this study can be considered sufficient to give the findings adequate reliability.

4.3 Reliability Test Results

The Cronbach's Alpha Test of reliability was used to test the reliability of the constructs describing the variables of the study. Cronbach's alpha reliability coefficient ranges between 0 and 1. Reliability coefficient of 0 implies that there is no internal reliability while 1 indicated perfect internal reliability. The standard value of alpha is 0.7 recommended by (Sekaran, 2009). A total of 25 questionnaires were used in the test for

reliability of the pilot study instruments. The statements for each of the variables were tested. The result showed that all the 25 questionnaires gave Cronbach's alpha coefficients of 0.7 and above. The threshold value of 0.7 was met and thus the pilot study instruments were said to be reliable. The results are presented in Table 4.1.

Table 4.1: Reliability Results

Variables	Number of Items	Cronbach's Reliability Coefficient
Collaborative Awareness	10	0.723
Cross-Functional Information Sharing	10	0.771
Decision Synchronization	10	0.821
Idiosyncratic Partner Investment	8	0.823
Supply Chain Agility	10	0.781
Technological Engagement	8	0.706

4.4 Demographic Information

The study put into account the demographic information of the respondents since the background information of the respondents is crucial for the authenticity of the results. The demographic information of the respondents was grouped in terms of gender, age bracket, education level, job experience and duration of existence of the firm.

4.4.1 Gender of the Respondents

The study sought to establish the respondents' gender. The results are presented in Table 4.2.

Table 4.2: Gender of the Respondents

Gender	Frequency	Percentage
Male	119	56.7
Female	91	43.3

From the results, 56.7% (119) were male and 43.3% (91) were female. This is a clear indication that males form the majority of the cosmetic manufacturing companies. Ideals of male beauty are changing around the world. Sales of men's grooming and beauty products have more than doubled in the past five years. In other emerging and developing markets, men are using a wider variety of products than ever before, including lip glosses, creams, foundations and many more. Thirty-five percent of Colombian men use nail polishes on a weekly basis. From 2012 to 2014, the total global male grooming market grew by 70 percent. Asia represents more than 60 percent of that market, with projected growth of nearly 10 percent despite already being the leading region in men's skin-care sales. In China, the men's grooming category is growing at a stunning 20 percent a year. And in South Korea, men use an average of 13 grooming products a month while leading the world in use of men's cosmetics, accounting for one-fifth of global sales (Cosmetics Report, 2015).

4.4.2 Distribution of Respondents by Age Bracket

The study sought to establish the age bracket of the respondents. The results are presented in Table 4.3.

Table 4.3: Age Bracket

Age Bracket	Frequency	Percent
20 years and below	4	**1.9**
21-30 years	98	**46.7**
31-40 years	82	**39**
41-50 years	24	**11.4**
Above 50 years	**2**	**1.0**

From Table 4.3, majority of the respondents i.e. 46.7% (98) were in the age bracket 21-30 years, 39.0% (82) were in the age bracket 31-40 years, 11.4% (24) were in the age bracket 41-50 years, 1.9% were 20 years and below while 1% (2) were above 50 years. This is a clear indication that the people who work in Cosmetics Manufacturing Firms are young people comprising 30 years and below. Bass (2005) argues that age brings in experience, responsibility and skills. This finding implies that majority of the people who work in cosmetics manufacturing firms in Nairobi County are between the ages of 21-30 years. This age group is energetic, very active, experienced, responsible and skilled (Teeple & Glyers, 2007). The minority of the respondents comprising those aged 20 years and below (1.9%) is an indication that this group are still going on with schooling or are still young to be absorbed by such firms.

4.4.3 Distribution of Respondents by Academic Qualifications

The study also sought to determine respondent's education level. Table 4.4 shows the results of the analysis.

Table 4.4: Level of Education

Level of Education	Frequency	Percent
Secondary Education	36	2.9
Certificate/Diploma	65	31.0
Graduate	111	52.9
Masters	28	13.3
Doctorate	0	0

The findings of the study indicate 2.9% (6) of the respondents had secondary education, 31.0% (65) of the respondents were certificate/diploma holders, and 52.9% (111) were graduates while the rest 13.3% (28) were Masters Holders. This was an indication that most of the employees had relevant skills needed in the cosmetic manufacturing firms. In the cosmetic industry, a bachelor's degree is crucial. Many of the cosmetics firms recruit graduates in any discipline into areas such as finance, sales, marketing, purchasing, supply chain management, human resource management and customer services.

The graduates work in the labs of both small and large cosmetics companies, including final product manufacturers, raw material suppliers and contract manufacturers, sometimes in marketing or sales departments, and also in the testing and regulatory companies. Bachelor of Science in cosmetic science prepares graduates to work in the research and development laboratories of the cosmetic and toiletry industry. This

explains why majority of the respondents 52.9% (111) were graduates. Bigger companies like P&G or L'Oreal tend to favour students who have Masters or PHD degrees in cosmetic science. This category are not as many as the graduates. This explains the 13.3% (28) of the respondents were Masters Holders**.** Production in the cosmetics industry involves the technical and supervisory planning and control of scientific manufacturing plants, along with the design, development and implementation of systems and procedures of ensuring products are of specified quality. This explains 31.0% (65) of the respondents were certificate/diploma holders.

In 2013, The Technical and Vocational Education and Training Act was passed, aiming to expand and improve the country's system of vocational institutions, which impart practical and entrepreneurial skills. The number of young Kenyans enrolled in youth polytechnics has increased from 85,200 in 2008 to 127,691 in 2012. There has also been an important shift in the curriculum that provides students not just with employable skills, but also with the skills to create their own jobs. Youth polytechnics now play a critical role in promoting youth entrepreneurial skills development as well as equipping the youth with employable skills.

4.4.4 Distribution of Respondents by Period Worked in the Firm

The study sought to find out the duration the respondents have been working since they were employed. Table 4.5 shows the results of the analysis.

Table 4.5: Duration Worked

Duration Worked	Frequency	Percent
Less than 1 year	8	3.8
1-3 years	63	30.0
4-6 years	90	42.9
7-10 years	34	16.2
Above 10 years	15	7.1

It is evident from the findings that majority of the respondents 42.9% (90) of the respondents have been working in the firm for a duration of 3-6 years, 16.2% (34) have worked in the firms for a duration of 6-10 years. Those who have worked in the firm for over 10 years were 7.1% (15) , 30% (63) have worked in the firm for a duration 1-3 years whereas 3.8% (8) are the respondents who have less than one year experience working in the cosmetics manufacturing firm. This is an indication that most of the respondents have been working for over four years hence were able to provide relevant and reliable information for the study.

This also implies that cosmetics manufacturing firms in Nairobi had attracted and retained skilled labour as evidenced by their experience and the duration of the employee in the job. Length of service with the cosmetic company was important in order to determine the respondent's level of understanding regarding internal information pertinent to the company. The duration worked in the firm is usually in line with experience, responsibility and skills of the business person (Karanja, 2011).

4.4.5 Distribution of Cosmetic Manufacturing Firms by duration of existence

The study also sought to ascertain how long the Cosmetics Manufacturing Firms have been in existence. Table 4.6 shows the results of the analysis.

Table 4.6: Duration of Existence

Duration of Existence	Frequency	Percent
5 years and below	25	11.9
5-10 years	68	32.4
11-15 years	48	22.9
16-20 years	36	17.1
Over 20 years	33	15.7

The study found that most firms 32.4% (68) have been in existence for a duration of 5-10 years, 22.9% (48) of the firms have been in existence for a duration of 11-15 years, 17.1% (36) of the firms have been in existence for a duration of 16-20 years, 15.7% (33) of the firms have been in existence for over 20 years whereas those who have existed for a duration of less than 5 years were 11.9% (25). This is a clear indication that the information that was captured was sufficient since most of the firms sampled had existed for a long duration, that is, 5-10 years.

4.5 Descriptive Statistics of the Variables

This section illustrates descriptive findings and discussions based on the objectives of the study. The study focused on the following features of Supply Chain Agility: Collaborative Awareness**,** Cross Functional Information Sharing, Decision Synchronization, Idiosyncratic Partner Investments and the moderating variable Technological Engagement. The findings were presented in form of Mean, Standard Deviations, and Variances. Weighted Mean was done to give a conclusion of the findings. The responses are in line with a 5 Point Likert-Scale ranging from:- Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5.

4.5.1 Collaborative Awareness

The study analysed the views of the respondents in respect to Collaborative Awareness and Supply Chain Agility on the performance of cosmetics manufacturing firms. Table 4.7 shows the results of the analysis.

Table 4.7: Descriptive Statistics for Collaborative Awareness

Collaborative Awareness Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
Our firm and this supply chain partner have integrated production systems.	1.0	9.0	25.7	50.0	14.3	210	1	5	3.68	0.864
Our firm & supply partners operate under principle of shared rewards and risks.	4.3	8.1	20.5	52.4	14.8	210	1	5	3.68	0.972
Our firm has increased operational flexibility.	1.0	3.8	13.3	50.0	31.9	210	1	5	4.08	0.829
Our firm benchmarks best practices with SCP	0.5	8.1	21.9	43.8	25.7	210	1	5	3.86	0.910
Inventory information is shared with alliance members.	1.4	5.2	28.1	41.4	23.8	210	1	5	3.81	0.908
Improved supply chain performance by integrating operations with the supply chain partners.	1.0	2.4	10.5	56.2	30.7	210	1	5	4.12	0.758
The relationship that our firm has with our partners deserves our firm's maximum attention to maintain.	1.4	1.9	16.2	51.0	29.5	210	1	5	4.05	0.814
Our firm is always willing to develop a stable relationship with inter firm partners.	1.0	2.4	11.5	50.5	34.3	210	1	5	4.15	0.790
Our firm is willing to make short term sacrifices to maintain the relationship with our key suppliers and customers.	2.4	6.7	28.1	48.6	14.3	210	1	5	3.66	0.889
The supply chain members operate under the principle of shared returns.	0.5	6.7	36.7	39.5	16.7	210	1	5	3.65	0.852
Communication is key in dispute resolution among SCP	0.0	2.9	14.8	51.4	31.0	210	2	5	4.10	0.750
Grand Mean = 3.89										
Valid N (Listwise) = 210										

The findings indicates that the respondents agreed (Mean = 4.15; Std Dev =0.790) with the statement that our firm is always willing to develop a stable relationship with inter firm partners. Respondents also agreed (Mean = 4.12; Std Dev =0.758) that their firm has experienced improved Supply Chain Performance by integrating operations with the supply chain partners. The findings further indicates that Collaborative Communication among the relationship partners (Mean = 4.10; Std Dev =0.750) in our firm is always key in resolving disputes and aligns perceptions and expectations of supply chain partners. In addition, respondents concurred (Mean = 4.08; Std Dev =0.829) that their firm had increased operational flexibility through their relationship with the suppliers.

The study further indicates that the respondents agreed (Mean = 4.05; Std Dev =0.814) that the relationship that our firm has with our partners deserves our firms maximum attention to maintain. Respondents also agreed (Mean = 3.86; Std Dev =0.910) that our firm benchmarks best practices or processes and shares results with this supply chain partners. The respondents also concurred (Mean = 3.68; Std Dev =0.972) that our firm has a supply chain arrangement with our supply partners that operate under the principle of shared rewards and risks.

Findings also indicate that respondents were in agreement (Mean = 3.68; Std Dev =0.864) that our firm and this supply chain partner have integrated production systems. Furthermore, the respondents agreed (Mean = 3.68; Std Dev =0.972) with the statement that our firm is willing to make short term sacrifices to maintain the relationship with our key suppliers and customers. Finally, the respondents concurred (Mean = 3.65; Std Dev =0.852) that the supply chain members operate under the principle of shared returns. Overall, the respondents agreed on the statements pertaining to collaborative awareness.

This finding is supported by the literature findings that collaborative awareness help managers mitigate supply and demand uncertainties as partners' knowledge and resources are shared to remain efficient and responsive (agile) to customer needs (Fawcett & Magnan, 2004). Further, extant literature (Anderson & Weitz, 1992; Hadaya

& Cassivi, 2007; Monczka, Petersen, Handfield, & Ragatz, 1998; Nyaga *et al.*, 2010; Spekman *et al.*, 1998) supports that joint planning and sharing improve relationships and enhance elements that form a culture in collaborative environment, thus improved performance.

4.5.2 Cross Functional Information Sharing

The study sought to determine on the effect of Cross Functional Information Sharing on Performance. The results are presented in Table 4.8

Table 4.8: Descriptive Statistics for Cross Functional Information Sharing

Cross Functional Information Sharing Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
Up to date data and information readily available for all the parties	2.9	5.7	20	53.3	18.1	210	1	5	3.78	0.907
We inform supply chain partners in advance of changing needs	0	1.9	11.9	60.5	25.7	210	2	5	4.10	0.667
We keep each other informed about events that may affect the other party	0	3.3	14.8	44.8	37.1	210	2	5	4.16	0.794
Unforeseen challenges are properly communicated to our suppliers	0.5	3.3	20.0	44.3	31.9	210	1	5	4.04	0.835
Exchange of information takes place frequently, and/or in a timely manner	0	2.9	13.3	58.1	25.7	210	2	5	4.07	0.709
Our firm provides substantial information to the parties in the relationship	0.5	3.3	17.1	47.6	31.4	210	1	5	4.06	0.813
Information exchange between us and our SCP is always timely, fast and accurate	1.9	1.0	16.2	50.0	31.0	210	1	5	4.07	0.824
Information exchanged between us and our SCP is often adequate	1.0	4.3	17.2	50.2	27.3	210	1	5	3.99	0.841
Information exchanged between us and our SCP is often reliable	0.5	1.4	14.3	47.1	36.7	210	1	5	4.18	0.761
Information exchanged between us and our SCP is quite complete	1.4	3.3	19.5	48.1	27.6	210	1	5	3.97	0.858
Grand Mean = 4.04										
Valid N (Listwise) =210										

The findings reveal that the respondents admitted (Mean =4.18; Std Dev =0.761) that Information exchanged between them and their supply chain partners is often reliable. Respondents were also in agreement (Mean =4.16; Std Dev =0.794) that they keep each other informed about events or changes that may affect the other party. The findings further indicated (Mean =4.10; Std Dev =0.667) that they inform their supply chain partners in advance of changing needs. The respondents also concurred (Mean =4.07; Std Dev =0.824) with the statement that Information exchanged between us and our supply chain partners is often adequate.

Findings also revealed that respondents were in agreement (Mean =4.07; Std Dev =0.709) that exchange of information takes place frequently, and/or in a timely manner. Findings further indicated the respondents were in agreement (Mean =4.06; Std Dev =0.813) with the statement that their firm provides substantial information to the parties in the relationship which is of great use in order to improve their products. In addition, the respondents agreed (Mean =4.04; Std Dev =0.709) that unforeseen challenges are properly communicated to our suppliers.

Further, findings revealed (Mean =3.99 Std Dev =0.841) that information exchanged between us and our supply chain partners is often adequate. Furthermore, respondents agreed (Mean =3.97 Std Dev =0.858) that Information exchanged between us and our supply chain partners is quite complete. Finally, findings revealed that (Mean =3.78 Std Dev =0.907) up to date data and information of the company is always readily available for all the parties. The respondents generally agreed on the statements pertaining to cross functional information sharing.

The findings are supported by previous works of Harisson *et al.*,(1999) who emphasized on the important role played by information sharing and information technology for achieving organizational performance.

4.5.3 Decision Synchronization

The study further inquired on the effect of Decision Synchronization on Performance. The results are presented in Table 4.9.

Table 4.9: Descriptive Statistics for Decision Synchronization

Decision Synchronization Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
Our firm and SCP have agreement on the goals of the SC.	1.9	1.9	16.2	59.0	21.0	210	1	5	3.95	0.787
Our firm and the SCP have common agreements on integral relationships of the SC	0	2.9	14.3	56.2	26.7	210	2	5	4.07	0.722
Our firm and the SCP agree that our individual firm goals can be achieved through working towards the goals of the SC.	0	2.9	14.8	48.1	34.3	210	2	5	4.14	0.767
Our firm consistently incorporates our SCP input to joint planning and assortment	0	3.3	29.0	42.4	25.2	210	2	5	3.90	0.818
We jointly develop demand forecasts with our SCP	1.0	7.1	18.6	50.5	22.9	210	1	5	3.87	0.879
Our firm incorporates the SCP input on order exceptions	1.9	6.2	21.0	44.3	26.7	210	1	5	3.88	0.940
Our firm and the SCP have common agreement on improvements that benefit the SC as a whole.	1.4	1.0	18.1	53.3	26.2	210	1	5	4.03	0.772
Our firm and the SCP have joint Agreement on the inventory requirements.	0	3.8	17..6	51.9	26.7	210	2	5	4.01	0.773
There is alignment between the goals of the SC partners	0.5	4.8	13.3	52.4	29.0	210	1	5	4.05	0.811
As a result of joint effort, it has resulted into better commitment of partners,	1.0	1.4	16.7	49.5	31.4	210	1	5	4.09	0.786
Grand Mean = 4.00 Valid N (Listwise) =210										

The findings in Table 4.9 indicates that the respondents agreed (Mean =4.14; Std Dev =0.767) that their firm and the supply chain partners agree that their individual firm goals can be achieved through working towards the goals of the supply chain. The findings further indicated that as a result of joint effort (Mean =4.09; Std Dev =0.786) has resulted into better commitment of partners, hence supply chain agility. The respondents were also in agreement (Mean =4.07; Std Dev =0.722) that our firm and the supply chain partners have common agreements on the importance of integral relationships of the supply chain.

Further, findings indicated that there is an alignment (Mean =4.05; Std Dev =0.811) between the goals of the supply chain and that of partners in the supply chain. The respondents also concurred (Mean =4.03; Std Dev =0.772) that our firm and the supply chain partners have common agreement on the importance of improvement that benefit the supply chain as a whole. In addition, respondents were in agreement (Mean =4.01; Std Dev =0.773) with the statement that our firm and the supply chain partner have joint agreement on the inventory requirements. Findings too indicated that respondents agreed (Mean =3.95; Std Dev =0.787) with the statement that our firm and supply chain partners have agreement on the goals of the supply chain.

Respondents also concurred (Mean =3.90; Std Dev =0.818) with the statement that our firm consistently incorporates our supply chain partners input to joint planning and assortment. Further, respondents were in agreement (Mean =3.88; Std Dev =0.940) with the statement that our firm incorporates the supply chain partners input on order exceptions. Finally, the respondent's concurred (Mean =3.87; Std Dev =0.879) that they jointly develop demand forecasts with our supply chain partners. These findings imply that when Cosmetics Manufacturing Firms ensure that the needs and expectations of the partners have been incorporated in the operations, will lead to the achievement of Supply Chain Agility. Generally the respondents were on agreement with the statements pertaining to decision synchronization. The findings are consistent with the study findings of Wilson *et al.,* (1995), who found that mutual goals influence performance satisfaction which in turn influences the level of commitment to the strategic alliance.

The study findings are also supported by the findings of Harland *et al.,(*2004), who concluded that the level of synchronization in the decision making process is a key element of supply chain coordination and as a way of building and maintaining mutual partnerships.

4.5.4 Idiosyncratic Partner Investment

The study sought to assess the effect of Idiosyncratic Partner Investment on the Performance of Cosmetics Manufacturing Firms Nairobi County. The findings are presented in Table 4.10

Table 4.10: Descriptive Statistics for Idiosyncratic Partner Investment

Idiosyncratic Partner Investment Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
We have made major investments in time and effort to improve our products and services	2.9	2.4	21.4	52.9	20.5	210	1	5	3.86	0.869
Our company shares resources and abilities which leads to attainment of objectives	1.0	6.7	24.8	51.4	16.2	210	1	5	3.75	0.839
We provide our partners and clients with the opportunity to use our resources hence provide quality products and services	3.3	6.7	25.2	38.1	26.7	210	1	5	3.78	1.021
Our company provides resources and abilities which are beneficial to the relationship	0.5	4.8	19.0	49.5	26.2	210	1	5	3.96	0.829
Our firm has made specific investments in assets, software or personnel so as to better meet the customer needs	1.4	1.0	22.4	50.5	24.8	210	1	5	3.96	0.800
We have made significant investments in tooling and equipment dedicated to this supplier	1.0	6.2	22.9	49.0	21.0	210	1	5	3.83	0.863
Qualifying this supplier has involved substantial commitments of time and money	0.5	2.4	16.7	51.0	29.5	210	1	5	4.07	0.774
The supplier's product requires technical skills that are unique to this supplier	0.5	4.3	17.1	48.6	29.5	210	1	5	4.02	0.827
Grand Mean = 3.90										
Valid N (Listwise) = 210										

The findings reveal that the respondents were in agreement (Mean =4.07; Std Dev =0.774) that Qualifying this supplier has involved substantial commitments of time and money. The respondents also concurred (Mean =4.02; Std Dev =0.827) that the supplier's product requires technical skills that are unique to this supplier. Further the respondents agreed (Mean =3.96; Std Dev =0.829) with the statement that our company provides resources and abilities which are beneficial to the relationship. The respondents also concurred (Mean =3.96; Std Dev =0.800) that our firm has made specific investments in assets, software or personnel so as to better meet the customers' needs and that the supplier can adequately meet our needs.

The study further indicated that there was an agreement (Mean =3.86; Std Dev =0.869) with the statement that we have made major investments, specifically for these relationships, in time and effort in order to improve our products and services. Findings also revealed that (Mean =3.83; Std Dev =0.863) that the firms had made significant investments in tooling and equipment dedicated to this supplier. Further, respondents concurred (Mean =3.78; Std Dev =1.021) with the statement that we provide our partners and clients with the opportunity to use our resources, such as plant, technology, software or machinery hence provide quality products and services.

Finally, the respondents agreed (Mean =3.75; Std Dev =0.839) with the statement that we have made major investments, specifically for these relationships, in time and effort in order to improve our products and services. The findings imply that Idiosyncratic Partner Investment is a significant factor that can affect Supply Chain Agility of Cosmetics Manufacturing Firms. Generally, the respondents were in agreement with the statements pertaining to idiosyncratic partner investment. The findings are supported by prior work of Jap and Anderson (2003) who found that specific investments in a relationship can safeguard it especially if there is a reciprocity and both buyer and supplier invest in assets that are Idiosyncratic to the relationship.

4.5.5 Performance

The study also sought to determine the respondent's level of agreement concerning the performance of Cosmetics Manufacturing Firms in the Nairobi County. Table 4.11 shows the findings.

Table 4.11: Descriptive Statistics for Performance

Performance Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
Manufacturing lead times has improved in our firm	3.3	1.9	9.0	63.3	22.4	210	1	5	3.99	0.832
Customers' requirements are met in terms of quality	1.0	3.8	13.8	52.4	29.0	210	1	5	4.29	3.609
We have the capability to adapt and respond in a speedy manner to changes & actual disruptions	0	2.9	16.2	48.1	32.9	210	2	5	4.11	0.772
There is improved delivery and reliability of the firm	1.9	1.4	13.3	48.1	35.2	210	1	5	4.13	0.837
Products and services offered are of high quality.	0	1.9	9.5	53.8	34.8	210	2	5	4.21	0.689
SCA has led to improved responsiveness hence Customer satisfaction.	0.5	1.4	15.2	45.2	37.6	210	1	5	4.18	0.774
There is real time delivery of goods to our clients.	0.5	1.0	13.8	51.0	33.8	210	1	5	4.16	0.729
The firm is always ready to produce a broad range of low cost, high quality products with short lead times	1.0	2.9	11.9	45.2	39.0	210	1	5	4.19	0.824
As a result of integral relationship, it has led to reduction of customer complaints.	0.5	2.4	8.1	48.6	40.5	210	1	5	4.26	0.747
Productivity has improved in our firm	1.0	1.4	13.3	57.1	27.1	210	1	5	4.08	0.737
Grand Mean = 4.13 Valid N (Listwise) = 210										

The results indicates that respondents were in agreement (Mean =4.29; Std Dev =3.609) that customers' requirements are met in terms of quality. Further, the respondents concurred (Mean =4.26; Std Dev =0.747) that As a result of integral relationship, it has led to reduction of customer complaints. It is also evident from the results (Mean =4.21; Std Dev =0.689) that respondents were in agreement that Products and services offered are of high quality. In addition, respondents agreed (Mean =4.19; Std Dev =0.824) that the firm is always ready to produce a broad range of low cost, high quality products with short lead times.

The respondents also agreed (Mean =4.18; Std Dev =0.774) with the statement that our firm through supply chain agility has led to customer satisfaction in a turbulent and volatile market hence improved responsiveness to customer needs. Further, respondents concurred (Mean =4.16; Std Dev =0.729) that there is real time delivery of goods to our clients. Respondents were also in agreement (Mean =4.13; Std Dev =0.837) that there is improved delivery and reliability of the firm. It is also evident from the results (Mean =4.11; Std Dev =0.772) that the respondents agreed that they have the capability to adapt and respond in a speedy manner to changes and actual disruptions.

Findings further indicates that the respondents agreed (Mean =4.08; Std Dev =0.737) that through integral relationships and supply chain agility, Productivity has improved in our firm. Finally, the respondents also agreed (Mean =3.99; Std Dev =0.832) with the statement that our Manufacturing lead times has improved in our firm. Confirming earlier research results (Goldman & Nagel, 1993; Kidd, 2003; Booth, 1995; Hilton & Gill, 1994), Gunasekaran and Yusuf (2002) found that agile manufacturing enables the firm to meet changing market requirements with high quality goods on a consistent basis. Furthermore, integral relationships and supply chain agility has been shown to maximize customer service levels while minimizing the cost of goods.

4.5.6 Technological Engagement

The study further sought to assess the Moderating effect of Technological Engagement on Integral Relationship and Supply Chain Agility on the Performance of Cosmetics Manufacturing Firms in Nairobi County. The results are presented in Table 4.12.

Table 4.12: Descriptive Statistics for Technological Engagement

Technological Engagement Statements	SD (%)	D (%)	N (%)	A (%)	SA (%)	N	Min	Max	Mean	Std Dev
Information Technology in our firm has quite improved the quality of communication	1.4	1.4	7.6	53.8	35.7	210	1	5	4.21	0.760
IT has led to added value to SC functions.	0	1.0	10.0	51.0	38.1	210	2	5	4.26	0.673
Technology engagement in our firm has led to better coordination and integration of information flows.	0.5	0	9.0	43.8	46.7	210	1	5	4.36	0.686
Technology has led to the development of new services, products, functions and formation of alliances.	0.5	1.0	11.9	41.0	45.7	210	1	5	4.30	0.753
Our firm's use of IT has improved our transaction speed thus reduced lead time	0	0	5.7	44.8	49.5	210	3	5	4.44	0.602
Technology has led to reduction in costs & increased efficiency across the extended SC	0.5	1.4	6.7	52.4	39.0	210	1	5	4.28	0.693
Technology in our firm has led to improved service delivery to our customers	0.5	0.5	7.1	49.5	42.4	210	1	5	4.33	0.672
Technology use has led to planning, tracking and estimating lead times	0	2.4	18.6	39.5	39.5	210	2	5	4.16	0.808
Grand Mean = 4.29										
Valid N (Listwise) = 210										

The findings reveal that the respondents were in agreement (Mean =4.44; Std Dev =0.602) that Our firm's use of IT has improved our transaction speed thus reduced lead time. Respondents were also in agreement that Technology Engagement (Mean =4.36; Std Dev =0.686) in our firm has led to better coordination and integration of information flows and activities within and between boundaries. The respondents also concurred with the statement that the use of Technology in our firm (Mean =4.33; Std Dev =0.672) has led to improved service delivery to our customers.

Further, findings reveal that respondents agreed that adoption of technology (Mean =4.30; Std Dev =0.753) has led to the development of new services, products, functions and formation of alliances. It is also evident from the findings that technology engagement in the firms (Mean =4.28; Std Dev =0.693) has led to reduction in costs, increased efficiency across the extended supply chain and enhanced work flow. Further, the respondents agreed (Mean =4.26; Std Dev =0.673) with the statement that Adoption of technology has led to added value to supply chain functions through greater efficiency and information transparency. Respondents also concurred (Mean =4.21; Std Dev =0.760) that Information Technology in our firm has quite improved the quality of communication.

Finally, the respondents were in agreement (Mean =4.16; Std Dev =0.808) that Technology use in our firm has allowed planning, tracking and estimating lead times based on real data. Overall, the respondents agreed on the information pertaining to Technological Engagement. These findings are supported by previous works of Swafford *et al.,* (2008) who found that technology adoption drives business growth and integrates business' operations with strategies. This is further supported by Benton & Mc Henry, (2010) findings.

4.6 Test of Assumptions and their Results

The following assumptions of the study variables were tested.

4.6.1 Results of Outliers

Statistical evidence has established outliers as any observations which are numerically distant if compared to the rest of the dataset (Bryne, 2010). Presence of outliers was detected by use of Mahalanobis d-square test. The d values were arranged in ascending order and the values which were away from the rest of the dataset were dropped.

4.6.2 Linearity Results

Linearity means that the amount of change or rate of change between scores on two sets of variables is constant for the entire range of scores for the variables (Bai and Perron, 2008). It is therefore the consistent slope of change that represents the relationship between an independent variable and a dependent variable (Granger & Tera, 2007). Problem of linearity was obtained after removing outliers from the dataset. The study assumed linearity of the variables because outliers had been dropped.

4.6.3 Normality Test Results

The study conducted a normality test of the regression model to ascertain whether the observation could have reasonably come from a normal distribution. Normality test is important in order to determine appropriate tests to be conducted and ensure that the assumptions of a normal distribution are not violated (Math-Statistics-Tutor, 2010). The results are presented in Table 4.13.

Table 4.13: Normality Test Results

Variable	Kolmogorov-Smirnov Statistics	Sig
Collaborative Awareness	1.315	0.063
Cross functional information	0.771	0.752
Decision synchronization	0.818	0.806
Idiosyncratic partner investment	0.789	0.770
Supply chain agility	0.799	0.775
Technological engagement	0.706	0.729

The normality test was evaluated using the Kolmogorov-Smirnov criterion ($p>0.05$ for all variables). Kolmogrov-Smirnov test is used to detect all departures from normality. The data is considered to come from a normal distribution if the significance value is greater than 0.05. Table 4.13 shows that all our sample values were above 0.05. This is an indication that our data is normally distributed.

4.6.2 Multicollinearity Results

To test the correlation between variables, multicollinearity test was conducted. Multicollinearity is a statistical phenomenon in which two or more predictor variables in a multiple regression model are highly correlated (Gujarat & Porter, 2009). It arises when there is a linear relationship between two or more independent variables in a single equation model (Gujarat & Porter, 2009). In a multiple regression analysis, the estimated regression coefficients fluctuate widely and become less reliable as the degree of correlation between independent variables increases (Kothari, 2004). Multicollinearity results are presented in Table 4.14.

Table 4.14: Multicollinearity Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity statistic	
	B	Std. Error	Beta			Statistics Tolerance	VIF
(Constant)	2.376	.377		6.297	.000		
Collaborative Awareness	.056	.067	.058	.826	.410	.915	1.093
Decision Synchronization	.042	.067	.046	.626	.532	.833	1.201
Cross functional information sharing	.157	.079	.148	1.996	.047	.808	1.237
Idiosyncratic partner Investment	.164	.070	.172	2.336	.020	.825	1.212

a. Dependent Variable: Performance

Detection Tolerance and Variance Inflation Factor (VIF) method was used to test for multicollinearity (Cooper & Schindler, 2011). O'Brien (2007) suggested that a tolerance value of less than 0.20 and a VIF of 5 or 10 and above indicates a multicollinearity problem. Multicollinearity is reflected by lower tolerance values and higher VIF values (Hair *et al*., 2006). Table 4.14 indicates that Variance Inflation Factor (VIF) results for the study variables was less than 5 while Tolerance was greater than 0.2 which shows no multicollinearity between predictor variables.

4.6.3 Autocorrelation Test Results

Autocorrelation is a characteristic of data in which the correlation between the values of the same variables is based on related objects. Autocorrelation makes predictors seem

significant when they are not. Autocorrelation test was done using Durbin-Watson Test. The results are presented in Table 4.15.

Table 4.15: Autocorrelation Results

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	.717	.514	.502	.319	1.788

Dependent Variable (Supply Chain Agility)

Durbin-Watson's d tests the null hypothesis that the residuals are not linearly auto-correlated. While d can assume values between 0 and 4, values around 2 indicate no autocorrelation. A d value between 1.5 and 2.5 is a clear indication that there is no auto-correlation in the multiple linear regression data. Table 4.15 shows that the Durbin - Watson d=1.788 is between the critical values of $1.5 < d < 2.5$. The researcher assumes that there is no first order linear autocorrelation in the regression data.

4.6.4 Homoscedasticity Results

Homoscedasticity is one of the assumptions of multiple linear regressions. Homoscedasticity means constant variance; that is variance of errors is the same across all levels of the independent variables. When there is violation it results in heteroscedaticity. It is present when the size of the error term differs across values of independent variables. Levene test was used to test for homoscedasticity. The results are shown in Table 4.16.

Table 4.16: Test of Homogeneity of Variances

Levene Statistic	Df1	Df2	P-value
2.784	14	196	0.001

Assessment of homoscedasticity of the residuals of supply chain agility was conducted. OLS makes the assumption that the variance of the error term is constant or Homoscedastic (Greene, 2003). If the error terms do not have constant variance, they are said to be heteroscedastic. Violation of this assumption leads to bias in test statistics and confidence intervals (Greene, 2003). Levene test was used to test the null hypothesis for the homogeneity of variance that the variance of the dependent variable is equal across groups defined by the independent variable that is, the variance is homogeneous. Table 4.16 shows a levene statistic of 2.784 with an associated p-value of 0.001. The probability associated with the Levene statistic 0.001 which is less than 0.05 level of significance indicates that the error terms have constant variance hence homogeneity of variance.

4.7 Inferential Statistics Findings

The study conducted factor analysis, correlation analysis, ANOVA, chi square and regression analysis between the independent variables, moderating variable and the dependent variable.

4.7.1 Factor Analysis

To assess the factorability of items, two indicators were examined: Kaiser Meyer-Olkin measure of sampling adequacy and Barletts test of Sphericity (Pallant, 2010). Bartlett test of Sphericity was used to assess the suitability of data for structure detection (Pallant, 2010). To assess sampling adequacy of variables, Kaiser-Meyer-Olkin (KMO)

test was used. The value for KMO ranges from 0 to 1, where when the values gets closer to 0, it is an indication that the model may not work well and when the value gets closer to 1, the explanatory effect of factor analysis is stronger. For adequate sample, KMO test statistic should be greater than 0.5 (Hair *et al.,* 2013). Table 4.16 shows KMO statistics of 0.837 which is greater than the conventional probability value of 0.5 and over .60 for a satisfying sample. This implies an acceptable degree of sample adequacy for factor analysis.

The appropriateness of using factor analysis was done using Bartlett‘s test of sphericity (Hair *et al.,* 2013). Table 4.17 presents the results of Bartlett‘s test of sphericity with a p-value of 0.000. For factor analysis to be recommended suitable, the Bartlett‘s test of sphericity should have p-value of less than 0.05 (Fabrigar *et al.,* 1999). Bartlett‘s test of sphericity indicates a chi-square of 3674.306 with an associated p-value of 0.00 which is lower than the conventional probability value of 0.05 thus it is reasonable to use the factor analysis.

Table 4.17: Kaiser-Meyer-Olkin and Bartlett’s Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.837
Bartlett's Test of Sphericity	Approx. Chi-Square	3674.306
	df	1176
	Sig.	.000

Factor analysis is a multivariate technique for identifying whether the correlations between a set of observed variables stem from their relationship to one or more latent variables in the data, each of which takes the form of a linear model. Principal Component Analysis (PCA) which is a descriptive variable reduction statistical technique was used in factor extraction. The goal of PCA was to extract maximum

variance from the data set with each component (Tabachnick & Fidell, 2013). Principal Component Analysis, Orthogonal rotation, Varimax methods are used to extract quality constructs for each of the independent variable (Zikmund *et al.,* 2010).

The factor loadings, also called component loadings in PCA which is the correlation coefficients between the cases (rows) and factors (columns) was used to indicate the percent of variance in the indicator variable explained by the factor. Tabachnick and Fidell (2013) indicate that a loading factor of 0.32 is good for minimum loading of an item. However Hair, *et al.,* (2010) guideline for practical significance indicates that a factor loading of ±0.3 means the item is of minimal significance, ±0.4 indicates it is more important and ±0.5 indicates the factor is significant.

The study therefore used a threshold factor loading of ±0.5. The results on factor analysis are presented in Table 4.18, Table 4.19, Table 4.20, and Table 4.21 respectively.

4.7.1 a) Factor Analysis on Collaborative Awareness and Performance

Factor analysis was carried out to describe the variability among the observed variables and check for any correlated variables with the aim of reducing data that was found to be redundant. Conventionally, statements scoring more than 30% which is the minimum requirements for inclusion of variables into the final model were included (Hair, Black & Rabin, 2010). Factor analysis on collaborative awareness and performance of cosmetics manufacturing firms in Nairobi County was carried out. The results are presented in Table 4.18.

Table 4.18: Component Matrix for Collaborative Awareness

Statements	Factor Component
Our firm and this supply chain partners have integrated production	0.523
arrangement operating under principle of shared rewards and risks	0.714
Operational flexibility relationship	0.581
Benchmarking practices and sharing results	0.640
Inventory info sharing with alliance members	0.610
Improved supply chain performance by integrating operation with partners	0.631
Relationship deserves firms maximum attention	0.572
Development of stable relationship with partners	0.726
Short term sacrifices to maintain relationship with customers and suppliers	0.758
Operation under principles of shared returns	0.724
Collaborative communication in resolving disputes	0.509
Average	**0.6262**

Extraction Method: Principal Component Analysis.

Table 4.18 shows the loadings of the eleven variables. The higher the absolute value of the loading, the more the factor contributes to the variable. From the analysis shown in Table 4.18, the firm's willingness to make short term sacrifices to maintain the relationship with its key suppliers and customers scored a factor component of 75.8%. This was followed by respondents who were in agreement that the firm is always willing to develop a stable relationship with the inter-firm partners, with a factor component of 72.6%. The statement on supply chain members operating under the principle of shared returns scored a factor component of 72.4%.

The firm having a supply chain arrangement with the supply partners that operate under the principle of shared rewards and risks scored a factor component of 71.4%. This was followed by the respondents who agreed that the firm benchmarks best practices or processes and shares results with the supply chain partner, with a factor component of 64%. The statement on the firm experiencing improved supply chain performance by integrating operations with the supply chain partners scored a factor component of 63.1%. Inventory information being shared with the alliance partners scored a factor of 61%, while the statement on the firm increasing operational flexibility as a result of relationship with the supplier scored a factor component of 58.1%.

On the other hand, the statement on the relationship that the firm has with its partners deserves the firm's maximum attention to maintain scored a factor component of 57.2%. The firm and the supply chain partner have integrated production systems scored a factor component of 52.3%, while collaborative communication among the relationship partners in the firm being key in resolving disputes and aligning perceptions and expectations of the supply chain partners scored a factor component of 50.9%.

From the analysis, majority of the respondents were in agreement that there is a close relationship between collaborative awareness and performance of cosmetics manufacturing firms in Nairobi County, Kenya as can be seen from the mean score of 62.6%. None of the statements required to be dropped since their factor components were above 30%, which is recommended threshold for inclusion of variable into the final model (Hair, Black & Babin, 2010).

4.7.1 b) Factor Analysis on Cross-Functional Information Sharing and Performance

Factor analysis was carried out to describe the variability among the observed variables and check for any correlated variables with the aim of reducing data that was found to be redundant. Conventionally, statements scoring more than 30% which is the minimum requirements for inclusion of variables into the final model were included (Hair, Black

& Rabin, 2010). Factor analysis on cross-functional information sharing and Performance was carried out. The results are presented in Table 4.19.

Table 4.19: Component Matrix for Cross Functional Information Sharing

Statement	Factor components
Up to date data and information of the company is always readily available for all the parties	0.589
We inform supply chain partners in advance of changing needs	0.510
We keep each other informed about events that may affect the other party	0.642
Unforeseen challenges are properly communicated to our suppliers	0.624
Exchange of information takes place frequently, and/or in a timely manner	0.571
Our firm provides substantial information to the parties in the relationship which is of great use in order to improve our products	0.571
Information exchange between us and our supply chain partners is always timely, fast and accurate	0.662
Information exchanged between us and our supply chain partners is often adequate	0.551
Information exchanged between supply chain partners is often reliable	0.523
Information exchanged between supply chain partners is quite complete	0.530
Average	**0.5773**

Extraction Method: Principal Component Analysis.

Table 4.19 shows the loadings of the ten variables. The higher the absolute value of the loading, the more the factor contributes to the variable. From the analysis shown in Table 4.19, information exchange between the firm and the supply chain partners is always timely, fast and accurate, scored a factor component of 66.2%. The company keeping each other informed about events and changes that may affect the other party

scoring a factor component of 64.2%. The statement that unforeseen challenges are properly communicated to the suppliers scoring a factor component of 62.4%. The firm providing substantial information to the parties in the relationship was seen as of great use in order to improve the company's products with a factor component of 57.1%.

The statement on the information exchange between the firm and the supply chain partners being often adequate scored a factor component of 55.1%, while information exchanged between the firm and supply chain partners is quite complete scored a factor component of 53%. On the other hand, information exchanged between the firm and supply chain partner is often reliable, scored a factor component of 52.3%, while the statement on the firm informing supply chain partners in advance of changing needs scored a factor component of 51%.

Overall, majority of the respondents were in agreement that there is a close relationship between cross-functional information sharing and performance of cosmetics manufacturing firms in Nairobi County, Kenya as can be seen from the mean score of 57.73%. None of the statements required to be dropped since their factor components were above 30%, which is the recommended threshold for inclusion of variables into the final model (Hair, Black & Babin, 2010).

4.7.1 c) Factor Analysis on Decision Synchronization and Performance

Factor analysis was carried out to describe the variability among the observed variables and check for any correlated variables with the aim of reducing data that was found to be redundant. Conventionally, statements scoring more than 30% which is the minimum requirements for inclusion of variables into the final model were included (Hair, Black & Rabin, 2010). Factor analysis on decision synchronization and performance was carried out. The results are presented in Table 4.20.

Table 4.20: Component Matrix for Decision Synchronization

Decision Synchronization Statements	Factor Components
Our firm and supply chain partners have agreement on the goals of the supply chain.	0.792
our firm and the supply chain partners have common agreements on the importance of integral relationships of the supply chain	0.754
Our firm and the supply chain partners agree that our individual firm goals can be achieved through working towards the goals of the supply chain.	0.721
Our firm consistently incorporates our supply chain partners input to joint planning and assortment	0.682
We jointly develop demand forecasts with our supply chain partners	0.761
Our firm incorporates the supply chain partners input on order exceptions	0.775
Our firm and the supply chain partners have common agreement on the importance of improvement that benefits the supply chain as a whole.	0.555
Our firm and the supply chain partner have joint agreement on the inventory requirements.	0.44
There is an alignment between the goals of the supply chain and that of partners in the supply chain	0.580
As a result of joint effort, it has resulted into better commitment of partners, hence supply chain agility.	0.500
Average	**0.6560**

Extraction Method: Principal Component Analysis.

Table 4.20 shows the loadings of the ten variables. The higher the absolute value of the loading, the more the factor contributes to the variable. From the analysis shown in Table 4.20, most respondents reported that the firm and supply chain partners have agreement on the goals of the supply chain, with a factor component of 79.2%. The firm incorporates the supply chain partners input on order exceptions scored a factor component of 77.5%. This was followed by the statement that the firm jointly develop forecasts with the supply chain partners having common agreements on the importance of integral relationships of the supply chain with a factor component of 75.4%.

On the other hand, the statement on the firm and the supply chain partners having common agreements that their individual firm goals can be achieved through working towards the goals of the supply chain scored a factor component of 72.1%. The statement that the firm consistently incorporates supply chain partners input to joint planning and assortment scored a factor component of 68.2%. There is an alignment between the goals of the supply chain and that of partners in the supply chain scored a factor component of 58%. The firm and the supply chain partners have common agreements on the importance of improvement that benefits the supply chain as a whole scored a factor component of 55.5%.

As a result of joint effort, it has resulted into better commitment of partners, hence supply chain agility scored a factor component of 50%. The statement that the firm and the supply chain partner have joint agreement on the inventory requirements scored a factor component of 44%. Overall, majority of the respondents were in agreement that there is a close relationship between decision synchronization and Performance of cosmetics manufacturing firms in Nairobi County. From the analysis, none of the statements required to be dropped since their factor components were above 30% which is recommended threshold for inclusion of variables into the final model. (Hair, Black & Babin, 2010).

4.7.1 d) Factor Analysis on Idiosyncratic Partner Investment and Performance

Factor analysis was carried out to describe the variability among the observed variables and check for any correlated variables with the aim of reducing data that was found to be redundant. Conventionally, statements scoring more than 30% which is the minimum requirements for inclusion of variables into the final model were included (Hair, Black & Rabin, 2010). Factor analysis on Idiosyncratic Partner Investment and Performance was carried out. The results are presented in Table 4.21.

Table 4.21: Component Matrix for Idiosyncratic Partner Investment

Statement	Factor Components
We have made major investments, specifically for these relationships,	0.57
in time and effort in order to improve our products and services	
our company shares resources and abilities which combined with those	
of the parties in the relationship enables us to achieve objectives beyond	0.837
what we could attain on our own	
We provide our partners and clients with the opportunity to use our resources, such as plant, technology, software or machinery hence provide quality products and services	0.724
Our company provides resources and abilities which are beneficial to the relationship	0.551
Our firm has made specific investments in assets, software or personnel so as to better meet the customers needs and that the supplier can adequately meet our needs	0.783
We have made significant investments in tooling and equipment dedicated to this supplier	0.693
Qualifying this supplier has involved substantial commitments of time and money	0.656
The supplier's product requires technical skills that are unique to this supplier	0.565
Average	**0.6724**

Extraction Method: Principal Component Analysis.

Table 4.21 shows the loadings of the eight variables. The higher the absolute value of the loading, the more the factor contributes to the variable. From the analysis shown in Table 4.21, most respondents reported that the company shared resources and abilities which combined with those of the parties in the relationship enables them to achieve objectives beyond what they could attain on their own with a factor component of 83.7%. The firm making specific investments in assets, software or personnel so as to better meet the customers' needs and that the supplier can adequately meet the firms needs scored a factor component of 78.3%. Provision of the partners and clients with the opportunity to use the firm's resources, such as plant, technology, software or machinery to provide quality products and services, scored a factor component of 72.4%. This was followed by the statement that the firm have made significant investments in tooling and equipment dedicated to the supplier scoring a factor component of 69.3%.

Qualifying the supplier has involved substantially commitments of time and money scored a factor component of 65.6%. The statement on the firm making major investments specifically for those relationships in time and effort in order to improve the products and services scored a factor component of 57%. The supplier's product requires technical skills that are unique to this supplier scored a factor component of 56.5%. The statement on the firm making major investments specifically for those relationships in time and effort in order to improve the products and services scored a factor component of 57%.

The supplier's product requires technical skills that are unique to this supplier scored a factor component of 56.5%, while the statement on the company provides resources and abilities which are beneficial to the relationship scored a factor component of 55.1%. Overall, majority of the respondents were in agreement that there is a close relationship between idiosyncratic partner investment and Performance of cosmetics manufacturing firms in Nairobi County, Kenya, as seen from the mean score of 67.24%. Thus none of the statements required to be dropped since their factor components were above 30% which is recommended threshold for inclusion of variables into the final model (Hair, Black & Babin, 2010).

4.7.2 Correlation of Study Variables

Correlation between variables is a measure of how the variables are related. The most common measure of correlation in statistics is the Pearson Correlation (technically called the Pearson Product Moment Correlation or PPMC), which shows the linear relationship between two variables. Results are between -1 and 1 inclusive, i.e $-1 \leq \rho \leq 1$. A result of -1 means that there is a perfect negative correlation between the two values while a result of 1 means that there is a perfect positive correlation between the two variables. Result of 0 means that there is no correlation between the two variables (Gujarat, 2004). If the value of R is close to one, then it shows there is a strong correlation between the variables. If the value of R is close to zero, then the correlation is weak.

4.7.2 a) Correlation between Collaborative Awareness and Performance

The correlation between collaborative awareness and Performance in cosmetics manufacturing firms in Nairobi County, Kenya was examined. The results are presented in Table 4.22.

Table 4.22: Correlation between Collaborative Awareness and Performance

Variable		**Performance**
Collaborative Awareness	Pearson Correlation	.505**
	Sig. (2-tailed)	.000
	N	210

** Correlation is significant at the 0.01 level (2-tailed).

The results indicates that there is a positive and statistically significant correlation between collaborative awareness and Performance ($r=0.505$, $p<0.01$). This implies that collaborative awareness enhances Performance of cosmetics manufacturing firms in Nairobi County.

4.7.2 b) Correlation between Cross Functional Information Sharing and Performance

The relationship between Cross Functional Information Sharing and Performance was also examined. The results of correlation analysis are presented in Table 4.23.

Table 4.23: Correlation between Cross Functional Information Sharing and Performance

Variable		Performance
Cross Functional Information sharing	Pearson Correlation	.582**
	Sig. (2-tailed)	.000
	N	210

** Correlation is significant at the 0.01 level (2-tailed).

The results indicates that there is a positive and statistically significant correlation between Cross Functional Information Sharing and Performance of cosmetics manufacturing firms in Nairobi County ($r=.582$, $p < 0.01$). This is a clear indication that any effort to improve the communications channels making it more informative will lead to an increased performance of these firms.

4.7.2 c) Correlation between Decision Synchronization and Performance

The correlation between Decision Synchronization and Performance in cosmetics manufacturing firms in Nairobi County, Kenya was done. The results of the correlation are presented in Table 4.24.

Table 4.24: Correlation between Decision Synchronization and Performance

Variable		Performance
Decision Synchronization	Pearson Correlation	.516**
	Sig. (2-tailed)	.000
	N	210

** Correlation is significant at the 0.01 level (2-tailed).

The correlation results shows that there is a positive and statistically significant correlation between decision synchronization and performance of cosmetics firms in Nairobi County ($r=.516$, $p < 0.01$). This implies that when there is alignment between the goals of the supply chain and that of the partners, it would ultimately lead to a higher level of Performance.

4.7.2 d) Correlation between Idiosyncratic Partner investment and Performance

The correlation between Idiosyncratic Partner Investment and Performance in cosmetics manufacturing firms in Nairobi County was examined. The results of the correlation are presented in Table 4.25.

Table 4.25: Correlation between Idiosyncratic Partner investment and Performance

Variable		Performance
Idiosyncratic Partner investment	Pearson Correlation	.529**
	Sig. (2-tailed)	.000
	N	210

** Correlation is significant at the 0.01 level (2-tailed).

It is also evident from the results that there is positive and significant correlation between Idiosyncratic Partner Investment and Performance (r=.529, $p < 0.01$). This implies that the introduction of specific investments in assets, software or personnel enhanced the Performance of cosmetics manufacturing firms.

4.7.2 e) Correlation between Technological Engagement and Performance

The correlation between Technological Engagement and Performance in Cosmetics Manufacturing Firms in Nairobi County was also examined. The results of the correlation are presented in Table 4.26.

Table 4.26: Correlation between Technological Engagement and Performance

Variable		Performance
Technological Engagement	Pearson Correlation	.588**
	Sig. (2-tailed)	.000
	N	210

** Correlation is significant at the 0.01 level (2-tailed).

The results indicates that, there is a positive and statistically significant correlation between Technological Engagement and Performance ($r = .588$, $p < 0.01$). This implies that Technological engagement was linearly correlated with Performance. This is a clear

indication that when Technological engagement indicators increases there is likelihood of firm performance increasing.

Table 4.27: Combined Correlation Results

	Performance	**Collaborative Awareness**	**Cross functional information sharing**	**Decision synchronization**	**Idiosyncratic partner investment**	**Technological Engagement**
Performance	1	.505**	.582**	.516**	.529**	**.588****
Collaborative Awareness	.505**	1	.573**	.516**	.492**	**.400****
Cross functional information sharing	.582**	.573**	1	.675**	.555**	**.542****
Decision synchronization	.516**	.516**	.675**	1	.513**	**.510****
Idiosyncratic partner investment	.529**	.492**	.555**	.513**	1	**.402****
Technological engagement	**.588****	**.400****	**.542****	**.510****	**.402****	**1**

**** Correlation is significant at the 0.01 level (2-tailed).**

Overall, correlation findings indicates that there exist highest relationship between Technological Engagement and Performance. Collaborative Awareness and Performance depicted a low relationship but both are statistically significant. This is consistent with the findings of Holweg *et al.* (2005), who found that some collaboration initiatives are not being implemented as expected.

4.7.3 Chi Square Test

To examine the strength of associations between the bivariate categorical variables, a Chi-Square test for association was done for the independent variables, dependent and moderating variable.

Table 4.28: Chi- Square Tests between Collaborative Awareness and Performance

	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi Square	1327.561[a]	624	.000
Likelihood Ratio	408.421	624	1.000
Linear-by- Linear Association	52.816	1	.000
Sample size	210		

Table 4.28 shows a Chi-Square value = 1327.561, p = 0.000. The p value is less than 0.05 and hence there is a statistically significant association between collaborative awareness and Performance. This meant that collaboration allows the firms to partner by combining core competencies with the supply chain partners, hence high organizational Performance

Table 4.29: Chi- Square Tests between Cross Functional Information Sharing and Performance

	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi Square	1470.099[a]	600	.000
Likelihood Ratio	393.586	600	1.000
Linear-by- Linear Association	69.894	1	.000
Sample size	210		

Strength of the associations between cross functional information sharing and Performance was also tested. Table 4.29 shows a Chi-Square value = 1470.099, p = 0.000. The p value is less than 0.05 and hence there is a statistically significant association between cross functional information sharing and Performance. This is a clear indication that information sharing is a source of competitive advantage and fundamental to firm's survival and growth if well established.

Table 4.30: Chi- Square Tests between Decision Synchronization and Performance

	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi Square	1256.001[a]	552	.000
Likelihood Ratio	389.355	552	1.000
Linear-by- Linear Association	54.922	1	.000
Sample size	210		

The nature of the association between Decision Synchronization and Performance was examined using Chi-square test resulting in a Pearson Chi-Square value = 1256.001, p = 0.000. The p value is less than 0.05 and hence there is a statistically significant association between decision synchronization and performance. This meant that there is a statistically significant association between decision synchronization and performance of cosmetics manufacturing firms in Nairobi County.

Table 4.31: Chi- Square Tests between Idiosyncratic Partner Investments and Performance

	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi Square	1171.964[a]	504	.000
Likelihood Ratio	381.615	504	1.000
Linear-by- Linear Association	57.941	1	.000
Sample size	210		

The Pearson Chi-Square test results of the association between idiosyncratic partner investments and Performance are presented in Table 4.29. It shows a Chi-Square value = 1171.964, p = 0.000. The p value is less than 0.05 and hence there is a statistically significant association between Idiosyncratic Partner Investments and performance.

Table 4.32: Chi- Square Tests between the Moderating effect of Technological Engagement on Performance

	Value	Degree of Freedom	Asymptotic Significance (2-sided)
Pearson Chi Square	797.854[a]	384	.000
Likelihood Ratio	313.481	384	0.996
Linear-by- Linear Association	71.641	1	.000
Sample size	210		

The nature of the association between Technological Engagement and Supply Chain Agility was examined. It resulted in a Pearson Chi-Square value = 797.854, p = 0.000. The p value is less than 0.05 and hence there is a statistically significant association between Technological Engagement and Performance of cosmetics firms in Nairobi County.

4.7.4 Analysis of Variance for Hierarchical Integrated Regression Model

The Anova tests whether the regression model is generally a good fit for the data. Two Anova tests were performed on; all the independent variables controlling for the moderating variable and all the independent variables while uncontrolling the moderating variable. The results obtained are presented in Table 4.33.

Table 4.33: ANOVA of the Independent Variables

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18.544	4	4.636	39.880	.000[b]
	Residual	23.366	201	.116		
	Total	41.909	205			
2	Regression	21.533	5	4.307	42.270	.000[c]
	Residual	20.376	200	.102		
	Total	41.909	205			

a. **Predictors:** (constant), Collaborative Awareness, Cross Functional Information Sharing, Decision Synchronization, Idiosyncratic Partner Investments

b. **Dependent variable:** Performance.

c. **Predictors:** (constant), Collaborative Awareness, Cross functional information sharing, Decision synchronization, idiosyncratic partner investments, Technological engagement.

d. **Dependent variable:** Performance.

The Table 4.33 shows ANOVA output for model 1 and 2. Model 1 resulted in F (4,201) =39.880, p =0.000. The p-value obtained is less than 0.05 which implies that the independent variables significantly predicts Performance. Model 2 shows F (5,200) =42.270, p =0.000. This is a clear indication that the inclusion of the moderating variable is significant in predicting the dependent variable. This was evident from the p-value=0.000<0.05. This demonstrates that both the regression models 1 and 2 are statistically significant at 95% level of significance considering that the p- values are less than 0.05. It is evident that the independent variables significantly predict the dependent variable, which depicts a good regression model for the data. This implies that joint contribution of the independent variables with the moderator was significant in predicting the performance of cosmetics firms.

4.7.5 Hypotheses Testing Results

To test for individual significance of a coefficient, t-test was used under the null hypothesis. The test was done at 95% level of significance (α=0.05), critical value t=1.96. The null hypothesis is rejected when the t-calculated is strictly greater than the t-tabulated. The five research hypothesis that the study sought to test are addressed in this section.

4.7.5 a) Collaborative Awareness and Performance

The hypothesized research hypothesis for collaborative awareness was stated as:

Ho: $\beta_1=0$: Collaborative Awareness has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

The test was done at 95% level of significance (α=0.05), critical value t=1.96. T-test statistic was used to test for the significance of collaborative awareness. From Table 4.35, Model 1, the T value obtained was 8.400. Comparing the t-tabulated and t-calculated values statistically, it is evident that the t_calc > t_ α. The study therefore

rejected the null hypothesis and concluded that collaborative awareness has a significant effect on the performance of cosmetics manufacturing firms in the Nairobi County. This implies that collaborative awareness enables supply chain partners to leverage resources and capabilities to respond to dynamic market needs, hence performance. Collaboration is thus key to supply chain agility since it brings the interest of the supply chain to the forefront rather than of any individual firm. The study findings agrees with kalwani and Narayandas, (1995) findings who found that firms participating in collaboration have an opportunity to be more efficient, more customer focussed by exchanging information about the customer needs (Myers & Cheung, 2008) and more successful overall than those not participating (Simatupang & Sridhan, 2005). Sales growth, market share and satisfaction often increase and working closely together makes firms more likely to extend their relationships into the future (Ramadhan and Gunasekaran, 2014). Supply chains may even become more resilient by managing risk as a network rather than at the firm level. The study agrees with both Resource Based View Theory, Supply Chain Network Theory and Relational View Theory since competitive advantage and thus high performance can result as firms focus on working together.

Collaboration is critical to a successful supply chain since it enables firms to: reduce lead time, greater end-customer satisfaction, increased market share, increased flexibility and profits. Extant literature (Anderson & Weitz, 1992; Hadaya & Cassivi, 2007; Monczka, Petersen, Handfield, & Ragatz, 1998; Nyaga et al., 2010; Spekman et al., 1998) supports that joint planning and sharing improve relationships and enhance elements that form a culture in collaborative environment.

4.6.5 b) Cross Functional Information Sharing and Performance

The hypothesized research hypothesis for cross functional information sharing was stated as:

Ho: $\beta_2 = 0$: Cross Functional Information Sharing has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

The test was done at 95% level of significance (α=0.05), critical value t=1.96. T-test statistic was used to test for the significance of Cross Functional Information Sharing. From Table 4.37, Model 1, the T value obtained was 10.260. Comparing the t-tabulated and t-calculated values statistically, it is evident that the t_calc > t_ α. The study therefore rejected the null hypothesis and concluded that cross functional information sharing has a significant effect on the performance of cosmetics manufacturing firms Nairobi County. This is because cross functional information sharing forms the backbone of inter-firm relationships. It facilitates the exchange of data regarding sales, customer needs, market structures and even demand levels.

The study findings agrees with Kwon and Suh, (2004), who noted that the information sharing among partners reduces uncertainty levels and thereby improves the degree to which firms trust one another. This is a key aspect to achieving high performance since shared information facilitates firms ability to meet end user needs (Spekman *et al*., 1998) and free exchanges of information have been found to be very effective in reducing the risks of supplier failure (Lee, 2004). Dougherty, (1992) reveal that successful inter-departmental integration is primarily achieved through the encouragement of information sharing activities among functional departments. This involves both formal and informal communications.

Thus cross functional information sharing enables partners in a firm to effectively interact and work together to plan, coordinate and implement strategic initiatives, hence superior performance. The findings also agrees with Resource Based View Theory of the firm which emphasizes on the ability of firms in generating new knowledge and ability in facilitating information sharing. Knowledge acquisition, transformation and exploitation which are termed as absorptive capacity in literature are important dimensions of organizational capability. Hence cross functional information is believed to be directly related to a firm's competitiveness and profitability, hence performance.

4.6.5 c) Decision Synchronization and Performance

The hypothesized research hypothesis for decision synchronization was stated as:

Ho: $\beta_3 = 0$: Decision Synchronization has no significant effect on the Performance of Cosmetics Manufacturing Firms in the Nairobi County.

The test was done at 95% level of significance (α=0.05), critical value t=1.96. T-test statistic was used to test for the significance of Decision Synchronization. From Table 4.39, Model 1, the T value obtained was 8.633. Comparing the t-tabulated and t-calculated values statistically, it is evident that the t_calc > t_ α. The study therefore rejected the null hypothesis and concluded that decision synchronization has a significant effect on the performance of cosmetics manufacturing firms in Nairobi County.

Decision synchronization is a key dimension of performance that has the potential to reduce a source of conflict inherent in supply chain relationships. The study findings are supported by previous works of Simatupang and Sridharan (2005) which notes that decision synchronization facilitates incentive alignment which allows firms to appropriately devise incentives based on the level of responsibility a party owns.

The scholars further asserted that decision synchronization enables partners in the supply chain to coordinate critical decisions in planning and operations that benefit the supply chain as a whole. Decision synchronization can improve information sharing by specifying information needs and incentive alignment by providing justification for incentive alignment. Thus, supply chain partners should coordinate critical decisions that affect the agility of their firms. Supply chain network theory was relevant to the study. Firms aspiring to supply chain performance must have common inclination for managing their supply chain and develop firm-level strategies consistent with their supply chain orientation.

4.6.5 d) Idiosyncratic Partner Investment and Performance

The hypothesized research hypothesis for idiosyncratic partner investment was stated as:

Ho: $\beta_4 = 0$: Idiosyncratic Partner Investment has no significant effect on the Performance of Cosmetics Manufacturing Firms in Nairobi County.

The test was done at 95% level of significance (α=0.05), critical value t=1.96. T-test statistic was used to test for the significance of Idiosyncratic Partner Investment. From Table 4.41, Model 1, the T value obtained was 8.948. Comparing the t-tabulated and t-calculated values statistically, it is evident that the t_calc > t_ α. The study therefore rejected the null hypothesis and concluded that idiosyncratic partner investment has a significant effect on the performance of cosmetics manufacturing firms in Nairobi County. This is because collaboration processes inevitably require supplier's idiosyncratic investments and the sharing of sensitive cost and process information on the part of the customer (Buvik & Gronhaug, 2000).

Thus SC integral relationships inevitably require idiosyncratic investments by either party of the supply chain members. The findings are supported by study findings of Harland & Lamming, (2004) who found that idiosyncratic partner investment secures sufficient levels of cooperation and commitment, and would allow the chain members to accept the importance of the potential rewards that can be achieved through collaboration even if the costs are to be shared. The level of accumulated relation-specific investments is closely linked to several relational constructs.

It is understood as an indicator for relationship heaviness (Håkansson & Ford, 2002), and one of the factors influencing relationship stability. Resource based view theory was relevant to the study because idiosyncratic partner investment in supply chain helps increase the level of obligation between the involved parties, gaining competitive advantage in the market hence performance of the firm. Rowley (2003) stresses the role of relational embeddeness in deepening and strengthening inter-firm relationships. Inter-

firm relationship acquires a social character above and beyond the technical characteristics of the exchange at hand (Heugens & Zyglidopoulos, 2008).

4.6.5 e) Technological Engagement and Performance

The hypothesized research hypothesis for Technological Engagement was stated as:

Ho: ***β_5= 0: Technological Engagement does not significantly Moderate Integral Relationship and Supply Chain Agility on the Performance of Cosmetics Manufacturing Firms in Nairobi County***

The test was done at 95% level of significance (α=0.05), critical value t=1.96. T-test statistic was used to test for the moderating effect of Technological Engagement on integral relationship and supply chain agility on the Performance of cosmetics firms in Nairobi County. From Table 4.43, Model 2, the T value obtained was 5.417.

Comparing the t-tabulated and t-calculated values statistically, it is evident that the t_calc > t_ α. The study therefore rejected the null hypothesis and concluded that technological engagement significantly moderates SC integral relationship and Performance of cosmetics manufacturing firms in Nairobi County. This is due to the fact that technology engagement enables the business activities to be integrated across the whole supply chain through the information flows which is required to coordinate the business process as a whole. These technologies enable supply chain members to make real-time decisions which would also impact the cost structure and ultimately the competitive position of the firm (Sambamurthy *et al.*, 2003).

Using advanced IT systems, supply chain partners are able to improve their production planning, inventory management, distribution and safety management decisions because of the information sharing capabilities provided by the technology investments. The findings agrees with the study findings of Schonsleben (2000) who noted the importance of technologies to agility and performance. According to Power *et al*. (2001) in their analysis for “less agile” and “more agile” companies, found that the “more agile”

companies are willing to use high technology. Thus technological advances is an important attribute for achieving high level of performance.

The findings also agrees with technology adoption theory because it leads to a competitive supply chain management, which includes: Better service delivery, increased efficiency and effectiveness, increased performance of supply chain, better customer satisfaction, more quality products, improved productivity among others (Russell & Hoag, 2004). According to Barney (2004), points out that technology adoption in supply chain cultivates organizational capabilities that enable the firm to outperform their competitors. Modern technology in supply chain can drive efficiencies, streamline processes and enable visibility, and the ability to use data to forecast customer needs. Thus, the development of technological systems for SCM that supports and speed up all business activities, improving decision making and productivity, can build competitive advantage throughout the supply chain. Nelson (2001) stresses the importance of gaining sustainable competitive advantage from IT. This can help companies become more efficient, improve the productivity and respond rapidly to customer's needs.

4.7.6 Regression Analysis

Multiple regression analysis was conducted so as to determine the relationship between Performance, technological engagement and the independent variables. Regression models were generated at two levels. The first level without the interaction term and the second level with the moderator.

4.7.6 a) Relationship between Collaborative Awareness and Performance in Cosmetics manufacturing firms in Nairobi County, Kenya

Table 4.34 shows two model summary for collaborative awareness when moderator is included and when the effect of the moderator is not included.

Table 4.34: Regression Model Summary for Collaborative Awareness

Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	Df1	Df2	Sig. F Change
1	.505[a]	.255	.252	.396	.255	70.566	1[a]	206	.000
2	.658[b]	.433	.427	.347	.178	64.286	1[b]	205	.000

a. Predictor (Constant), Collaborative Awareness

b. Predictor (Constant), Collaborative Awareness * Technological Engagement

Model 1 shows there is a positive relationship between collaborative awareness and supply chain agility (R = 0.505, R^2 = 0.255) and F (1,206) = 70.566, p=0.000). The R^2 explains the variations in the dependent variable that can be explained by the independent variables. R^2 of 0.255 indicates that 25.5% of the variations in the Performance in cosmetics manufacturing firms can be accounted for by collaborative awareness. **Model 2** shows the results after the interaction of the moderator (Collaborative Awareness*****Technological Engagement) was introduced in the model.

The results shows there is a positive relationship between collaborative awareness and performance in cosmetics manufacturing firms with (R = 0.658, R^2 = 0.433) and F (1,205) = 64.286, p=0.000). An R^2 of 0.433 indicates that 43.3% of the variations in the performance in cosmetics manufacturing firms can be accounted for by Collaborative Awareness*Technological Engagement. The adjusted R-square is a modified version of R-squared that has been adjusted for the number of predictors in the model. The adjusted R-squared increases only if the new term improves the new model and it is always lower than the R-squared.

Table 4.34 shows adjusted R-square of 0.252 for model 1 and 0.427 for model 2. It is evident that the moderator improved our model. The inclusion of the interaction term resulted in a R^2 change of .178 which indicates that the moderating effect explains

17.8% of the variation in the performance above and beyond the variation explained by the collaborative awareness. The results obtained shows a significant presence of moderating effect of technological engagement on the relationship between collaborative awareness and performance in cosmetics manufacturing firms in Nairobi County.

Table 4.35 shows the significance test results with two models, the model with the inclusion of the interaction term and the other model without the moderator.

Table 4.35: Significance Test Results for Collaborative Awareness

		Unstandardized Coefficients		Standardized Coefficient		
Model		B	Std. Error	Beta	T	Sig
1	(Constant)	2.134	.240		8.908	.000
	Collaborative Awareness	.514	.061	.505	8.400	.000
2	(Constant)	.731	.273		2.676	.008
	Collaborative Awareness	.327	.058	.321	5.604	.000
	Technological Engagement	.497	.062	.460	8.018	.000

a. Dependent Variable: Performance

Model 1 indicates that relationship between Collaborative Awareness and performance was positive and significant (b1=0.514, p = 0.000, Beta = 0.505). Equation 4.1 shows the regression equation for model 1. For every unit increase in collaborative awareness, performance is predicted to increase by 0.514.

OLS Model: Performance = 2.134+ 0.514 Collaborative Awareness ……..Equation 4.1

This implies that an increase in information pertaining to collaborative awareness leads to increase in performance amongst cosmetics manufacturing firms. The null hypothesis that stated collaborative awareness has no significant effect on the performance was

rejected at 95% significance level. **Model 2** shows that the moderating effect of Technological Engagement on the relationship between collaborative awareness and performance of cosmetics manufacturing firms in the County Government of Nairobi, Kenya was positive and significant (b1=0.327,p = .000, Beta = 0.321).

Equation 4.2 shows the regression equation with the inclusion of the moderator. The equation implies that for every unit increase in collaborative awareness, performance is predicted to have a change of 0.327 on condition that Technological Engagement is kept constant. The null hypothesis is therefore rejected at 95% significance level and it is concluded that Technological Engagement moderates the relationship between Collaborative Awareness and performance.

MMR Model: Performance = 0.731+ 0.327Collaborative Awareness + 0.497 Technological Engagement……..……..……...Equation 4.2

4.7.6 b) Relationship between Cross Functional Information Sharing and Performance in Cosmetics Manufacturing Firms in Nairobi County.

Table 4.36 show two model summary for Cross Functional Information Sharing when moderator is included and when the effect of the moderator is not included.

Table 4.36: Regression Model summary for Cross Functional Information Sharing

					Change Statistics				
Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	.582[a]	.339	.336	.374	.339	105.272	1[a]	206	.000
2	.670[b]	.449	.443	.343	.110	40.531	1[b]	205	.000

a. Predictor (Constant), Cross Functional Information Sharing
b. Predictor (Constant), Cross Functional Information Sharing * Technological Engagement

Model 1 shows there is a positive relationship between Cross Functional Information Sharing and Performance (R = 0.582, R^2 = 0.339) and F (1,206) = 105.272, p=0.000). The R^2 explains the variations in the dependent variable that can be explained by the independent variables. R^2 of 0.339 indicates that 33.9% of the variations in the Performance of cosmetics manufacturing firms can be accounted for by Cross Functional Information Sharing.

Model 2 shows the results after the interaction of the moderator (Cross Functional Information Sharing*****Technological Engagement) was introduced in the model. The results shows there is a positive relationship between Cross Functional Information Sharing and Performance in cosmetics manufacturing firms with (R = 0.670, R^2 = 0.449) and F (1,205) = 40.531, p=0.000). An R^2 of 0.449 indicates that 44.9% of the variations in the Performance in cosmetics manufacturing firms can be accounted for by Cross Functional Information Sharing *Technological Engagement. The inclusion of the interaction term resulted in a R^2 change of .110 which indicates that the moderating effect explains 11% of the variation in the Performance above and beyond the variation explained by the cross functional information sharing. The results obtained shows a significant presence of moderating effect of technological engagement on the relationship between cross functional information sharing and Performance in cosmetics manufacturing firms in Nairobi County, Kenya. Table 4.37 shows the significance test results with two models, the model with the inclusion of the interaction term and the other model without the moderator.

Table 4.37: Significance Test Results for Cross Functional Information Sharing

Model		Unstandardized Coefficients		Standardized Coefficient Beta		
		B	Std. Error		T	Sig
1	(Constant)	1.803	.229		7.890	.000
	Cross Functional Information Sharing	.577	.056	.582	10.260	.000
2	(Constant)	.819	.260		3.147	.002
	Cross Functional Information Sharing	.367	.061	.370	5.997	.000
	Technological Engagement	.427	.067	.393	6.366	.000

a. Dependent Variable: Performance

Model 1 indicates that relationship between cross functional information sharing and Performance was positive and significant (b1=0.577, p = 0.000, Beta = 0.582). Equation 4.3 shows the regression equation for model 1. For every unit increase in cross functional information sharing, Performance is predicted to increase by 0.577.

OLS Model: Performance = 1.803+ 0. 577 Cross Functional Information Sharing ……..…..equation 4.3

This implies that an increase in information pertaining cross functional information sharing leads to increase in performance amongst cosmetics manufacturing firms. The null hypothesis that states cross functional information sharing has no significant effect on the performance was rejected at 95% significance level.

Model 2 shows that the moderating effect of technological engagement on the Relationship between cross functional information sharing and performance of

cosmetics manufacturing firms in the Nairobi County, Kenya was positive and significant (b1=0.367, p = .000, Beta = 0.321). Equation 4.4 shows the regression equation with the inclusion of the moderator. The equation implies that for every unit increase in cross functional information sharing, performance is predicted to have a change of 0.367 given that Technological Engagement is kept constant. The null hypothesis is therefore rejected at 95% significance level and it is concluded that technological engagement moderates the relationship between cross functional information sharing and performance of cosmetics manufacturing firms.

MMR Model: Performance = 0.819+ 0.367 Cross Functional Information Sharing + 0.427 Technological Engagement……..Equation 4.4

4.7.6 c) Relationship between Decision Synchronization and Performance in Cosmetics Manufacturing Firms in Nairobi County, Kenya

Table 4.38 shows two model summary for decision synchronization when moderator is included and when the effect of the moderator is not included.

Table 4.38: Regression Model Summary for Decision Synchronization

					Change Statistics				
Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	.516[a]	.267	.263	.387	.267	74.524	1[a]	206	.000
2	.640[b]	.410	.404	.348	.144	49.676	1[b]	205	.000

a. Predictor (Constant), Decision Synchronization

b. Predictor (Constant), Decision Synchronization * Technological Engagement

Model 1 shows there is a positive relationship between decision synchronization and performance (R = 0.516, R^2 = 0.267) and (F (1,206) = 74.524, p=0.000). An R^2 of 0.267 was obtained which indicates that 26.7% of the variations in the performance of cosmetics manufacturing firms can be accounted for by decision synchronization. **Model 2** shows the results after the interaction of the moderator (Decision Synchronization *****Technological Engagement) was introduced in the model.

The results shows there is a positive relationship between decision synchronization and performance in cosmetics manufacturing firms with (R = 0.640, R^2 = 0.410) and F (1,205) = 49.676, p=0.000). An R^2 of 0.410 indicates that 41% of the variations in the performance of cosmetics manufacturing firms can be accounted for by decision synchronization *Technological Engagement. The inclusion of the interaction term resulted in a R^2 change of .144 which indicates that the moderating effect explains 14.4% of the variation in the performance above and beyond the variation explained by the decision synchronization. Moderating effect of technological engagement on the relationship between decision synchronization and performance in cosmetics manufacturing firms in Nairobi County, Kenya shows a significant effect. Table 4.39 shows the significance test results with two models, the model with the inclusion of the interaction term and the other model without the moderator.

Table 4.39: Significance Test Results for Decision Synchronization

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficient Beta	T	Sig
1	(Constant)	2.167	.230		9.425	.000
	Decision Synchronization	.493	.057	.516	8.633	.000
2	(Constant)	1.022	.263		3.885	.000
	Decision Synchronization	.276	.060	.289	4.614	.000
	Technological Engagement	.469	.067	.442	7.048	.000

a. Dependent Variable: Performance

Model 1 indicates that relationship between Decision Synchronization and Performance was positive and significant (b1=0.493, p = 0.000, Beta = 0.516). Equation 4.5 shows the regression equation for model 1, for every unit increase in Decision Synchronization, Performance is predicted to increase by 0.493.

OLS Model: Performance = 2.167+ 0. 493 Decision Synchronization Equation 4.5

This implies that an increase in information pertaining to decision synchronization leads to an increase in performance amongst cosmetics manufacturing firms. The null hypothesis that states decision synchronization has no significant effect on the performance was rejected at 95% significance level. The study therefore fails to reject the alternative hypothesis and concludes that decision synchronization has a significant effect on performance amongst cosmetics manufacturing firms in Nairobi County.

Model 2 shows that the moderating effect of Technological Engagement on the Relationship between Decision Synchronization and Performance of cosmetics manufacturing firms in Nairobi County was positive and significant (b1=0.276, p = .000, Beta = 0.289). Equation 4.6 shows the regression equation with the inclusion of the moderator (Technological Engagement) .The equation implies that for every unit increase in decision synchronization, performance is predicted to have a change of 0.276 given that technological engagement is kept constant.

The null hypothesis is therefore rejected at 95% significance level and it is concluded that technological engagement moderates the relationship between decision synchronization and performance of cosmetics manufacturing firms in Nairobi County.

MMR Model: Performance = 1.022+ 0.276 Decision Synchronization Sharing + 0.469 Technological Engagement……..……....equation 4.6

4.7.6 d) Relationship between Idiosyncratic Partner Investments and performance in Cosmetics Manufacturing Firms in the County Government of Nairobi

Table 4.40 shows two model summary for idiosyncratic partner investments when moderator is included and when the effect of the moderator is not included.

Table 4.40: Regression Model summary for Idiosyncratic Partner Investments

Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	Df1	Df2	Sig. F Change
1	.529[a]	.280	.276	.390	.280	80.074	1[a]	206	.000
2	.670[b]	.449	.443	.342	.169	62.725	1[b]	205	.000

a. Predictor (Constant), Idiosyncratic Partner Investments

b. Predictor (Constant), Idiosyncratic Partner Investments * Technological Engagement

Model 1 shows there is a positive relationship between idiosyncratic partner investments and Performance (R = 0.529, R^2 = 0.280) and F (1,206) = 80.074, p=0.000). An R^2 of 0.280 indicates that 28% of the variations in the Performance of cosmetics manufacturing firms can be accounted for by idiosyncratic partner investments. **Model 2** shows the results after the interaction of the moderator (Idiosyncratic Partner Investments*****Technological Engagement) was introduced in the model. The results shows there is a positive relationship between Idiosyncratic Partner Investments and Performance in cosmetics manufacturing firms with (R = 0.670, R^2 = 0.449) and F (1,205) = 62.725, p=0.000).

An R^2 of 0.449 indicates that 44.9% of the variations in the Performance of cosmetics manufacturing firms can be accounted for by Idiosyncratic Partner Investments *Technological Engagement. The inclusion of the interaction term resulted in a R^2 change of .169 which indicates that the moderating effect explains 16.9% of the variation in the Performance above and beyond the variation explained by the idiosyncratic partner Investments. Moderating effect of technological engagement on the relationship between Idiosyncratic Partner Investments and Performance in cosmetics manufacturing firms in Nairobi County, Kenya shows a significant effect. Table 4.41 shows the significance test results with two models; model 1 without the inclusion of the moderator whereas model 2.

Table 4.41: Significance Test Results for Idiosyncratic Partner Investments

Model		Unstandardized Coefficients		Standardized Coefficient		
		B	Std. Error	Beta	T	Sig
1	(Constant)	2.332	.203		11.483	.000
	Idiosyncratic Partner Investments	.462	.052	.529	8.948	.000
2	(Constant)	.867	.257		3.376	.001
	Idiosyncratic Partner Investments	.305	.049	.349	6.174	.000
	Technological Engagement	.484	.061	.448	7.920	.000

a. Dependent Variable: Performance

Model 1 in Table 4.41 indicates that the relationship between Idiosyncratic Partner Investments and Performance was positive and significant (b1=0.462, p = 0.000, Beta = 0.529). Equation 4.7 shows the regression equation for model 1, for every unit increase in Idiosyncratic Partner Investments, Performance is predicted to increase by 0.462.

OLS Model: Performance = 2.332+ 0. 462 Idiosyncratic Partner Investments equation 4.7

This implies that an increase in several factors pertaining Idiosyncratic Partner Investments leads to increase in Performance amongst cosmetics manufacturing firms. The null hypothesis that states Idiosyncratic Partner Investments has no significant effect on the Performance was rejected at 95% significance level. The study therefore fails to reject the alternative hypothesis and concludes that Idiosyncratic Partner Investments has a significant effect on Performance amongst Cosmetics Manufacturing Firms in Nairobi County**.**

Model 2 in Table 4.41 shows that the moderating effect of Technological Engagement on the Relationship between Idiosyncratic Partner Investments and Performance of cosmetics manufacturing firms in Nairobi County was positive and significant (b1=0.305, p = .000, Beta = 0.349). Equation 4.8 below shows the regression equation with the inclusion of the moderator (Technological Engagement). The equation implies that for every unit increase in Idiosyncratic Partner Investments, Performance is predicted to have a change of 0.276 given that Technological Engagement is kept constant. The null hypothesis is therefore rejected at 95% significance level and it is concluded that Technological Engagement moderates the relationship between Idiosyncratic Partner Investments and Performance.

MMR Model: Performance = 1.022+ 0.276 Idiosyncratic Partner Investments + 0.469 Technological Engagement…… …….equation 4.8

4.6.6 e) Multiple Regression for Overall Models

Multiple regression analysis was conducted so as to determine the relationship between Performance and the independent variables (Collaborative Awareness, Cross Functional Information Sharing, Decision Synchronization, Idiosyncratic Partner Investment and Technological Engagement). Table 4.42 shows the results obtained for model 1 without the inclusion of the moderator and Model 2 with the inclusion of the Moderating effect.

Table 4.42: Multiple Regression for Overall Models

					Change Statistics				
Model	R	R^2	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Df1	Df2	Sig. F Change
1	.665[a]	.442	.431	.341	.442	39.880	4[a]	201	.000
2	.717[b]	.514	.502	.319	.071	29.340	1[b]	200	.000

a. **Predictors:** (Constant), Collaborative Awareness, Cross functional information sharing, Decision synchronization, idiosyncratic partner investments

b. **Predictors:** (Constant), Collaborative Awareness, Cross functional information sharing, Decision synchronization, idiosyncratic partner investments and Technological Engagement.

The coefficient of determination (R^2) of 0.442 was obtained which indicates that only 42.2% of the variation in Performance can be contributed by the independent variables. Model 2 in Table 4.40 shows the results after the interaction of the moderating variable that was introduced in the equation. The coefficient of determination R^2 of 0.514 was obtained which indicates that 51.4% of variance in the Performance can be explained by the independent variables with the interaction of moderator. Inclusion of interaction term resulted in a $\mathbf{R^2}$ change of 0.071.

An $\mathbf{R^2}$ change of 0.071 indicates that moderating effect of Technological Engagement explains 7.1% variances in Performance above and beyond the variations explained by the other independent variables.

4.6.6 f) Overall Significance Test Results

Table 4.43 shows the overall test results for the hypothesized research for model 1 and model 2.

Table 4.43: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	1.115	.245		4.545	.000
	Collaborative Awareness	.207	.057	.241	3.645	.000
	Cross Functional Information Sharing	.372	.167	.272	2.570	.011
	Decision Synchronization	.272	.077	.280	3.555	.000
	Idiosyncratic Partner Investment	.112	.071	.117	1.580	.036
2	(Constant)	.471	.259		1.821	.002
	Collaborative Awareness	.181	.053	.211	3.394	.001
	Cross Functional Information Sharing	.349	.063	.149	2.376	.018
	Decision Synchronization	.183	.074	.188	2.484	.014
	Idiosyncratic Partner Investment	.354	.215	.033	.461	.045
	Technological Engagement	.353	.065	.331	5.417	.000

a. Dependent Variable: Performance

The relationship between all explanatory variables was positive and statistically significant at 95% level of significance. The results were supported by the conventional p-value that were less than 0.05. This shows a significant presence of moderating effect of Technological Engagement on the relationship between the explanatory variables and Performance in Cosmetics Manufacturing Firms in Nairobi County, Kenya. This is a clear indication that parameters in **SC** integral relationship are important in determining the Performance in Cosmetics Manufacturing Firms.

Table 4.43 was used to develop the models with and without the interaction of the moderator. The multiple regression equations for Performance were as follows;

OLS Model: Performance = 1.115+ 0.207 Collaborative Awareness +0.372 Cross functional information sharing +0.272 Decision synchronization + 0.112 Idiosyncratic Partner Investments…….Equation 4.9

MMR Model: Performance = 0.471+ 0.181 Collaborative Awareness +0.349 Cross functional information sharing +0.183 Decision synchronization +0.354 Idiosyncratic Partner Investments + 0.353 Technological Engagement…..Equation 4.10

Summary of Hypothesis Testing Results

The hypothesized research hypotheses were tested. After testing the hypothesized research models, all the research null hypotheses were rejected at 95% level of significance. The resultant t-calc statistics values for all the variables were either less than -1.96 or greater than 1.96 at 0.05 significance level. The p-values for all the variables were less than 0.05. Hence relationships between all hypothesized variables were significant. Table 4.44 provides a summary of hypothesis testing.

Table 4.44: Summary of Hypothesis Testing

Hypothesis		T-statistics (.05 sig level)	P-value	Results	Empirical Results
H_{01}	Collaborative Awareness has no significant effect on the Performance of Cosmetic Manufacturing Firms in Nairobi County	8.40	0.000	Positive and Significant (Rejected)	Supported
H_{02}	Cross Functional Information Sharing has no significant effect on the Performance of Cosmetic Manufacturing Firms in Nairobi County	10.260	0.000	Positive and Significant (Rejected)	Supported
H_{03}	Decision Synchronization has no significant effect on the Performance of Cosmetic Manufacturing Firms in Nairobi County	8.633	0.000	Positive and Significant (Rejected)	Supported
H_{04}	Idiosyncratic Partner Investment has no significant effect on the Performance of Cosmetic Manufacturing Firms in Nairobi County	8.948	0.000	Positive and Significant (Rejected)	Supported
H_{05}	Technological Engagement does not significantly moderate the relationship between SC Integral Relationship and Performance of Cosmetic Manufacturing Firms in Nairobi County	5.14	0.000	Positive and Significant (Rejected)	Supported

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the research findings based on the research objectives and presents the conclusion and recommendations that may be considered for further research. The main objective of the research was to determine the Effect of Supply Chain Integral Relationships on Performance of Cosmetics Manufacturing Firms in Nairobi County, Kenya.

5.2 Summary of the Findings

The section presents the summary of the study on Effect of Supply Chain Integral Relationships on Performance of Cosmetics Manufacturing Firms in Nairobi County, Kenya based on the specific objectives.

5.2.1 Effect of Collaborative Awareness on Performance

The first objective of the study sought to determine the effect of collaborative awareness on Performance in cosmetics manufacturing firms in Nairobi County. The results of the study revealed that collaborative awareness contributed positively to Performance of cosmetics manufacturing firms in Nairobi County. The results indicated that there was a positive and significant correlation between collaborative awareness and Performance ($r=0.505$, $p<0.001$). This implied that collaborative awareness enhanced Performance of cosmetics manufacturing firms in Nairobi County. From the findings, the study found that there was a positive and statistically significant relationship between collaborative awareness and Performance of cosmetics manufacturing firms ($R = 0.505$, $R^2 = 0.255$). Statistics indicated an R^2 of 0.252 meaning that 25.2% of the variations in the

Performance of cosmetics manufacturing firms was accounted for by collaborative awareness.

5.2.2 Effect of Cross Functional Information Sharing on Performance

The second objective of the study sought to examine the effect of cross functional information sharing on Performance of cosmetics manufacturing firms in Nairobi County. The results of the study revealed that majority of the respondents were in agreement that cross functional information sharing contributed positively to Performance of cosmetics manufacturing firms in Nairobi County. Cross functional information sharing played a significant role in supply chain management as an enabler in achieving supply chain integration and hence performance. Information sharing between parties is required for a streamlined execution of SCM resulting in improved performance.

The results indicated that there is a positive and statistically significant correlation between cross functional information sharing and Performance ($r=.582$, $p < 0.01$). The study also rejected the null hypothesis and concluded that cross functional information sharing has a significant effect on the Performance of cosmetics manufacturing firms in Nairobi County. This is because shared information across functions enables firms to meet end user needs, reduces uncertainty levels and improves the degree to which firms trust one another. Free exchanges of information is very effective in reducing the risks of supplier failure.

From the findings, the study found out that cross functional information sharing had a positive and statistically significant relationship on Performance ($R = 0.582$, $R^2 = 0.339$). R^2 of 0.339 indicated that 33.9% of the variations in the Performance of cosmetics manufacturing firms was accounted for by cross functional information sharing. The study found out that on average, cosmetics manufacturing firms employed cross functional information sharing as a tool for achieving competitive advantage, though the implementation is still low as evident from the results.

5.2.3 Effect of Decision Synchronization on Performance

The third objective of the study sought to establish the effect of decision synchronization on the Performance of cosmetics manufacturing firms in Nairobi County. The correlation results showed that there was a positive and statistically significant correlation between decision synchronization and Performance ($r=.516$, $p < 0.01$). This implied that when there is an alignment between the goals of the supply chain and that of the partners, it would ultimately lead to a higher level of partnership and thus performance. The study also rejected the null hypothesis and concluded that decision synchronization has a significant effect on the performance of cosmetics manufacturing firms in Nairobi County.

This is due to the fact that decision synchronization is a key dimension of Performance that has the potential to reduce a source of conflict inherent in supply chain relationships.

From the findings, results reveal that there is a positive relationship between decision synchronization and Performance ($R = 0.516$, $R^2 = 0.267$). An R^2 of 0.267 was obtained which indicated that 26.7% of the variations in the Performance of cosmetics manufacturing firms was accounted for by decision synchronization.

5.2.4 Effect of Idiosyncratic Partner Investments on Performance

The fourth objective of the study was to assess the effects of idiosyncratic partner investments on the Performance of cosmetics manufacturing firms in Nairobi County. Generally, the respondents agreed that idiosyncratic partner investment contributes positively to the Performance of cosmetics manufacturing firms in Nairobi County. It is evident from the results that there is positive and significant correlation between Idiosyncratic Partner Investment and Performance ($r=.529$, $p < 0.01$). The study also rejected the null hypothesis and concluded that Idiosyncratic Partner Investment had a

significant effect on the Performance of cosmetics manufacturing firms in Nairobi County.

The findings implied that Idiosyncratic Partner Investment is a significant factor that can affect Performance of cosmetics manufacturing firms. From the findings, results reveal that there is a positive relationship between idiosyncratic partner investments and Performance ($R = 0.529$, $R^2 = 0.280$). An R^2 of 0.280 indicated that 28% of the variations in the Performance of cosmetics manufacturing firms can be accounted for by idiosyncratic partner investments.

5.2.5 Moderating Effect of Technological Engagement on Supply Chain Integral Relationship and Performance of Cosmetics Manufacturing firms in Nairobi County

The fifth objective of the study was to assess the moderating effect of technological engagement on supply chain integral relationship and performance of cosmetics manufacturing firms in Nairobi County. From the study findings, demonstrated that majority of the respondents strongly agreed that technological engagement strongly moderates the relationship between the predictor variables and performance. The results indicated that, there is a positive and statistically significant correlation between Technological Engagement and Performance ($r = .588$, $p < 0.01$). This implied that Technological engagement was linearly correlated with performance. It also implied that modern technology is very crucial when it comes to Performance in cosmetics manufacturing firms. Overall, correlation findings indicated that there existed highest relationship between technological engagement and Performance. It is thus a very significant factor in this study.

5.3 Conclusions of the study

The findings of the study indicated that antecedents of supply chain integral relationships are important drivers to increase alliance practices in an agile environment, thus high performance. The analysis revealed that placing emphasis on supply chain integral relationships can benefit organizations within the supply chain, whether they are the buyer or supplier. Although some organizations have realized the importance of implementing supply chain management practice, they often do not know exactly what to implement to develop long-term, mutually-beneficial relationships with suppliers or buyers in the supply chain.

This is due to lack of understanding of what constitutes a comprehensive set of supply chain integral relationships in agile supply chain. For many managers, it will be necessary to begin the process of developing the supply chain relationship by examining the resources and capabilities of their partners to match with theirs, according to a long-range plan of building a mutually-beneficial relationship.

5.3.1Effect of Collaborative Awareness on Performance

Based on the results of the study, it could be concluded that collaborative awareness had a positive and significant effect on Performance. However, it was found to have a low correlation, yet required attention. The findings leads the researcher to conclude that collaborative awareness is still not a fully utilized strategy for the respondent firms. The conceptual idea of collaboration does not yet seem to be commonplace. It could be concluded that if collaborative awareness initiatives are embraced by the management of cosmetics manufacturing firms, it could mutually benefit them by reducing costs and inventory, and the final customer receives quality goods and services.

5.3.2 Effect of Cross Functional Information Sharing on Performance

Based on the results of the study, it could be concluded that cross-functional information sharing had a positive and significant effect on Performance. From the findings, the researcher concluded that cross functional information sharing has been averagely adopted in the cosmetics manufacturing firms, though not fully implemented. Cross functional information sharing is very key in deciding the supply chain success. The success of a company's supply chain management depends upon the accuracy and the speed of the information shared among the supply chain partners. The researcher concludes that cross functional information sharing can enhance the Performance of cosmetics firms. It is important therefore, that cross functional teams are involved in making tactical and strategic decisions of the extended supply chain and mitigating uncertainty within and between organizations.

5.3.3 Effect of Decision Synchronization on Performance

From the findings, the researcher concludes that decision synchronization has a positive and significant relationship on Performance of cosmetics manufacturing firms. Therefore, if decision synchronization was implemented throughout the entire supply chain, it could result in enhanced Performance of a manufacturing entity. Decision synchronization among partners would result in efficient implementation of alliance practices, which anticipate improved Performance.

5.3.4 Effect of Idiosyncratic Partner Investments on Performance

From the findings of the study, the researcher also concluded that idiosyncratic partner investment was a predictor for performance. It is evident from the results that cosmetic manufacturing firms uses idiosyncratic partner investment as a tool for deepening and strengthening inter-firm relationships. Firms need to build idiosyncratic investments specifically for their relational exchanges. The findings of the study led the researcher to conclude that cosmetics manufacturing firms have not made major investments, in time

and effort to learn about the business practices of their suppliers, specifically for relational exchange. Cosmetics manufacturing firms should also make major investments in time and effort to develop supplier relationships.

5.3.5 Moderating Effect of Technological Engagement on Integral Relationship and Supply Chain Agility on Performance

Equally important, the findings revealed a high correlation in technological engagement metrics, which suggested that it strongly moderated the relationship between SC integral relationship and Performance of Cosmetics manufacturing firms in Nairobi County. The study found that technological engagement was a crucial factor to the success of a manufacturing function. Therefore, if technological engagement was implemented throughout the supply chain it could lead to efficient and effectiveness of operations, automation of operations thus enhanced performance. The researcher therefore concludes that managers need to understand the different supply chain technologies to adopt for high-technological industry, such as cosmetics manufacturing firms.

Overall, the results provide support for both the identified basic theories, and show that SC integral relationships can significantly enhance performance. Improvement in collaborative awareness, cross functional information sharing, decision synchronization and idiosyncratic partner investment and technological engagement improves performance. This is significant as it both provides direction for academics in terms of focus areas and assists practitioners in terms of resource allocation for relationship building and management for enhancing their capability to respond to marketplace uncertainties. These resources and capabilities are important factors for the establishment of SC integral relationship, due to the highly volatile market which requires strategic collaboration with partners in the supply chain. Established buyer and supplier relationships have been proven to increase alliance practices in the supply chain, which leads to improved performance.

5.4 Recommendations of the study

In today's volatile market environments, SC integral relationships is perceived to be a significant competitive weapon. To achieve a competitive advantage in a volatile business environment, the study recommends that firms should align with all the parties in the supply chain including the suppliers and customers. This will help to streamline operations and together achieve a level of performance beyond individual companies. The study therefore recommends that companies that are coping with more highly dynamic environments like cosmetics manufacturing firms need to be more agile and to enhance their SC integral relationships thus achieving their performance.

5.4.1 Effect of Collaborative Awareness on Performance

To successfully implement collaboration, this study recommends that cosmetics manufacturing firms need to build a sustainable or long lasting culture, joint problem solving, strategic and operational planning, and resource sharing, and that collaborative activities should be designed and executed in a way that should be well synchronized with other activities. The activities must be connected with the long-term goals of the partner firms. This is because without this key aspect of collaboration, there will likely always be a significant barrier to any relationship and thus performance.

5.4.2 Effect of Cross Functional Information Sharing on Performance

The researcher recommends that cosmetics manufacturing firms should keep each other informed about events or changes that may affect the other party and properly communicate any unforeseen challenges. Inter-firm communication should also be made frequent and adequate to all the supply chain parties.

5.4.3 Effect of Decision Synchronization on Performance

Based on the findings, the researcher recommends that cosmetics manufacturing firms should focus more on developing commitment to decision synchronization. This is particularly important in the decision making process and as a key element of supply chain coordination and therefore competitive advantage of the firm. It is also key in building and maintaining mutual partnerships of the supply chain firms hence achieving higher levels of performance.

5.4.4 Effect of Idiosyncratic Partner Investments on Performance

Based on the results, findings and conclusions, the researcher recommends that cosmetics manufacturing firms in Kenya need to build idiosyncratic investments specifically for their relational exchanges. The management of these firms have to make major investments, in time and effort to learn about the business practices of their suppliers, specifically for relational exchange. It is also recommended that buyers should stick to their major suppliers if they add value to them. Buying firms should also make major investments in time and effort to develop supplier relationships.

5.4.5 Moderating Effect of Technological Engagement on Supply Chain Integral Relationship and Performance

With the growing technological advances and the emergence of the global information infrastructure, firms should possess the suitable competitive inter-organisational informational systems to enable them to achieve the rapid and effective response to the customer needs and changing expectations. The study recommends that cosmetics manufacturing firms should focus more on supply chain technologies because these technologies enable supply chain members to make real-time decisions which could impact the cost structure and ultimately the competitive position of the firm.

5.5 Recommendation for Future Research

The current research endeavor focused on cosmetics manufacturing firms in a developing economy, being Kenya. The findings could be different with other country classification groups considering developed countries. This suggests a need for more cross-boundary research to identify whether cosmetics manufacturers consider the same SC integral relationship antecedents. Future research should also explore and compare SC integral relationships antecedents in other developed countries. The antecedents of SC integral relationships were identified for agile supply chains suitable for innovative products, such as in cosmetics manufacturing firms in Kenya. Therefore, the implications might show differences in contexts where the identified antecedents are tested on industries with the adoption of lean or le-agile supply chains. On the other hand, the respondents' companies represented a small sample size, which may affect the stability of the parameter estimates. This necessitates replication of the study in contrasting empirical contexts. Future studies should collect data from a larger population and compare with other countries to further validate or extend the theoretical constructs identified in this study.

Further, the research employed a cross-sectional snapshot of the phenomenon. The research was not able to draw causal inferences because of the undertaken cross-sectional nature of data. This gap can be remedied by examining the linkage between SC integral relationship factors and performance in a longitudinal setting in an agile environments. Longitudinal data are needed for studying causations.

REFERENCES

Agarwal, A., Shankar, R., & Tiwari, M. K. (2007). Modelling Agility of Supply Chain. *Industrial Marketing Management, 36*(4), 443-457.

Aguinis, H., & Gottfredson, R. K. (2010). Best-practice recommendations for estimating interaction effects using moderated multiple regression. *Journal of Organizational Behavior, 31*(6), 776-786.

Agarwal, A., Shankar, R., & Tiwari, M. K. (2007). Modelling Agility of Supply Chain. *Industrial Marketing Management, 36*(4), 443-457.

Aguinis, H., & Gottfredson, R. (2010). Best Practice Recommendations for estimating interraction effects using Moderated Multiple Regression. *Journal of Organizational Behaviour, 31*, 776-786.

Ajzen, I. (2005). *Attitudes, personality, and behaviour*. UK: McGraw-Hill Education.

Alame, & Noor. (2009). Macroeconomic determinants of Malaysian stock market. *African Journal of Business Management, 3*(3), 95-106.

Allred, C. R., Fawcett, S. E., Wallin, C., & Magnan, G. M. (2011). A Dynamic Collaboration Capability as a Source of Competitive Advantage. *Decision Sciences Journal, 42*(1), 129-160.

Amit , R., & Schoemaker, P. (1993). Strategic Assets and Organizational Rent. *Strategic Management Journal, 14*, 33-46.

Andersen, P. H., Christensen, P. R., & Damgaard, T. (2009). Diverging expectations in Buyer-Seller Relationships: Institutional contexts and relationship Norms. *Industrial marketing management, 38*(7), 814-824.

Anderson, E., & Weitz, B. (1992). The use of Pledges to build and sustaim committment in distribution channels. *Journal of Marketing research, 29*, 18-34.

Anderson, J. C., & Narus, J. A. (1990). A Model of Distributor Firm and Manufacturer Firm Working Partnerships. *Journal of Marketing, 54*(1), 42-58.

Angeles, R., & Nath, R. (2001). Partner Congruence in Electronic Data Interchange (EDI)- Enabled Relationships. *Journal of Business Logistics, 22*(2), 109-127.

Auramo, J., Kauremaa, J., & Tanskanen, K. (2005). Benefits of IT in supply chain management: An explorative study of progressive companies. *Internatioanl Journal of Physical Distribution and Logistics Management, 35*(2), 82-100.

Autry, C. W., Grawe, S. J., Daugherty, P. J., & Richey, R. G. (2010). The effects of technological turbulence and breadth on supply chain technology acceptance and adoption. *Journal of Operations Management, 28*(6), 522-536.

Awino, Z., & Gituro, W. (2011). An Emprirical Investigation of Supply Chain Management Best Practices ij Large Manufacturing Firms in Kenya. *Prime Journals. Business Administration and management, 1*(2), 26-31.

Bagchi, K., & Udo, G. (2007). Roles of Inter-firm Information Systems in Supply Chain Management. *International Journal of Physical Distribution and Logistics Management, 37*(4), 264-286.

Baramichai, M., Zimmers, E. W., & Marangos, C. A. (2007). Agile Supply Chain Transformation Matrix: An Integrated tool for Creating an Agile Enterprise Supply Chain Management. *An International Journal, 12*(5), 334-348.

Barnes, J., & Liao, Y. (2012). The effect of individual, network and collaborative competencies on the supply chain management system. *International Journal of Production Economics, 140*, 888-899.

Barney , J., & Hansen, M. H. (1994). Trustworthiness as a Source of Competitive Advantage. *Strategic management Journal, 15*, 175-190.

Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*, 99-120.

Barney, J. B. (1995). Looking Inside for Competitive Advanatage. *Academy of management Executive, 9*(4), 49-61.

Barney, J. B. (2000). Firm resources and sustained competitive advantage. *Advances in Strategic Management, 17*, 203-227.

Barney, U. (2004). E-Commerce adoption for supply Chain management in US apparel Manufacturers. *Journal of Textile and Apparel, technology and Management, 4*(1), 1-11.

Barrat, M. (2004). Understanding the meaning of Collaboration in the Supply Chain: Supply Chain Management. *An International Journal, 9*(1), 30-42.

Barrat, M., & Oke, A. (2007). Antecedents of supply chain visibility in retail supply chains: A resource-based theory perspective. *Journal of Operations Management, 25*(6), 1217-1233.

Bass, B. M., & Riggio, R. E. (2006). *Transformational Leadership.* Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.

Bensaou, M., & Anderson, E. (1999). Buyer-Supplier relations in industrial markets: When do buyers risk making idiosyncratic investments? *Organizational Science, 10*(4), 460-481.

Benton, W. C., & McHenry, L. F. (2010). *Construction Purchasing and Supply Chain Management.* New York: Mc Graw-Hill.

Berry, W. D., & Feldman, S. (1985). *Multiple Regression in Practice* (Vol. 7). Newbury Park: Sage.

Biehl, M., Cook, W., & Johnson, D. A. (2006). The efficiency of Joint decision making in buyer-supplier relationships. *Annuals of Operations Research, 145*(1), 15-34.

Blome, C., Schoenherr, T., & Eckstein , D. (2013). The impact of knowledge transfer and complexity on supply chain flexibility: A Knowledge-based view. *International Journal of production Economics, 27*(3), 307-316.

Booth, R. (1995). More agile than lean. In *Proceedings of the British Production and Inventory Control Society Conference* (Vol. 1, No. 1, pp. 191-207).

Bowersox, D. W., Closs, D. J., & Stank, T. P. (1999). *21st CenturyLogistics: Making Supply Chain Integration A Reality*. Oak Brook, IL United States: Council of Logistics Management.

Bowersoxq, D. J., Closs, D. J., & Stank, T. P. (2003). How to Master Cross-Enterprise Collaboration. *Supply Chain Management Review, 7*(4), 18-27.

Bowling, A. (2009). *Research Methods in health: Investigating Health and Health Services* (3rd ed.). Maidenhead: Open University Press.

Braunscheidel, M. J., & Suresh, N. C. (2009). The Organizational Antecedents of a Firm's Supply Chain Agility for Risk Mitigation and response. *Journal of Operations Management, 27*(2), 119-140.

Brindley, C. S., & Ritchie, R. L. (2004). Reducing risk in information serach activities. *Business Intelligence in the digital economy: Oppokrtunities, Limitations and risks*, 1-24.

Brouthers, K. D., Brouthers, L. E., & Wilkinson, T. J. (1995). Strategic Alliances: Choose Your Partners. *Long Range Planning, 28*(3), 18-25.

Brown, S. L., & Kathleen, M. E. (1995). A product Development : Past research, present findings and future directions. *Academy of Management review, 20*(2), 343-378.

Browne, J., Sackett, J., & Wortmann, J. (1995). Future Manufacturing Systems: Towards The Extended Enterprise. *Computers in Industry, 25*, 235-254.

Burgess, K., Singh, P. J., & Koroglu, R. (2006). Supply Chain Management: A Structured Literature Review and Implications For Future Research. *International Journal of Operations Business Logistics, 28*(1), 195-314.

Burns, N., & Grove, S. K. (2009). *The practice of nursing research: Appraisal, synthesis and generation of evidence* (8th ed.). St Louis,MO: Saunders Elsevier.

Buvik, A., & Reve, T. (2001). Asymmetrical deployment of specific assets and contractual safequarding in industrial purchasing relationships. *Journal of Business Research, 7*(2), 111-115.

Cagliano, R., Caniato, F., & Spina, G. (2004). Lean, Agile and Traditional Supply: How Do They Impact Manufacturing Performance? *Journal of Purchasing and Supply Management, 10*(4-5), 151-164.

Calantone, R., & Garcia, R. (2003). The Effects of Environmental Turbulence on New Product Development Strategy Planning. *Journal of Product Innovation Management, 20*(2), 90-103.

Cannon, S. P., & Perreault, W. D. (1999). Buyer-Supplier Relationships in Business Markets. *Journal of Marketing Research, 36*(4), 439-460.

Cao, M., & Zhang, Q. (2011). Supply Chain Collaboration: Impact on Collaborative Advantage and Firm Performance. *Journal of Operations Management, 29*(3), 163-180.

Carr, A. S., & Pearson, J. N. (1999). Strategically managed Buyer-Seller Relationships and Performance Outcomes. *Journal of Operations Management, 17*(5), 497-519.

Cavana, R., Delahaye, B. L., & Sekeran, U. (2001). *Applied Business Research: Qualitative and Quantitative Research.* Milton Queensland: John Wiley & Sons Australia.

Cavusgil, S. T., & Deligonul, S. (2012). Exogeneous Risk Analysis in Global Supplier Networks: Conceptualization and Field Research Findings. *Information, Knowledge, Systems Management, 11*(1), 131-149.

Chandler, A. D. (1962). *Strategy and structure: chapters in the history of American industrial enterprises*. USA: Massachusetts Institute of Technology.

Chatfield, A. T., & Yetton, P. (2008). Strategic Payoff from EDI as A Function of EDI Embeddedness. *Journal of Management Information Systems, 16*(4), 195-224.

Chatfield, D. C., Kim, J. G., Harrison, T. P., & Hayya, J. C. (2004). The bullwhip effect: Impact of stochastic lead time, information quality and information sharing: A stimulation study. *Production and Operations Management, 13*(4), 340-353.

ChatterJee, P. (2004). Inter-Firm Alliances in Online Retailing. *Journal of Business Research, 57*(7), 714-723.

Chen, H., Chen, J., & Chen, Y. F. (2006). A Coordination Mechanism For a Supply Chain with Demand Information Updating. *International Journal of Production Economics, 103*(1), 347-361.

Chen, I. J., & Paulraj, A. (2004). Towards A Theory of Supply Chain Management: The Constructs and Measurement. *Journal of Operations Management, 22*(2), 119-150.

Chiang, C. Y., Kocabasoglu-Hillmer, C., & Suresh, N. C. (2012). An Empirical Investigation of the Impact of Strategic Sourcing and Flexibility on Firms Supply Chain Agility. *International Journal of Operations Management, 32*, 49-78.

Choi, T. Y., & Harley, J. L. (2004). An Exploration of Supplier Selection Practices Across the Supply Chain. *Journal of Operations Management, 14*(4), 333-430.

Choi, T. Y., & Wu, Z. (2015). Taking the leap from dyads to triads: Buyer Supplier Relationships in Supply Networks. *Journal of Supply Chain Management, 45*(1), 8-25.

Choi, T. Y., Doodley, K. J., & Rungtusanatham, M. (2008). Supply networks and complex adaptive systems: Control versus emergence. *Journal of Operations Management, 19*(3), 351-366.

Chong, A. Y., Chan, F. T., Ooi, K. B., & Sim, J. J. (2011). Can malaysian firms improve organizational/ Innovation performance via Supply Chain Management. *Industrial Management and Data Systems, 111*(3), 410-431.

Chopra, S., & Van Mieghaam, J. A. (2000). Which E-Business is right for your supply chain? . *Supply Chain Management Review, 4*(3), 32-40.

Chopra, S., & Sodhi, M. (2014).Reducing the risk of supply chain disruptions. *MIT Sloan management review, 55*(3), 72-80.

Chow, I. H. (2008). How Trust Reduces Transaction Costs and Enhances Performance in chinas Businesses. *Advanced Management Journal, 73*(2), 25-34.

Chow, M. Y. K., Quine, S., & Li, M. (2010). The benefits of using a mixed methods approach–quantitative with qualitative–to identify client satisfaction and unmet needs in an HIV healthcare Centre. *AIDS care, 22*(4), 491-498.

Christopher , M. (2000). The Agile Supply Chain: Competing in Volatile Markets. *Industrial Marketing Management, 29*(1), 37-44.

Christopher , M., & Juttner, U. (2000). Supply chain relationships: Making Transition to Closer Integration. *International Journal of Logistics Research and Applications: A Leading Journal of supply chain Management, 3*(1), 5-23.

Christopher, M., & Towill, D. (2001). An Integrated Model For the Design of Agile Supply Chains. *International Journal of Physical Distribution & Logistics Management, 31*(4), 235-246.

Christopher, M., Lowson, R., & Peck, H. (2004). Creating Agile Supply Chains in the Fashion Industry. *International Journal of Retail and Distribution Management, 32*(8), 367-376.

Churchill, G. A. (1979). A Paradigm for Developing Better Measures of Marketing Constructs. *Journal of Marketing Research*, 64-73.

Clements, M., & Wilson, M. J. (2009). Alligning 3PL Service Bundles with Relational Integration: A Conceptula Model. *International Journal of Services Technology and Management, 12*(1), 88-105.

Clements, M., Dean, D., & Cohen, D. (2007). Proposing an Operational Classification Scheme For Embryonic Cooperative Relationships. *Journal of Management and Organization, 13*(1), 51-64.

Cochran, W. G. (1963). *Sampling Techniques.* New York: John Wiley & Sons Inc.

Cohen, J. (1968). Multiple Regression as a general data-analytic system. *Psychological Bulletin, 70*(6), 426-443.

Cohen, J. W. (1988). *Statistical Power Analysis For The Behavioural Sciences* (2nd ed.). Hillsdale: Lawrence Erlbaum Associates.

Cohen, L., Manion, L., & Morrison, K. (2000). *Research Methods in Education* (5th ed.). London: Routledge Farmer.

Collins, K. M., Onwuegbuzie, A. J., & Jiao, Q. G. (2007). A Mixed methods Investigation of Mixed methods sampling designs in social and health science research. *Journal of Mixed Methods Research, 1*(3), 267-294.

Cooper, D. R., & Schindler, P. S. (2006). *Marketing Research.* Boston: McGraw-Hill.

Cooper, D., & Schindler, P. (2008). *Business research Methods* (10th ed.). New York: Mc Graw Hill/ Irwin.

Corbett, C. J., Blackburn, J. D., & Van Wassenhove, L. N. (1999). Partnerships to improve supply chains. *Sloan Management Review, 40*(4), 71-82.

Cousins, P. D. (2002). A Conceptual Model For Managing Long Term Inter-Organizational Relationships. *European Journal of Purchasing & Supply Management, 8*(2), 71-82.

Creswell, J. W. (2013). *Research design: Qualitative, Quantitative and Mixed Method Approaches* (2nd ed.). Thousands Oaks, CA: Sage.

Creswell, J. W., & Clark, V. L. (2010). *Designing and conducting mixed nethods research.* Thousands Oak, CA: Sage Publications.

Damanpour, F. (1991). Organizational Innovation: A Meta-Analysis of Effect of Determination and Moderators. *Academy of Management Journal, 34*(3), 555-590.

Daniel, J. F. (2012). The Supply Chain Management of shopper marketing as viewed through a service eco-system lens. *International Journal of Physical Distribution and logistics Management, 44*(1/2), 23-38.

Darlington, R. (1968). Multiple Regression in Psychological Research and Practice. *Psychological Bulletin, 69*(3), 161-182.

Das Narayandas, V., & Kasturi, R. (2004). Building and Sustaining Buyer-Seller Relationships in Mature Industrial Markets. *Journal of Markets, 63*(3), 63-77.

Davis, T. (1993). Effective Supply Chain Management. *Sloan Management Review, 34*(2), 35-46.

Dawn, M. R., & Anne, M. H. (2004). People and Information technology in the Supply Chain: Social and organizational Influence on Adoption. *International Journal of Physical Distribution & Logistics Management, 34*(2), 102-122.

Dawson, & Catherine. (2002). *Practical Research Methods.* New Delhi: USB Publishers Distributors.

Dawson, C. (2009). *Introduction to Research Methods: A Practical Guide for anyone undertaking a Research Project.* London: Newtec.

Defee, C. C., & Stank, T. P. (2005). Applying the Strategy-Structure-Performance Paradigm to the Supply Chain Environment. *The International Journal of Logistics Management, 16*, 28-50.

Degroote, S. E., & Marx, T. G. (2013). The Impact of IT on Supply Chain Agility and Firm Performance: An Empirical Investigation. *International Journal of Information management, 33*(6), 909-916.

Donaldson, L. (2001). *The contingency theory of organizations*. London: Sage.

Doney, P. M., & Cannon, J. P. (1997). An Examination of the Nature of Trust in Buyer-Seller Relationships. *Journal of Marketing, 61*(4), 35-51.

Dyer, & Singh. (1996). The Relational View: Cooperative strategy and sources of interorganizational competitive advantage. *Academy of Management Review, 22*, 660-679.

Dyer, J. H., & Chu, W. (2003). The Role of Trustworthiness in reducing Transaction Costs and Improving Performance: Empirical Evidence from the United States, Japan and Korea. *Organizational Science, 14*(1), 57-68.

Dyer, J. H., & Singh, H. (1998). The Relational View: Cooperative Strategy and Sources of International Competitive Advantage. *Academy of Management review, 23*(4), 660-679.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities: What Are They? *Strategic Management Journal, 21*, 1105-1121.

Eisenhardt, K. M., & Schoonhoven, C. B. (1996). Resource-Based View of Strategic Alliance Formation: Strategic and Social Effects in Enterpreneurial Firms. *Organizational Science, 7*(2), 136-150.

Eisingerich, A. B., & Bell, S. J. (2007). Maintaining Customer Relationships in High Credence Services. *European Journal of Marketing, 21*(4), 253-262.

Eliashberg, J., & Mitchie, D. A. (1984). Interorganizational Competitive Advantage. *Academy of Management Review, 23*(4), 660-679.

Elmore, P. E., & Beggs, D. L. (1975). Salient of Concepts and Committment to Extreme Judgements in response. *Pattern of Teachers Education, 95*(4), 325-334.

Emory, C. W., & Cooper, D. R. (1995). *Business research methods* (5th ed.). Chicago: Irwin.

Farooq, S., & O'Brien, C. (2010). Risk Calculations in the Manufacturing Technology Selection Process. *Journal of Manufacturing Technology Management, 21*(1), 28-49.

Fawcett, S. E., & Magnan, G. (2002). The Rhetoric and reality of Supply Chain Integration. *International Journal of Physical Distribution & Logistics Management, 32*(5), 339-361.

Fawcett, S. E., Smith, S. R., & Cooper, M. B. (1997). Strategic Intent, Measurement Capability and Operational Success: Making the Connection. *International Journal of Physical Distribution & Logistics Management, 27*(7), 410-421.

Fawcett, S., Magnan, G., & McCarter, M. (2008). A Three-Stage Implementation Model For Supply Chain Collaboration. *Journal of Business Logistics, 29*(1), 93 - 121.

Fayezi, S., O'Loughlin, A., & Zutshi, A. (2012). Agency Theory and Supply Chain Management: A Structured Literature Review. *Supply Chain Management: An International Journal, 17*(5), 556-570.

Fayezi, S., Zutshi, A., & O'Loughlin, A. (2014). Developing an analytical framework to assess the uncertainty and flexibility mismatches across the supply chain. *Business process Management Journal, 20*(3), 362-391.

Fayezi, S., Zutshi, A., & O'Loughlin, A. (2017). Understanding and development of supply chain agility and flexibility: a structured literature review. *International Journal of Management Reviews, 19*(4), 379-407.

Fiala, P. (2007). Information sharing in supply chains. *Omega, 33*, 419-423.

Fisher, M. L. (1997). What is the Right Supply Chain For Your Product? *Harvard Business Review, 75*(2), 105.

Fisher, M. L., Raman, A., & McClelland, A. S. (1994). Rocket Science Retailing is almost here: Are You Ready? *Harvard Business Review, 72*(3), 83-93.

Fliedner, D., & Vokurka, R. J. (1997). Agility: Competitive Weapon of the 1990s and Beyong. *Production and Inventory Management, 38*(3), 9-24.

Flint, D. J. (2004). Strategic Marketing in Global Supply Chains: Four Challenges. *Industrial Marketing Management, 33*(1), 45-50.

Flynn, B. B., Huo, B., & Zhao, X. (2010). The Impact of Supply Chain Integration on Performance: A Contingency and Configuration Approach. *Journal of Operations Management, 28*(1), 58-71.

Forger, G. R. (2002). The problem with collaboration. *Supply Chain Management Review, 6*(2), 56-57.

Franca, R., Jones, E., Richards, C., & Carlson, J. (2010). Multi-Objective Stochastic Supply Chain Modelling to Evaluate Tradeoffs between Profit and Quality. *International Journal of Production Economics*, 147-170.

Galbraith, J. R., & Nathason, D. A. (1978). *Strategy Implementation: The role of structure and Process.* St. Paul, MN: West Publishing Company.

Gallagher, D., Ting, L., & Palmer, A. (2008). A journey into the unknown; taking the fear out of structural equation modeling with AMOS for the first-time user. *The Marketing Review, 8*(3), 255-275.

Ganesan, S. (1994). Determinants of long-term orientation in buyer-seller relationships. *Journal of marketing, 58*(2), 1-19.

Ganeshan, R. (1999). Managing Supply Chain Inventories: A Multiple Retailer, One Warehouse, Multiple Supplier Model. *International Journal of Production Economics, 59*(1-3), 341-354.

Gavirneni, S. (2006). Price fluctuations, information sharing and supply chain performance. *European Journal of Operations Research, 174*(3), 1651-1663.

Gligor, D. M., & Holcomb, M. C. (2012). Antecedents and Consequences of Supply Chain Agility: Establishing the link to firm performance. *Journal of Business Logistics, 33*(4), 295-308.

Gligor, D. M., & Holcomb, M. C. (2012). Understanding The Role of Logistics Capabilities in Achieving Supply Chain Agility: A Systematic Literature Review. *Supply Chain Management: An International Journal, 17*(4), 438-553.

Gligor, D. M., & Holcomb, M. C. (2014). The Road to Supply Chain Agility: An RBV Perspective on the Role of Logistics Capabilities. *The International Journal of Logistics Management, 25*(1), 160-179.

Gligor, D. M., Holcomb, M. C., & Stank, T. P. (2013). A Multidisciplinary Approach to Supply Chain Agility: A Conceptualization and Scale Development. *Journal of Business Logistics, 34*(2), 94-109.

Goldman, S., Nagel, R., & Preiss, K. (1995). *Agile competitors and virtual organizations-Strategies for enriching the customer.* Reinhold: Von Nostrand.

Gordon, O. O. (2005). *Supply Chain management Practices used in the Cosmetics Industry in kenya.* Nairobi: University of Nairobi.

Greene, K. W., Whitten, D., & Inman, R. A. (2007). The Impact of timely information on organizational performance in a supply chain. *Production Planning and Control, 18*(4), 274-282.

Greene, W. H. (2003). *Economic Analysis* (5th ed.). New Jersey: Prentice Hall.

Guan, J. C., & Ma, N. (2009). Structural Equation Model with PLS Path Modelling for an integrated system of publicly funded basic research. *Scientometrics, 81*, 683-698.

Guan, J., & Ma, N. (2003). Innovative Capability and Export Performance of Chinese Firms. *Technovation, 23*(9), 737-747.

Gujarat, D. N. (2004). *Basic Econometrics.* New York: Mc GrawHill Book Co.

Gunasekaran, A. (1998). Agile Manufacturing: Enablers and an Implementation Framework. *International Journal of Production research, 26*(5), 1223-1247.

Gunasekaran, A. (1999). Agile Manufacturing: A Framework For Research and Development. *International Journal of Production Economics, 62*(1/2), 87-105.

Gunasekaran, A., & Ngai, E. W. (2004). Information Systems in Supply Chain Integratio and Management. *European Journal of Operations research, 159*, 269-295.

Gunasekaran, A., & Yusuf, Y. (2002). Agile Manufacturing: A Taxonomy of Strategic and Technological Imperatives. *International Journal of Production Research, 40*(6), 1357-1385.

Hair, J. F. (2005). Anderson, RE/Tatham, RL/Black, WC (1998): *Multivariate data analysis.* Upper Saddle River, NJ: Prentice Hall.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th Ed.). New Jersey: Prentice Hall.

Handfield, R. B., & Nichols, E. L. (2007). *Introduction to Supply Chain Management.* London: Prentice Hall.

Harindranath, G., Dyerson, R., & Barnes, D. (2008). ICT adoption and use in UK SMEs: A failure of initiatives. *The electoral Journal of Information Systems Evaluation, 11*(2), 91-96.

Harland, C. (1996). Supply network Strategis. *European Journal of Purchasing and Supply Management, 2,* 183-192.

Harland, C. M., & Knight, L. A. (2005). Managing Supply Networks: Organizational Roles in Network Management. *European Management Journal, 23*(3), 281-292.

Harland, C. M., Lamming, R. C., Zheng, J., & Johnsen, T. E. (2004). A Taxonomy of Supply Networks. *Journal of Supply Chain Management, 37*(4), 21-27.

Harland, C. M., Zheng, J., Johnsen, T., & Lamming, R. (2004). A Conceptual Model for Researching the Creation and Operation of Supply Networks. *British Journal of Management, 15*(1), 1-21.

Harland, C., Zheng, J., Johnson, T., & Lamming, R. (2004). A Conceptual Model for reseraching the creation and operation of supply networks. *British Journal of Management, 15*(1), 67-85.

Harrison , J. S., Hitt, M. A., Hoskisson, R. E., & Ireland, R. D. (2001). Resource Complementarity in Business Combinations: Extending the Logic to Organizational Alliances. *Journal of Management, 27*(6), 679-690.

Harrison, A., Christopher, M., & VanHoek, R. (1999). *Creating the agile suplly chain.* Cranfield University: School of Management.

Hasan, T., Muhaddes, T., Selim, N., & Rashid, S. F. (2014). Prevalence and experiences of intimate partner violence against women with disabilities in Bangladesh: Results of an explanatory sequential mixed-method study. *Journal of Interpersonal violence, 29*(17), 3105-3126.

Hatzicgronoglou, T. (1997). Revision of the high-technology sector and product classification. *STI Working paper, 97*(216), 4-14.

Hearnshaw, E. J., & Wilson, M. M. (2013).A complex network approach to supply chain network theory. .*International Journal of Operations & Production Management*, *33*(4), 442-469.

Heim, G. R., & Peng, D. X. (2010). The impact of information technology use on plant structure, practices and performance: An exploratory study. *Journal of operations management, 28*, 144-162.

Helfat, C. E., & Peteraf, M. A. (2007). The Dynamic Resource- Based View: Capability Lifecycles Dynamic Capabilities. *Strategic Management Journal*, *24*(10), 997-1010.

Helo Petri, S. (2005). Logistics Information Systems: An Analysis of software solutions for supply chainco-ordination. *Industrial Management and Data Systems, 105*(1), 5-18.

Hervani, A. A., Helms, M. M., & Sarkis, J. (2005). Performance Measurement For Green Supply Chain Management. *Benchmarking: An International Journal, 12*(4), 330-353.

Heugens, P. P., Van Essen, M., & Van Oosterhout, J. (2008). Meta-Analyzing ownership concentration and firm performance in Asia: Towards a more fine-grained understanding. *Organization Studies, 27*(3), 391-411.

Hilda, M. (2012). *Supply Chain Management Practices and organizational Performance of Large Manufacturing Firms in Nairobi, kenya.* Nairobi: University of Nairobi.

Hilton, P. D., & Gill, G. K. (1994). Achieving Agility: Lessons from the leaders. *Manufacturing Review, 7*(2), 172-179.

Hodgkinson, G. P., & Healey, M. P. (2011). Psychological Foundations of Dynamic Capabilities: Reflection in strategic management. *Strategic Management Journal, 32*, 1500-1516.

Holmberg, S. A. (2000). Systems perspective on suply chain measurements. *International Journal of Physical Distribution and Logistics Management, 30*(10), 847-868.

Holweg, M., Disney, S., Holmstrom, J., & Smarosh, J. (2005). Supply Chain Collaboration: Making Sense of the Strategy Continuum. *European Management Journal, 23*(2), 170-181.

Hoskisson, R. E., & Busenitz, L. W. (2001). *Market Uncertainty and Learning Distance in Corporate Entrepreneurship.* Press oxford U.K: Blackwell Publishers.

Hoskisson, R. E., Johnson, R. A., & Moesel, D. D. (1999). Corporate divestiture intensity in restructuring firms: Effects of governance, Sttrategy and Performance. *Academy of Management Journal, 37*, 1207-1251.

Hoxx, J. J. (1995). *Applied Multilevel Analysis.* Amsterdam: TT Publication.

Hoyt, W., Leierer, S., & Millington, M. (2006). Analysis and Interpretation of Findings Using Multiple Regression Techniques. *Rehabilitation Councelling Bulletin, 49*(4), 223-233.

Hsu, C., Kannan, V., Tan, K., & Leong, K. (2008). Information Sharing, Buyer-Supplier Relationships and Firms Purchasing Performance. *International Journal of Physical Distribution and Logistics, 38*(4), 296-310.

Hult , G. T., & Ketchen, D. J. (2001). Does Market Orientation Matter?: A Test of the Relationship between Positional Advanatge and Performance. *Strategic Management Journal, 22*(9), 899-906.

Hult, G. T., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its Antecedents and Impact on Business Performance. *Industrial Marketing Management, 33*(5), 429-438.

Hult, G. T., Hurley, R. F., & Nicholas, E. L. (2000). Organizational Learning in Global Supply Management: A model and tests of internal users and corporate buyers. *Decision Sciences, 31*(2), 293-325.

Ismael , H. S., & Sharifi, H. (2006). A Balanced Approach to building a Supply Chain. *International Journal of Physical Distribution and Logistics Management, 36*(6), 431-444.

Israel, & Glen, D. (1992). *Determining Sample Size.* Florida: University of Florida.

Jaccard, J., Guillamo-Ramos, V., Johansson, M., & Bouris, A. (2006). Multiple Regression Analysis in Clinical Child and Adolescent Psychology. *Journal of Clinical Child and Adolescent Psychology, 35*(3), 456-479.

Jap, S. D., & Anderson, E. (2003). Safequarding inter-organizational Performance and Continuity under Ex Post Opportunism. *Management Science, 49*, 1684-1701.

Jennifer, C. G., Valerie, J. C., & Wendy, F. G. (1989). A Conceptual Framework for Mixed-Method Evaluation Designs. *Educational Evaluation and Policy Analysis, 11*(3), 255-274.

Johnson, B. R., & Onwuegbuzie, A. J. (2003). Mixed methods research: A research paradigm whose time has come. *Educational research, 33*(7), 14-26.

Joshi, A. W., & Stump, R. L. (1996). Supplier opportunism: Antecedents and consequences in buyer-supplier relationships. *American Marketing Association Summer Educators' Conference Proceedings*, 129-135.

Kaefer, F., & Bendoly, E. (2004). Measuring the Impact of Organizational Constraints on the Success of Business-To-Business E-Commerce Efforts. *Information and Management, 41*(5), 529-541.

Kalpan, R. S., & Norton, D. P. (2001). The Balanced Scorecard measures that drive Performance. *Harvard Business Review, 70*, 71-90.

Kandemir, D., & Yaprak, A. (2006). Alliance Orientatiion: Conceptualization, Measurement and Impact on Market Performance. *Academy of marketing Science Journal, 34*(3), 324-340.

Karanja, J. (2011). Improving water provision in Nairobi through control of non-revenue water: Global Water Summit 2011. *Global Water Intelligence, 7*, 212-213.

keith, T. (2006). *Multiple Regression and Beyond.* Ally and Bacon: Pearson.

Ketchen, J., & Hult, G. T. (2007). Bridging Organization theory and supply Chain management: The case of best value supply chains. *Journal of Operations Management, 25*(2), 573-580.

Kidd, J., Ritcher, F. J., & Li, X. (2003). Learning and trust in Supply Chain Management. *Management Decision, 41*(7), 603-612.

Kim, B., & Oh, H. (2005). The Impact of Decision making Sharing between Supplier and Manufacturer on their Collaboration Performance, Supply Chain Management. *An International Journal, 10*(3-4), 223-236.

Kim, S. W. (2009). An Investigation on the Direct and Indirect Effects of Supply Chain Integration on Firm Performance. *International Journal of Production Economics, 119*(2), 328-346.

Kim, W. G., & CUA, Y. (2002). Antecedents and consequences of relationship quality in Hotel Industry. *International Journal of Hospitality Management, 27*(4), 321-338.

Kingshott, R. P. (2006). The impact of psychological contracts upon trust and committment within buyer-supplier relationships: A social exchange view. *Industrial Marketing Management, 26*, 1084-1107.

Kisperska-Moron, D., & De Haan, J. (2011). Improving Supply Chain Performance to Satisfy Final Customers: Leagile Experiences of a Polish Distributor. *International Journal of Production Economics, 133*(1), 127-134.

Kisperska-Moron, D., & Swierczek, A. (2009). The Agile Capabilities of polish Companies in the supply chain: An Empirical study. *International Journal of Production Economics, 18*, 217-227.

Klein, R., & Rai, A. (2009). Interfirm Strategic Information Flows in Logistics Supply Chain Relationships. *MIS Quarterly, 33*, 735-762.

Kobulsak, M. (1998). Talent Hunt gets hotter. *Information Week, 7*(15), 74-76.

Kombo, D. K., & Tromp, D. L. (2009). *Proposal and Thesis Writing: An Introduction.* Nairobi: Paulines Publication Africa.

Koo, C., & Song, J. (2007). Do E-Business Strategies Matter? The Antecedents and Relationshis with Firm Performance. *Information Systems Frontiers, 9*(3), 283-296.

Kothari, C. R. (2004). *Methods and Techniques* (2nd ed.). New Delhi: New Age International Publishers.

Kumar, R. (2005). *A Step-by-Step Guide For beginners.* London: Sage.

Lambert, D. M., Cooper, M. C., & Pagh, J. D. (2000). Supply Chain Management. *International Journal of Logistics Management: Implementation Issues and research opportunities, 9*(2), 1-19.

Lee, C. H., & Rhee, B. D. (2007). Channel Coordination using Product Returns for a Supply Chain Chain with Stochastic Salvage Capacity. *European Journal of Operations Research, 177*(1), 214-238.

Lee, H. C. (2007). Coordination on Stocking and Progressive pricing Policies for a Supply Chain. *International Journal of Production and Economics, 106*(1), 307-319.

Lee, H. L. (2004). The Tripple Supply Chain. *Harvard Business Review, 82*(10), 102-112.

Lee, H. L., & Billington, C. (1992). Managing Supply Chain Inventory: Pitfalls and Opportunities. *Sloan Management Review, 33*(3), 65-73.

Lee, H. L., Padmanabhan, V., & Whang, S. (1997). Information Distortion in a Supply Chain: The Bullwhip Effect. *Management Science, 43*(4), 546-558.

Lee, H. S., & Whang. (2000). Information sharing in a supply chain. *International Journal of Manufacturing Technology and Management, 1*, 79-93.

Leedy, P. D. (1993). *Practical Research: Planning and Design* (Vol. 5th). New York: Macmillan Publishing Company.

Lejeune, M. A., & Yakova, N. (2005). On Characterizing the 4 Cs in Supply Chain Management. *Journal of Operations Management, 23*(1), 81-100.

Lewis, I., & Talalayersky, A. (2004). Improving the inter-organizational supply chain through optimization. *Journal of Enterprise Information Management, 17*(3), 229-237.

Li, G., Yang, H., Sun, L., & Sohal, A. S. (2009). The Impact of IT Implementation on Supply Chain Integration. *International Journal of Production Economics, 120*(1), 125-138.

Li, S., & Lin, B. (2006). Accessing Information Sharing and Information Quality in Supply Chain Management. *Decision Support Systems, 42*(3), 1641-1656.

Li, X., Chung, C., Goldsby, T. J., & Hollsopple, C. W. (2008). A Unified Modelof Supply Chain Agility: The Work-Design Perspective. *International Journal of Logistics Management, 19*(3), 408-435.

Li, X., Goldsby, T. J., & Hollsopple, C. W. (2009). Supply Chain Agility: Scale Development. *International Journal of Logistics Management, 20*(2), 408-424.

Liao, C., & Chuang, S. H. (2012). How Knowledge Management mediates the relationship between environment and organizational structure. *Journal of Business research, 64*, 728-736.

Lin, C. T., Chiu, H., & Chu, P. Y. (2006). Agility Index in the Supply Chain. *International Journal of Production Economics, 100*(2), 285-299.

Lohr, S. L. (2009). *Sampling: Design and Analysis.* USA: Nelson Education.

Lysons, K., & Gillingham, M. (2003). *Purchasing and Supply Chain Management* (6th ed.). Amsterdam: Prentice Hall.

Madhok, A. (2006). How Much Does Ownership Really Matter? Equity and Trust Relations in Joint Venture Relationships. *Journal of International Business Studies, 37*(1), 411.

Mahapatra, S. S. (2011). Supplier Selection in Supply Chain Management: A Fuzzy Multi-Criteria Decision-Making approach. *International Journal of Services and Operations management, 8*(1), 108-126.

Malhotra, N. K. (2004). *Marketing Research: An Applied Orientation* (4th ed.). Upper Saddle River, New Jersey: Prentice Hall.

Manthou , V., Vlachopoulou, M., & Folinas, D. (2004). Virtual e-Chain (VeC) model for Supply Chain Collaboration. *International Journal of Production Economics, 87*(3), 241-250.

Manuj, L., & Mentzer, J. T. (2008). Global Supply Chain Risk management strategies. *International Journal of Physical Distribution & Logistics Management, 38*(3), 192-223.

Mason, C., & Perreault Jr., W. (1991). Collinearity, Power and Interpretation of Multiple Regression Analysis. *Journal of Marketing Research, 28*(3), 268-280.

Mason-Jones, R., & Towill, D. R. (1999). Total Cycle Time Compression and the Agile Supply Chain. *International Journal of Production Economics, 62*(1/2), 61-73.

Matsuno, K., & Bharadwaj, N. (2006). Investigating the antecedents and outcomes of customer firm transactions cost: savings in a supply chain relationship. *Journal in Business research, 59*(1), 62-72.

Maverenge, N. B. (2013). Role of Information Systems for Strategic Agility in Supply Chain Setting: Telecommunication Industry. *Electronic Journal Information Systems Evaluation, 17*(1), 327-340.

Mentzer, J. T., De Witt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining Supply Chain Management. *Journal of Business Logistics, 17*(1), 1-25.

Mentzer, J. T., Min, S., & Zacharia, Z. G. (2004). The nature of inter-firm partnering in supply chain management. *Journal of Retailing, 76*(4), 549-568.

Mesquita, L. F., Anand, J., & Brush, T. H. (2008). Comparing the resource-based and relational views: Knowledge transfer and spillover in vertical alliances. *Strategic Management Journal, 41*, 913-941.

Miles, R. E., Snow, C. C., & Meyer, A. D. (1978). Organizational Strategy, Structure and Process. *Academy of Management Review, 3*(1), 546-562.

Min, S., Roath, A. S., Daugherty, P. J., Genchev, S. E., Chen, H., Arndt, A. D., & Richey, R. G. (2005). Supply Chain Collaboration: Whats Happening? *The International Journal of Logistics Management*, *16*(2), 237-256.

Mintzberg, H. (1981). What is planning anyway? *Strategic Management Journal*, *2*(3), 319-324.

Moberg, C. R., & Speh, T. W. (2003). Evaluating the relationship between questionable business practices and the strength of supply chain relationships. *Journal of Business Logistics, 24*(2), 1-19.

Modi, S. B., & Mabert, V. A. (2007). Supplier development: Improving supplier performance through knowledge transfer. *Journal of Operations Management, 25*(8), 42-64.

Monczka, R. M., Petersen, K. J., Handfield, R. B., & Ragatz, G. L. (1998). Success Factors in Strategic Supplier Alliances: The Buying Company Perspective. *decision Sciences, 29*(3), 553-577.

Monczka, R., Trent, R., & Handfield, R. (2002). *Purchasing and Supply Chain management* (2nd Ed.). South Western: Cicinnati.

Moorman, C., Zaltman, G., & Deshpande, R. (1992). Relationships between providerss and users of market research: The Dynamics of trust within and between organizations. *Journal of Marketing research, 29*(3), 314-329.

Morgan, R. M., & Hunt, S. (1999). Relationship-Based Competitive Advantage: The Role of Relationship Marketing in Marketing Strategy. *Journal of Business Research, 46*(3), 281-290.

Morgan, R. M., & Hunt, S. D. (1994). The Committment-Trust Theory of Relationship Marketing. *Journal of Marketing, 58*, 20-38.

Morone, Carol, L., James, H., Foggin, & John, T. M. (2004). A Supply Chain Diagnostic Tool. *International Journal of Physical Distribution and Logistics Management, 34*(10), 827-855.

Morris, M., & Carter, C. R. (2005). relationship Marketing and Supplier Logistics Performance: An extension of the key mediating variables model. *Journal of Supply bChain Management, 41*(4), 32-43.

Mugenda, O. M., & Mugenda, A. G. (2008). *Research Methods: Quantitative and Qualitative Approaches.* Nairobi: Acts Press.

Mukhtar, M., Mohamed, S. A., & NabiBaksh, M. S. (2002). Supply Chain Relationship Structures as scenarios for simulation. *European Simulation Symposium*, 276-280.

Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital and The Organizational Advanatage. *The Academy of Management Review, 23*(2), 242-266.

Narasimhan, J., & Jayaram, J. (1998). Causal Linkages in supply chain management: An exploratory study of North American manufacturing firms. *Decision Sciences, 29*, 579-605.

Narasimhan, R., & Das, A. (1999). Manufacturing Agility and Supply Chain Management Practices. *production and Inventory Management Journal, 40*(1), 10-15.

Narasimhan, R., & Jayaram, J. (1998). Causal Linkages in supply Chain Management: An Exploratory study of North American Manufacturing Firms. *Decision Sciences, 29*(3), 579-605.

Nazir, S., & Pinsonneault, A. (2012). IT and Firm Agilty: An Electronic Integration Perspective. *Journal of the Association For Information Sysytems, 13*(3), 150-171.

Neale, M., Eaves, L., Kendler, K., Heath , A., & Kessler, R. (1994). Multiple Regression with data collected from relatives. Testing Assumptions of the Model. *Multivariate Behavioural Research, 29*(1), 33-61.

Nelson, R. R., & Winter, S. G. (1975). Growth theory from an evolutionary perspective-Differential roductivity Puzzle. *American Economic Review, 65*(2), 338-344.

Neuman, W. L. (2011). *Social Research Methods: Qualitative and Quantitative Approaches* (7th ed.). Boston: Allyn & Bacon.

Newbert, S. L. (2008). Value, rareness, competitive advantage and performance: A Conceptual -level empirical investigation of the resource-based view of the firm. *Strategic Management Journal, 29*(7), 745-768.

Ngai, E. W., Chau, D. C., & Chan, T. A. (2011). Information Technology, Operational and Management Competences For Supply Chain Agility: Findings from Case Studies. *Journal of Strategic Information Systems, 20*(3), 232-249.

Nor, K., & Zulkifli, M. U. (2009). Supply Chain Technology adoption in Malaysian Automotive Suppliers. *Journal of Manufacturing Technology management, 20*(3), 385-403.

Norman, A. (2008). Supply Chain Risk-Sharing Constructs from a Buyers Perpective: Content and Exprerience. *International Journal of Procurement Management, 1*(4), 371-393.

Nunnaly, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: Mc Graw-Hill.

Oliver, C. (1990). Determinants of interorganizational relationships: Integration and future directions. *Academy of management review, 15*(2), 241-265.

Omar, R., Ramayah, T., LO, M. C., Sang, T. Y., & Siron. (2015). Informatiom sharing quality and usage of IT tools in Malaysian organizations. *African Journal of Business Management, 4*(12), 2486-2499.

Orodho, A. J., & Kombo, D. K. (2008). *Research Methods.* Nairobi: Kenyatta University.

Osborne, & Waters. (2002). Four Assumptions of Multiple Regression that Researchers should always test. *Practical Assessment Research and Evaluation, 8*(2), 371-393.

Overby, E., Bharadwaj, A., & Sambamurthy, V. (2006). Enterprise Agility and the Enabling Role of Information Technology. *European Journal of InformationSystems, 15*(21), 120-131.

Pala, M., Edum-Otwe, F., Ruikar, K., Doughty, N., & Peters, C. (2014). Contractor practices for managing extended supply chain tiers: Supply Chain management. *An International Journal, 19*, 31-45.

Pallant, J. (2010). *SPSS Survival Manual: A step by step guide to data analysis using SPSS* (4th ed.). New York: Open University Press.

Palmatier, R. W., Dant, R. P., & Grewal, D. (2007). A Comparative Longitudinal Analysis of Theoretical Perspectives of Inter-Organizational Relationship Performance. *Journal of marketing, 71*(4), 171-194.

Patnayakuni, R., Rai, A., & Seth, N. (2006). Relational Antecedents of information flow integration for supply chain coordination. *Journal of Management Information Systems, 23*(1), 13-49.

Patterson, P. G., & Smith, T. (2003). A Cross-Cultural Study of Switching Barriers and Propensity to stay with Service Providers. *Journal of Retailing, 79*, 107-120.

Paulraj, A., Chen, I. J., & Lado, A. A. (2012). An Empirical Taxonomy of Supply Chain Management Practices. *Journal of Business Logistics, 33*(3), 227-244.

Paulraj, A., Lado, A. A., & Chen, I. J. (2008). Inter-Organizational Communication as a Relational Competency: Antecedents and Performance Outcomes in Collaborative Buyer-Supplier Relationships. *Journal of Operations Management, 26*(1), 45-64.

Penrose, E. (1959). *The Theory and growth of a Firm* (3rd ed.). New York: University Press.

Petersen, K. J., Handfield, R. B., & Ragatz, G. L. (2005). Supplier Integration into New Product Development: Coordinating Product, Process and Supply Chain Design. *Journal of Operations Management, 23*(3/4), 371-388.

Petri Helo, & BulcsuSzekely. (2005). Logistics Information Systems: An Analysis of Software Solutions For Supply Chain Co-ordination. *Industrial Management & Data Systems, 105*(1), 5-18.

Philip , K., & Keller, K. (2011). *marketing Management* (14th ed.). Upper Saddle River NJ: Prentice Hall.

Polit, D., & Beck, C. (2003). *Research principles and Methods* (7th ed.). Lippincott: Williams & Wilkins.

Poole, M., & O'Farrell, P. (1971). The Assumptions of the Linear Regression Model. *Transactions of the Institute of British Geographers, 52*, 145-158.

Power , J. D., Fair, D. A., Schlaggar, B. L., & Petersen, S. E. (2010). ***The Development of human functional brain networks*** **(Vol. 67).**

Power, D. (2005). Supply Chain Management Integration and Implementation: A Literature Review. *Supply Chain Management International Journal, 10*(4), 252-263.

Power, D. S. (2004). Adoption and diffusion in technology implementation: A supply chain study. *International Journal of Operations and Production Management, 18*(7), 509-533.

Powers, T. L., & Reagan, W. R. (2007). Factors influencing successful buyer-seller relationships. *Journal of Business Research, 60*(12), 1234-1242.

Prajogo, D., & Olhager, J. (2012). Supply Chain Integration and Performance: The Effects of Long-Term Relationships, Information Technology and Sharing and Logistics Integration. *International Journal of ProductionEconomics, 135*(1), 514-522.

Premkumar, G., & Roberts. (1999). The role of inter-organizational and organizational factors on the decision mode for adoption of inter=organizational systems. *Decision Sciences, 26*(3), 303-336.

Premkumar, G., Ramamurthy, K., & Saunders, C. S. (2005). Information Processing View of Organizations: An Exploratoty Examination of Fit in the Context of Inter-Organizational Relationships. *Journal of Management Information Systems, 22*(1), 257-294.

Prentice, I. C., Harrison, S. P., & Bertlein, P. J. (2011). Global vegetation and terrestrial carbon cycle changes after the last ice age. *New Phytol, 189*, 988-998.

Priem, R. L., & Burtler, J. E. (2001). Is the resource-based view a useful perspective for strategic management research? *Academy of Management Review, 26*(1), 22-40.

Purcell, J., Kinnie, N., Swart, J., Rayton, B., & Hutchinson, S. (2008). *People management and performance*. London: Routledge.

Qrunflesh, S., & Tarafdar, M. (2013). Lean and agile supply chain strategies and supply chain responsiveness: The role of strategic supplier partnership and postponement: Supply Chain Management. *An International Journal, 18*(6), 571-582.

Rai, A., Patnayakuni, R., & Seth, N. (2006). Firm performance impacts of digitally enabled supply chain integration capabilities. *MIS Quartely, 30*(2), 225-246.

Raschke, R. L. (2010). Process-Based View of Agility: The Value Contribution of IT and the Effects on Process Outcomes. *International Journal of Accounting Information systems, 11*(4), 297-313.

Ray, G., Barney, J. B., & Muhanna, W. A. (2004). Capabilities, business processes and competitve advantage: Choosing the dependent variable in empirical tests of the resource-based view. *Strategic management Journal, 25*(1), 23-37.

Raymond, A. (2005). Information technology: Threats and opportunities for small and medium-sized enterprises. *Industrial Journal of Information Management, 13*(6), 439-448.

Riegel, C. D., & Reid, R. D. (2010). Food-Service Purchasing: Corporate Practices. *Cornell Quarterly, 29*(1), 24-29.

Rowley, E. J. (2003). The Four Cs of Customer Loyalty. *Marketing Intelligence and Planning, 23*(6), 574-581.

SAGE Lambert, D. M., & Schwieterman, M. A. (2012). Supplier Relationship Management as a Macro Business Process. *Emerald*, 103-121.

Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping Agility through Digital Options: Reconceptualizing the role of IT in Contemporary Firms. *MIS Quarterly, 27*(2), 237-263.

Sanchez, A. M., & Perez, M. P. (2005). Supply Chain Flexibility and Firm Performance: A Conceptual Model and Empirical Study in the Automotive Industry. *International Journal of Operations and Production Management, 25*(7), 681-700.

Sanders, N. R. (2008). Pattern of Information technology Use: The Impact on Buyer-supplier Coordination and performance. *Journal of Operations Management, 26*(3), 349-367.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students* (5th ed.). Harlow, UK: Prentice Hall.

Saunders, N. R., & Premus. (2005). Modelling the relationship between Firm IT Capability, Collaboration and Performance. *Journal of Business Logistics, 26*(1), 1-3.

Sekaran, U. (2003). *Research Methods for Business: A Skill-bulding Approach* (4th Ed.). New York: John Wiley and Sons.

Sekaran, U., & Bougie, R. (2010). *Research Methods For Business: A Skill Building Approach.* London: Wiley.

Seppapen, R., Blomqvist, K., & Sundqvist, S. (2007). Measuring Inter-Organizational trust-A critical review of the empirical research in 1990-2003. *Industrial Marketing Management, 36*(2), 249-265.

Shapiro, S., & Wilk, M. (1965). Analysis of Variance Test of Normality. *Biometrica, 52*(3), 591-599.

Sharifi, H., & Zhang, Z. (1999). A Methodology For Achieving Agiity in manufacturing Organizations: An Introduction. *International Journal of Production Economics, 62*(1-2), 7-22.

Sharp, J. M., Irani, Z., & Desai, S. (1999). Working Towards Agile Manufacturing in the UK Industry. *International Journal of Production Economics, 62*(1/2), 155-169.

Shieh, G. (2010). On the Misconception of Multicollinearity in detection of Moderating Effects: Multicollinearity is not always detrimental. *Multivariate Behavioural Research, 45*, 483-501.

Simatupang, T. M., & Sridharan, R. (2002). The Collaborative Supply Chain. *International Journal of Logistics Management, 13*(1), 15-30.

Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of management Review, 31*(1), 273-292.

Skarmeas, D., Katsikeas, C. S., & Schlegelmich, B. B. (2002). Drivers of committment and its impact on performance in cross-cultural buyer-seller relationships: The importers perspective. *Journal of International Business Studies, 33*(4), 757-783.

Spathis, C., & Constantinides, S. (2004). Enterprise Resource Planning Systems Impact on Accounting processes. *Business Process Management Journal, 10*(2), 234-247.

Stank, T. P., Davis, B. R., & Fugate, B. S. (2005). A strategic framework for supply chain orinted logistics. *Journal of Business logistics, 26*(2), 27-45.

Stank, T. P., Keller, S. B., & Daugherty, P. J. (2007). Supply Chain Collaboration and Logistical Service Performance. *Journal of Business Logistics, 22*(1), 371-393..

Sundaramurthy, C., & Lewis, M. (2003). Control and collaboration: Paradoxes of Governance. *Academy of Management Review, 28*(3), 397-415.

Swafford, P. M., Ghosh , S., & Murthy, N. (2006). The Antecedents of Supply Chain Agility of a Firm: Scale Development and Model Testing. *Journal of Operations Management, 24*(2), 170-188.

Swafford, P. M., Ghosh, S., & Murthy, N. (2008). Achieving Supply Chain Agility Through IT Integrtion and Flexibility. *International Journal of Production Economics, 116*(2), 288-297.

Swing, M., & Hegarty, W. H. (2007). Core manufacturing Capabilities and their links to product differentiation. *International Journal of Operations and Production Management, 18*(4), 374-396.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics.* Boston: Pearson.

Tabachnick, B., & Fidell, L. (2006). *Cleaning up your act screening data prior to analysis: Using Multivariate Analysis* (5th ed.). Allyn & Bacon: Needham Heights.

Tan, K. C., & Wisner, J. D. (2009). Supply Chain Integration with 3rd party Logistics providers. *International Journal of Production Economics, 125*, 262-271.

Tan, K. C., Lyman, S. B., & Wisner, J. D. (2002). Supply Chain Management: A Strategic Perspective. *International Journal of Operations and Production management, 22*(6), 371-393.

Teece, D. J., Pisano, G., & Shuen, A. (2007). Dynamic Capabilities and Strategic Management. *Strategic Management Journal, 18*(7), 509-533.

Tippins, M. J., & Sohi, R. S. (2003). Information Technology Competency and Firm Performance: Is organizational Learning a Missing Link? *Strategic Management Journal, 24*, 745-761.

Tippins, M. J., & Sohi, R. S. (2003). IT competency and firm performance: Is organizational leraning a missing link? *Strategic Management Journal, 24*(8), 745-761.

Uma, S., & Roger, B. (2013). *Research Methods for Business: A Skill-Building Approach* (6th ed.). Chichester West Sussex: Wiley.

Van Hoek, R. I. (2001). Epiloque- Moving Forward with agility. *International Journal of Physical Distribution & Logistics Management, 31*(4), 290-301.

Van Hoek, R. I., Harrison, A., & Christopher, M. (2001). Measuring Agile Capabilities in the Supply Chain. *International Journal of Operations and Production Management, 21*(1/2), 126-147.

Veludo, M., Macbeth, D. K., & Purchase, S. (2004). Partnership and Relationships within an International Network Context. *International Marketingg Review, 21*(2), 142-157.

Vonderembse, M., Uppal, M., Huang, S. H., & Dismukes, J. P. (2006). Designing Supply Chains: Towards Theory Development. *International Journal of Production Economics, 100*(2), 223-238.

Wagner, S. M., & Bode, C. (2008). An Empirical Examination of Supply chain. *Journal of Business Logistics, 29*(1), 142-157.

Wagner, S. M., & Boutellier, R. (2002). Capabilities for managing a portfolio of supplier relationships. *Business Horizons, 45*(6), 79-88.

Walter, A., & Ritter, T. (2003). The Influence of Adaptations, Trust and Committment on Value-Creating Functions of Customer relationships. *journal of Business & Industrial marketing, 18*(4/5), 353-365.

Wang, E. T., Tai, J. C., & Wei, H. L. (2006). A Virtual Integration Theory of Improved Supply Chain Performance. *Journal of Management Information Systems, 23*(2), 41-64.

Wenerfelt, B. (1984). A Resource-Based View of the Firm. *Strategic management Journal, 5*, 171-180.

Whipple, J. M., Lynch, D. F., & Nyaga, G. N. (2010). A Buyers Perspective on Collaborative Versus Transactional Relationships. *Industrial Marketing Management, 39*(3), 507-518.

White, A., & Daniel, E. (2005). The Role of Emergent Information Technologies and Systems in Enabling Supply Chain Agility. *International Journal of Information Management, 25*(5), 396-410.

Wieland, A. (2013). Selecting the right supply chain based on risks. *Journal of Manufacturing Technology Management, 24*(5), 652-668.

Williamsons, O. E. (1983). Credible Committments using Hostages to support Exchange. *The American Economic Review, 73*(4), 519-540.

Wilson, D. (1995). *Journal of the Academy of marketing Science, 23*(4), 335-345.

Wilson, M. J. (2006). Supply Chains behaving badly: A dynamic model of inter-organizational supply chain exchange behaviour under rational, relational and chaotic paradigms. *Supply Chain Management, 3*, 109-121.

Winter, S. (2003). Understanding Dynamic Capabilities. *Startegic Management Journal, 24*, 991-995.

Wren, D. A. (2005). *The history of management thought*. New York: John Wiley & Sons.

Wu, K., & Ouyang, L. (2003). An Integrated Single-Vendor Single Buyer Inventory System with shortage derived Algebraically. *Production Planning Control, 14*(6), 555-561.

Wu, W. Y., Shih, H. A., & Chan, H. C. (2009). The Analytic Network Process For Partner Selection Criteria in Strategic Alliances. *Expert Systems with Applications, 36*(3), 4646-4653.

Wu, Z. T., Choi, & Rungtusanatham, M. J. (2006). Supplier-Supplier relationships in buyer-supplier triads: Implications for supplier performance. *Journal of Operations Management, 28*, 115-123.

Yamane, T. (1967). *Statistics: An Introductory Analysis.* New York: Harper and Row.

Yang, J. (2014). Securing Performance for Chinese Manufacturers. *International Journal of Production Economics, 150*, 104-114.

Yang, Q., & Crowther, D. (2012). *The Relationship Between Corporate Social Responsibility, Profitability nd Sustaainability in China. Business Strategy and Sustainability (Developments in Cororate Governace and Responsibility)* (Vol. 3). Emerald Group Pubishing Limited.

Yen, R., & Chae, B. (2006). Determinants of supplier-Retailer Collaboration: Evidence from an international study. *International Journal of Operations and Production Management, 104*, 164-179.

Yusuf , Y. Y., Gunasekaran, A., Adeleye, E. O., & Sivayoganathan, K. (2004). Agile Supply Chain Capabilities: Determinants of Competitive Objectives. *European Journal of Operations Research, 159*(2), 379-392.

Yusuf, Y. Y., Sarhadi, M., & Gunasekaran, A. (1999). Agile Manufacturing: The Drivers, Concepts and Attributes. *International Journal of Production Economics, 62*(1/2), 33-43.

Yusuf, Y., Gunasekaran, A., Musa, A., Dauda, M., & Cang, S. (2014). A relational study of supply chain agility, competitiveness and business performance in the oil and gas industry. *International Journal of Production Economics, 147*, 531-543.

Zaheer, A., Mcevily, B., & Perrone, V. (1998). Does Trust Matter? Exploring The Effects of Inter-Organizational and Interpersonal Trust on Performance. *Organizational science, 9*(2), 123-142.

Zhang, Z., & Sharifi, H. (2000). A Methodology For Achieving Agility in Manufacturing Organizations. *International Journal of Operations & Production Management, 20*(4), 496-513.

Zhao, X., Xie, J., & Leung, J. (2005). The Impact of forecasting model selection on the value of information sharing in a supply chain. *European Journal of Operations Research*, 321-344.

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2010). *Business Research Methods* (8th ed.). Mason, HO: Cengage Learning.

Zikmung, W. G. (2003). *Business Research Methods* (7th ed.). Thomson/South-Western: Cincinnati, OH.

Zollo, M., & Winter, S. G. (2002). Deliberate Learning and the Evolution of Dynamic Capabilities. *Organizational Science, 13*(3), 339-351.

APPENDICES

Appendix I: Letter of Introduction

Pauline Jeruto Keitany,

PhD Student in Supply Chain Management,

Jomo Kenyatta University of Agriculture and Technology,

Dear Sir/Madam,

RE: Request to fill the Questionnaire

This questionnaire is part of my PhD research and has been designed for the sole purpose of collecting data on Effect of Integral Relationship and Supply Chain Agility on the Performance of Cosmetic Manufacturing Firms in the Nairobi County, Kenya. The data collected will be treated with high degree of confidentiality and is meant for academic purpose only. Your responses are important in enabling me to obtain as full an understanding as possible of this topical issue.

Kindly answer the questions in the spaces provided herein. The questionnaire should take you about fifteen to twenty minutes to complete. If you have any questions or if you have any further information, please call me on my mobile number: 0710 389 167, or email me on the following address: polynkeitany@gmail.com

Thank You.

Yours Sincerely,

Pauline Jeruto Keitany.

Appendix II: Questionnaire

The questionnaire contains statements pertaining to the Effect of Integral Relationship and Supply Chain Agility on the Performance of Cosmetic Manufacturing Firms in the Nairobi County, Kenya. Kindly take a few minutes to complete the questionnaire.

SECTION A: DEMOGRAPHIC INFORMATION

Instructions: Please answer the questions below by putting a tick in the appropriate statement.

1. **Gender:**

   a) Male [ ]
   b) Female [ ]

2. **Age Bracket**

   a) Below 20 [ ]
   b) 21 – 30 [ ]
   c) 31 – 40 [ ]
   d) 41– 50 [ ]
   e) Above 55 [ ]

3. **How long have you worked for this firm?**

   a. Less than one year [ ]
   b. Between 1-3 years [ ]
   c. Between 3-6 years [ ]
   d. Between 6-10 years [ ]
   e. Above 10 years [ ]

4. Level of education

a. Secondary Education [ ]
b. Certificate/ Diploma [ ]
c. Graduate [ ]
d. Masters [ ]
e. Doctorate [ ]

5. How long has your organization existed?

a. Less than 5yrs [ ]
b. 5-10 years [ ]
c. 11-15 years [ ]
d. 16-20 years [ ]
e. 20yrs and above [ ]

SECTION B: COLLABORATIVE AWARENESS

This section deals with information pertaining to Collaborative Awareness

To what extent do you agree with the following statements? Please tick the appropriate statement in the 5 point Likert scale ranging from:-

Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5

Collaborative Awareness		**1**	**2**	**3**	**4**	**5**
B1	Our firm and this supply chain partner have integrated production systems					
B2	Our firm has a supply chain arrangement with our supply partners that that operate under the principle of shared rewards and risks.					
B3	Our firm has increased operational flexibility through our relationship with this supplier.					
B4	Our firm benchmarks best practices or processes and shares results with this supply chain partner.					
B5	Inventory information is shared with the alliance members					
B6	Our firm has experienced improved supply chain performance by integrating operations with the supply chain partners.					
B7	The relationship that our firm has with our partners deserves our firm's maximum attention to maintain					
B8	Our firm is always willing to develop a stable relationship with inter firm partners					
B9	Our firm is willing to make short term sacrifices to maintain the relationship with our key suppliers and customers					
B10	The supply chain members operate under the principle of shared returns					
B11	Collaborative communication among the relationship partners in our firm is always key in resolving disputes and alligns perceptions and expectations of the supply chain partners					

SECTION C: CROSS FUNCTIONAL INFORMATION SHARING

This section deals with information regarding cross functional information sharing.

To what extent do you agree with the following statements? Please tick the appropriate statement in the 5 point likert scale ranging from:

Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5

Cross Functional Information Sharing		**1**	**2**	**3**	**4**	**5**
C1	Up to date data and information of the company is always readily available for all the parties					
C2	We inform supply chain partners in advance of changing needs					
C3	We keep each other informed about events or changes that may affect the other party					
C4	Unforeseen challenges are properly communicated to our suppliers					
C5	Exchange of information takes place frequently, and/or in a timely manner					
C6	Our firm provides substantial information to the parties in the relationship which is of great use in order to improve our products					
C7	Information exchange between us and our supply chain partners is always timely, fast and accurate					
C8	Information exchanged between us and our supply chain partners is often adequate					
C9	Information exchanged between us and our supply chain partners is often reliable					
C10	Information exchanged between us and our supply chain partners is quite complete					

SECTION D: DECISION SYNCRONIZATION

This section deals with information pertaining to Decision Synchronization.

To what extent do you agree with the following statements? Please tick the appropriate statement in the 5 point Likert scale ranging from:

Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5

Decision Syncronization		**1**	**2**	**3**	**4**	**5**
D1	Our firm and supply chain partners have agreement on the goals of the supply chain.					
D2	our firm and the supply chain partners have common agreements on the importance of integral relationships of the supply chain					
D3	Our firm and the supply chain partners agree that our individual firm goals can be achieved through working towards the goals of the supply chain.					
D4	Our firm consistently incorporates our supply chain partners input to joint planning and assortment					
D5	We jointly develop demand forecasts with our supply chain partners					
D6	Our firm incorporates the supply chain partners input on order exceptions					
D7	Our firm and the supply chain partners have common agreement on the importance of improvement that benefit the supply chain as a whole.					
D8	Our firm and the supply chain partner have joint agreement on the inventory requirements.					
D9	There is an alignment between the goals of the supply chain and that of partners in the supply chain					
D10	As a result of joint effort, it has resulted into better commitment of partners, hence supply chain agility.					

SECTION E: IDIOSYNCRATIC PARTNER INVESTMENTS

To what extent do you agree with the following statements? Please tick the appropriate statement in the 5 point likert scale ranging from:

Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5

Idiosynratic Partner Investments		**1**	**2**	**3**	**4**	**5**
E1	We have made major investments, specifically for these relationships, in time and effort in order to improve our products and services					
E2	our company shares resources and abilities which combined with those of the parties in the relationship enables us to achieve objectives beyond what we could attain on our own					
E3	We provide our partners and clients with the opportunity tou use our resources, such as plant, technology, software or machinery hence provide quality products and services					
E4	Our company provides resources and abilities which are beneficial to the relationship					
E5	Our firm has made specific investments in assets, software or personnel so as to better meet the customers needs and that the supplier can adequately meet our needs					
E6	We have made significant investments in tooling and equipment dedicated to this supplier					
E7	Qualifying this supplier has involved substantial commitments of time and money					
E8	The supplier’s product requires technical skills that are unique to this supplier					

SECTION F: PERFORMANCE

Please indicate the extent to which you agree or disagree with each statement with regard to the Performance of your firm. The scale below utilizes a 5-point likert type scale with responses ranging from:-

Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5

Perfomance Statements		**1**	**2**	**3**	**4**	**5**
F1	Manufacturing lead times has improved in our firm					
F2	Customers' requirements are met in terms of quality					
F3	We have the capability to adapt and respond in a speedy manner to changes & actual disruptions					
F4	There is improved delivery and reliability of the firm					
F5	Products and services offered are of high quality					
F6	Our firm through supply chain agility has led to customer satisfaction in a turbulent and volatile market hence improved responsiveness to customer needs.					
F7	There is real time delivery of goods to our clients.					
F8	The firm is always ready to produce a broad range of low cost, high quality products with short lead times in varying low sizes, built to individual customer specifications					
F9	As a result of integral relationship, it has led to reduction of customer complaints.					
F10	Productivity has improved in our firm					

SECTION G: TECHNOLOGICAL ENGAGEMENT

Please indicate the extent to which you agree or disagree with each statement with regard to the Technological Engagement of your firm. The scale below utilizes a 5-point likert type scale with responses ranging from:-

Strongly Disagree= 1, Disagree=2 Neutral= 3, Agree= 4, and Strongly Agree= 5

Technological Engagement		**1**	**2**	**3**	**4**	**5**
G1	Information Technology in our firm has quite improved the quality of communication					
G2	Adoption of technology has led to added value to supply chain functions through greater efficiency and information transparency.					
G3	Technology engagement in our firm has led to better coordination and integration of information flows and activities within and between boundaries.					
G4	Adoption of technology has led to the development of new services, products, functions and formation of alliances.					
G5	Our firm's use of IT has improved our transaction speed thus reduced lead time					
G6	Technology engagement in our firm has led to reduction in costs, increased efficiency across the extended supply chain and enhanced work flow					
G7	The use of technology in our firm has led to improved service delivery to our customers					
G8	Technology use in our firm has allowed planning, tracking and estimating lead times based on real data.					

SECTION H

In your own opinion, what has been the effect of relationship integration in terms of changes in business processes and or changes in decision making processes?

.....
.....
.....

What approaches are being used to develop trust and key partner relationships in your firm?

.....
.....
.....

In your own opinion, are trust and partnerships necessary to build supply chain agility of your firm?

.....
.....
.....

In your own opinion, what supply chain agility results have been achieved through greater integration in the supply chain?

.....
.....
.....

What are the key metrics that have improved as a result of relationship integration in your firm?.....
.....
.....

In what part of the supply chain for your products is greater integration desired or required?.....
.....
.....

Why?

.....
.....
..

THANK YOU FOR YOUR PARTICIPATION

Appendix III: Cosmetic Manufacturers in Kenya

NO	NAME OF COMPANY
1	CALTEX OIL (K) LTD COSMETICS
2	MODERN SOAP FACTORY COSMETICS
3	FLAME TREE BRANDS COSMETICS
4	EUROPEAN PERFUMES COSMETICS
5	INTERCONSUMER PRODUCTS COSMETICS
6	MANHAR BROTHERS COSMETICS
7	UNITED CHEMICAL INDUSTRIES COSMETICS
8	TRICLOVER INDUSTRIES COSMETICS
9	UNILEVER KENYA LTD COSMETICS
10	KAM INDUSTRIES COSMETICS
11	RAMJI RHARIBHAI DEVANI COSMETICS
12	JAKHARIA PACKERS COSMETICS
13	BUYLINE INDUSTRIES COSMETICS
14	HACO INDUSTRIES COSMETICS
15	CLIQUE LIMITED COSMETICS
16	NIGHTROSE COSMETICS
17	OASIS LIMITED COSMETICS
18	BEIRSDORF E.A. LTD COSMETICS
19	ROC COSMETICS
20	SARALEE HOUSEHOLD/BODY
21	ALISON PRODUCTS COSMETICS
22	PZ. CUSSONS EAST AFRICA COSMETICS
23	UZURI MANUFACTURERS COSMETICS
24	PREMIER FOODS INDUSTRIES COSMETICS
25	MAIKAR QUALITY PRODUCTS COSMETICS
26	ANGELICA INDUSTRIES COSMETICS
27	SHANTI INDUSTRIES COSMETICS
28	ARIMAN TECHNOLOGIES COSMETICS

Source: Kenya Association of Manufacturers, (2015)