

**SUPPLY CHAIN INTEGRATION AND PERFORMANCE OF PUBLIC UNIVERSITIES  
IN KENYA**

**EZEKIEL NAMUDUMA ODONGO**

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS FOR AWARD OF DEGREE OF MASTER OF BUSINESS  
ADMINISTRATION, UNIVERSITY OF NAIROBI**

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## DECLARATION

This research project is my original work and has never been presented for any degree in this or any university.

**Signed.....**

**Date.....**

**Ezekiel Namuduma Odongo**

**D61/83753/2016**

This research project has been presented for examination with my approval as the university supervisor

**Signed.....**

**Date.....**

**Mr. Michael Chirchir**

**Lecturer, Department of Management Science,**

**School of Business,**

**University of Nairobi.**

## **DEDICATION**

To my wife Rebeccah Matanda, and to my daughters Esther Akinyi, Gloria Nanjala and Natalie Anyango

## **ACKNOWLEDGEMENT**

I would like to thank the Almighty God for good health, strength and wisdom He granted me during the entire MBA program that ensured I remained focused and the realization of this dream.

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## ABSTRACT

This study sought to establish the extent of supply chain integration in public universities and the relationship between supply chain integration and firm performance. A descriptive survey was employed, with a census of the 31 public universities being carried out. Questionnaires were administered to 31 respondents who managed supply chain, procurement and operations in the universities under survey. Frequencies, descriptive statistics and multiple regression analysis were used to analyze the data. With a survey response rate of 80.65%, the universities under study were found to have integrated their supply chains to a great extent. Specific elements of supply chain integration in the universities include customer, supplier and internal integration. Each of these forms of integration were found to involve a great extent of information and resource sharing with supply chain partners, collaboration in the execution of operations related tasks and interfirm linkages in information systems. The benefits found to have accrued following supply chain integration were increased responsiveness to dynamic customer needs and preferences resulting into high levels of customer satisfaction, reduction in resource requirements in task execution and by implication operating costs, alongside a host of other effects. A strong correlation was found between the extent of supplier, customer and internal integration and the performance of the surveyed firms. This was further affirmed by the coefficient of determination, R square. The R square was found to be 0.667, suggesting that 66.7% of the variation in the opinion on the extent of benefits from supply chain integration from respondent to respondent arose from the variation in the opinion on the extent of supply chain integration. The regression model obtained was found to be significant indicating that the relationship between supply chain integration and performance of the surveyed universities was a significant one. However, the regression coefficients were not significant. Future studies may employ quantitatively measured variables in attempting to discover relationships underlying supply chain integration and firm performance.



## CHAPTER ONE: INTRODUCTION

### 1.1 Background of the Study

Due to globalization, advanced technology, intense competition, high complexities in supply chain activities and dynamic economic environment, there is need for organization to create synergy across and within the firm in order to enhance efficiency and effectiveness in the firm. Supply chain practices seeks to improve performance of the organization by attentively integrating the internal processes within the firm and effectively linking this processes with external processes of customers, suppliers and other players of supply chain. Firms' gain competitive edge and foster customer value through linking supply chain functions across the firm which creates and sustain efficiencies (Devaraj, 2007). Efficient linkages among supply chain activities can make a firm achieve sustainable supply chain integration, and the linkages in the processes should be in a way that it constructs and utilize supply chain practices. This means that firms that need to adopt the effective supply chain practices should concentrate on supply chain integration. Supply chain management practices adopted to achieve performance of its supply chain require internal functional and processes integration within an organization and external integration with the suppliers and customers for it to be effective(Narasimhan, 2002)

Integration of supply chain activities enables an organization to meet customers demand by bringing different functions within a firm. According to Leuschner, Rodgers, & Charvet, (2013), there is need of cross-functional and cross-firm business processes in order for easier management of relationships with appropriate and collaboration, sharing close partnership and comprehensive coordination of supply chain activities. Efficiency

of the supply chain practices cannot be enhanced individually, but through interaction of various supply chain practices. Effective utilization of the supply chain practices through supply chain integration enhances operational performance of a firm, which have an impact on the overall firms' performance.

For an effective supply chain practices in the firm, there is need for comprehensive effort for enhancement in the supply chain functions within an organization, thus shift of focus from independent and functional unit to integrative and general business process.(Dawe, 1994). However, supply chain integration is not without milestones, for it is a difficult undertaking that requires a comprehensive and clear attention for effective implementation in the supply chain practices (Koufteros, 2007). There are various challenges but not limited to unidirectional flow of information, incongruent goals, focus shift from customers, forged relationships. Firms need to rethink the supply chain practices in line with supply chain integration, both internally and externally in order to have an impact to firms' performance.

### **1.1.1 Supply Chain Integration**

Integration is one of the techniques in the supply chain management that enhances customers' demand responsiveness. Supply chain integration is defined as the management of various set of activities that aims at seamlessly linking relevant business processes within and across firms in order to eliminate unnecessary processes for creating an efficient and effective supply chain (Chen, 2009). Demand responsiveness involves the anticipation to changes in the market environment (Suresh, 2009). This ability of integration enables organizations to exceed customer satisfaction while mitigating the risks that may be associated with stochastically demanded. Although integration is not an

ultimate solution to organization but it is a better supply chain tool that a firm can employ to be responsive in certain market and environmental conditions (Porter, 1980). Having reasons to integrate provides a platform for an effective internal and external relationship in the firm. In this regard, firms can integrate due to share common goal to maintain and improve firms' performance while ensuring superior customer value.

Supply chain integration is process oriented and strategic focus for it entails operational activities of the firms that might affect the overall firms' performance, for it does not look for a single unit operations but overall firms' operation both internal and external activities. Firms' integrate with its supply chain players as a way to deliver and provide customer value (Flynn, 2010). Integration of supply chain activities both internally and externally helps to improve the operations of the firm.(Mackelprang, 2014). Integration allows firms functions to act as a single unit potentially enhancing efficiency and performance for all parties (Tan, Kennan, & Handfield, 1998; Frohlich & Westbrook, 2001; Schoenherr & Swink, 2012)

### **1.1.2 Organizational Performance**

According to Henri (2011), performance measurement is vital for every firm for it focuses on the quantifying the effectiveness and efficiency of the internal and external processes using a specific set of metrics. Performance measurement act as surrogates for organizational phenomena, for it provides information concerning the operations of the firm to both internal and external users. It entails all elements of the organization management cycle, which constitute a process for creating and implementing a certain course of action.

Organizational performance refers to how well a firm achieves its market-oriented goals and objectives as well as its financial goals. It is a powerful tool for prioritizing firms' goals and attaining them (Kirkendall, 2010). It usually informs the policy makers, implementers as to the position of the firm and some of the challenges that requires attentions and allows for a progressive monitoring of the efficiency and effectiveness of the firms' operations. Poister (2003), indicates organizational performance helps to strengthen the management and inform decision making. He noted that profitability is one of the measures of organizational performance. Abdifatah (2012) argued that performance is not uniform in all organization and keen considerations is needed on different factors such as effectiveness and efficiency of internal operations, flexible production processes, good supplier relationship management, customer relationship management and continuous improvement in the firms' operations.

### **1.1.3 Public Universities in Kenya**

The public universities in Kenya are incorporated through Institutional Act of Parliament under the Universities Act, 2012 that ensures and monitors the development of public university education, governance and accreditation of the universities. The universities in Kenya are being regulated by the Commission for University Education (CUE) which is a sole regulatory which was a successor of the commission of higher education which was established in 1985 by an Act of parliament, University Act, CAP 210B that ensures planning and coordinating the growth and expansion of the university education in Kenya. According to the Commission for University Education, 2017, Kenya has 31 accredited public universities. The public universities generate broader economic growth in terms of creation of employment opportunities, creation of innovation and

diversification of the income generating paradigms through research, it also nurtures the graduates with the hope of the world; in solving challenges across the border, unlocking and harnessing new knowledge, building cultural and political understanding and modeling environment that promotes dialogue and debates.

Supply chain activities in public entities are characterized by their dynamism. Universities being a public entity usually get funds from government grants, donations, bursaries, students' fees and tuitions payments hence without an effective supply chain practice would lead to poor financial and operational performance. Supply chain activities in the public universities continues to evolve both conceptually and organizational in order to enhance their performance (Otieno, 2003). There is an emphasize on efficiency, transparency, accountability in the universities process and operations in order to enhance organizational excellence.

Supply chain integration will enhance organizational performance through streamlining the internal businesses process at the universities while at the same time linking the organization with its customers and suppliers for it will enhance good governance, promote transparency, increase accountability, improves the efficiency of the processes and ensures monitoring and evaluation capabilities. There are clear indications that supply chain integration would add value to the operations hence promoting high organizational performance in public universities (Baily, Farmer, Jessop & Jones, 1988).

## **1.2 Research Problem**

Due to globalization, rapid growth in technology, intense competition, high complexities in distribution, and intensely dynamic environment, there is need for organizations to

create synergy across and among supply chain partners in order to strive for operational excellence. The effective incorporation of both internal and external elements leads to realization of a considerable competitive advantage resulting to cost reduction and improved customer responsiveness, which will enhance profitability and firms' performance. Effective supply chain practices imply creating of long-term partnership and relationship with suppliers and customers, developing interactive platforms, creation of collaboration ties and cooperation in planning (Devaraj, 2007). Effective supply chain integration requires comprehensive knowledge sharing and clear interaction with various actors in the supply chain that strongly base on timely delivery, cost minimization and quality assurance. For the performance of other players in the supply, chain and their willingness and ability to incorporate their activities will determine the overall performance of the organization (Panos, 2006).

Public universities have been essential in the economy of the country for it is the link between the problems that the country is facing and provides the way out in order for the economy to be stable. Despite the acknowledgement of the universities in the economy, the public universities have been experiencing a lot of challenges for instance the issue of missing marks by students, lack of adequate funding on their projects and infrastructures which has really affected the operation and financial performance of the institutions (Otieno, 2003).

Both local and global studies have shown that effective implementation of supply chain integration contributes to organizational and operational performance. Globally, Frohlich and Westbrook(2001), in their study on the effect of consumer and supplier integration on the performance of an industry, the study acknowledges customer-facing, inward-facing,

supplier-facing, outward-facing and periphery-facing signifies the extent of integration with suppliers and customers, the study showed that the greater the supply chain mixing with customers and suppliers the higher the firms performance. Vickery et al.2003) found out that the association amid SCI and financial outcomes was indirectly and totally mediated by the effectiveness of customer service. The studies from the global perspective showed a positive relationship between supply chain integration and firms' performance, however, the studies were done from different countries and a different type of industry of operation. Narasimhan (2016) on his study on supply chain integration and performance of corporation in Korean and Japanese firms, where his study showed a positive relationship linking supply chain integration and firms' performance

Locally, Ijomba (2010) studied the effect of integrated supply chain on performance of Nairobi Bottlers. The study found out that the company improved its performance due to incorporated supply chain, which was evident on higher profitability and increased customer satisfaction. Lisanza (2013) studied supply chain integration and performance of international humanitarian organizations in East Africa. He focused on internal integration which enabled sharing of information within the organization which showed an improved functional performance which lead to an improved organizational performance. The study however, focused on internal integration a single aspect of supply chain integration. Mbaisi (2016) studied the effect of supply chain integration on large manufacturing firms in Kenya. The study established cross-functional integration to be significant to the supply chain performance. The study however, focused on manufacturing plant and single aspect of supply chain integration.

The aforementioned studies did not broadly address the relationship between supply chain integration and organizational performance especially in public universities. This study sought to fill this knowledge gap by answering the research questions; what is the extent of supply chain integration in public universities in Kenya? What is the relationship between supply chain integration and organizational performance of public universities in Kenya?

### **1.3 Research Objectives**

The research study will be guided by the following objectives:

- i. To establish the extent of supply chain integration in public universities in Kenya
- ii. To determine the relationship between supply chain integration and organizational performance of public universities in Kenya

### **1.4 Value of the Study**

This study would be important to the public universities to identifying the supply chain integration dimensions which it can be used to enhance organization performance. It would also help the organization to recognize the gaps in the operations of the organization especially regarding some non-value addition activities which consumes a lot of resources.

This study would be essential to other universities and other organization to enable them to gauge the importance of supply chain integration, which will help them being able identify the inefficiency and opportunities particularly those relating to cost lessening and improved performance.



The scholars and researchers will benefit from the study as the findings will provide comprehensive insights and create new knowledge on the supply chain integration. The study would also expand the literature on the body of supply chain integration and firms' performance

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter entails the theoretical framework on which supply chain integration is based, literature of organizational performance, supply chain integration and organizational performance. A review of empirical research studies is discussed alongside a conceptual framework linking supply chain integration and organizational performance.

### **2.2 Theoretical Literature Review**

A number of theories explain the rationale on integration of supply chain. This study is anchored on systems theory and resource-based view theory. These are discussed next:

#### **2.2.1 Systems Theory**

The systems theory was developed by Bertalanffy (1969). The theory development was in the platform of the efficiency of the components on the organization. The theory recognized different functions of the organization in which interacts differently in order to achieve a specific objective in the organization. The theory argues that components interact on a different platform in a global setup with an influence of various open systems that are distinguished from the environment through inputs and outputs of the system.

In supply chain there exists relations of different interactions between different players on the supply chain. Supply chain players need to interact simultaneously in order to achieve the general objectives of the firm. Supply chain should be able to identify the scope of different players in the supply chain in order to allow the seamless interaction of the supply chain activities in order to have harmonized results due to the contribution of

different players in the supply chain. The supply activity performance brings components of a complex system together to form large systems of supply chain. Holistic perspective is a new paradigm in shaping the performance of the organization.

### **2.2.2 Resource-Based View of the Firm**

For a firm to have a sustainable competitive advantage needs to poses unique resources and capabilities (Lynch et al. 2000). Resources can be classified as physical capital resources, human capital resources and firms' capital resources and capabilities can be seen as the high-end skills that a firm can utilize to enhance efficiency and effectiveness of its assets. Having the required individual skills and knowledge and organizational unique assets enables an organization to co-ordinate activities and utilize their resources (Olavarrieta & Ellinger, 1997). Researchers of the resource-based view argue that firms needs to find out the resources within the organization that that will gain them the competitive advantage rather than looking at the competitive environment, for it more feasible using the existing organizational resources to exploit external opportunities rather than acquiring new skills for the opportunities that emerges from the environment.

Integration in the supply can be seen as a valuable resource and capabilities in the organization to enhance performance. For integration with suppliers may enable sharing of the resources owned by the suppliers' firm and this will enhance operational efficiencies through cost reduction and this will build a long-term relationship that will create reputable brand and good working relationship between the firm and the supplier. The internal integration may create collaboration between departments thus eliminating the barriers within the functions of the organization and this leads to full utilization of the organization resources. Customer integration which entails the integration with the

distributors and ultimate customers, for it will lead to the firm being responsive to the customers' needs due to the access of the information regarding the needs and preferences of the customers, which will enhance brand image and competitiveness of the firm. Integration is an imperative in enhancing distinctive resources and capabilities in the firms' operations (Lynch et al., 2000)

### **2.3 Organizational Performance**

Organizational researchers have established various determinants of organizational performance perhaps more than their counterparts the economists while organizational behaviors literature recognizes determinants of organizational performance to customers' satisfaction, employees' interaction and shareholders' wealth creation (Goodman and Pennings, 1977, Steers, 1975 & Cameron 1986). A firm does not only need to be effective but also need to co-ordinate and develop system for efficient and effective interaction of the functions, activities, partners and employees. Furthermore, for organizations with sustainable performance have to emphasize on information sharing, collaboration with its partners and human resource development. Thus, performance of the firm mainly depends on the interaction between different functions, activities and personnel that influences the entire organization thus the reason to enhance integration in an organization (Zhao et al., 2011).

Organizational performance is based on the integration of different objectives of different functions, processes and players. Previous studies have identified various determinants of firms' performance for instance strategy of the firm, culture, customers' satisfaction (Gibson et.al., 1993). Strategy of the firm is a vital determinant of the organizational performance, which highlights the strategic direction, role and purpose of the operation in

a firm, thus there is a need to be comprehensive on the strategies being implemented in the organization in order to incorporate all the supply chain partners to the firms' strategy. Leadership of the firm is also one of the determinants of the organizational performance, which has the capacity to ensure sustainability of the organizational excellence (Gibson et.al. 1999), thus leaders need to be held by good systems and processes, which is adopted in the organization to enhance information sharing and making of informed decisions. The system needs to be sustained by both the internal and external integration in order to achieve its overall objective.

Culture and shared values is also a vital determinant of the organizational performance for it entails a set of shared paradigms in terms of operations and business alignment. It can be achieved through employees being aware of the need to enhance customers' satisfaction by delivering products and services that meet and exceed their needs. It is evident that no single aspect of the determinants enhances organizational performance, thus there is need to reinforce mutual integration, which will lead to organizational performance. Efficiency is required across the organizational frameworks if the competitiveness and sustainable performance is to be achieved (Flynn et.al. 2011)

## **2.4 Empirical Literature Review**

Integration can be defined creation of a single firm platform by several firms involved in all aspects of the firms' operations. A supply chain it comprises of the suppliers, organization and consumers and other partners that are involved in the operations of the firm. In integrated supply chain therefore exist seamless linkages of the upstream, downstream and the producing firms in their operations. Customer integration, supplier integration and internal integration are the elements of supply chain integration

(Bowersox et.al.2002) and are being facilitated by organizational relationship linkages and information integration (Lee, 2012).

Integration of supply chain results leads to high responsive to customers' demands, reduction in cycle time, transaction visibility, reduction in the operational costs and increased customer service levels (Bargchi & Larsen, 2002). All these results into high operational and firms' performance of the supply chain partners. Internal integration aims at unifying the firms' skills, ideas and culture, thus enhances decision making and reduces the conflict of interest, risks and cost implications imposed to the firm (Lisanza, 2013). Customer integration enhances greater customer value by being responsive to customer needs through systematic and frequent measurement of customer satisfaction and monitoring the levels of commitment to the customers' needs (Vickery et.al., 2003).

Several researchers both locally and globally have shown interest on the supply chain integration and organization performance. Globally, Frohlich & Westbrook (2001) on their research study on the effect of customer and supplier chain integration on the performance of manufacturing industry in which the study aimed at determining the extent of customer and supplier integration in the manufacturing industry and the relationship between the two dimensions of the supply chain integration. The study used a descriptive research study to carry out the research, and structure questionnaire was employed to collect data from the manufacturing industries. The study with 69.5% response rate recognized customer facing, inward facing, supplier facing, outward facing and periphery facing signifies the extent of supply chain integration. The customers' integration is vital for the performance of the firms for it indicates the levels of demand and customer satisfaction level and supplier integration is vital in product designing in

order to ensure quality of the products are maintained hence influence the overall performance of the firm. However, the study focused on the manufacturing firms.

In a census survey of the incorporation in Indonesia, Yunus (2013) sought out to establish the effect of supply chain integration and organizational performance. He established large extent of supply chain integration in the firms in Indonesia, which was characterized with ERP tools and functional coordination that lead to increase in the customer satisfaction through demand planning, reduction in lead-time, timely delivery and prompt decision-making. The study used a descriptive analysis and the use of questionnaires to carry the research, which the study showed a positive relationship between supply chain integration and organizational performance. However, the study focused on firms in Indonesia, which their mode of operation can be different here in Kenya.

Lisanza (2013) in his study on the extent of supply chain management integration within the humanitarian organization in East Africa, and its effects on the performance, he conceptualized SCMI as enterprise resource planning tools, joint planning, functional coordination, and information technology. He further recognized organizational performance in terms of timely delivery, inventory flow efficiency, prompt decision-making, reduction of total costs, reduction in lead-time and efficient utilization of resources. The research study used a cross-sectional descriptive study and in the collection of data, it deployed the use of structured questionnaire, with a 72.5 % response rate the study found out that there is the uses of joint planning to a larger extend among the supply chain functions for most of the humanitarian organization in East Africa. Information sharing is used across different functions and ERP and IT in integrating these

functions is not fully realized and not employees in these organizations have access to ERP system. The study concluded by realizing a positive relationship between SCMI and organizational performance despite focusing on one single aspect of integration and survey focus on International humanitarian organization. However, the study focused on internal integration, a single aspect of supply chain integration.

Nyamoko (2013) studied the effect of supply chain integration on performance of manufacturing firms. It was established that the manufacturing firms through supply chain integration enables exchange of information regarding demands of the products with key partners and operational co-ordination which entailed order execution and product designing with key partners. It was concluded that information sharing and operation coordination has an effect on the performance of the firm. Performance was measured by ROI, Market Share, and sales growth. The study concluded that supply chain integration had an effect on the performance of manufacturing firms in Kenya.

Cheruiyot (2013) studied the impact of supply chain integration on supply chain performance. In a survey of 165 KTDA managed tea factories in Kenya, the study established the effect of internal, external and customer integration on the performance of the supply chain. With a response rate of 73%, it was found that supply chain integration encompassing customer, internal and supplier integration positively affected supply chain performance under marked by raw material purchasing costs, transport costs, distribution costs, asset turnover and inventory handling costs. The study however, focused on manufacturing firms.

Mbaisi (2016) studied the effect of supply chain integration on large manufacturing firms in Kenya. The study employed descriptive research design in carrying out the research



study. A survey method was conducted with the use of the structured questionnaire to measure the extent of supply chain integration on the large manufacturing firms in Kenya. The study established that the existence of strategic partnership between large manufacturing and their supplier is higher and they consult their supplier through electronic platform on their value of the firm when they are being developed. There was also existence of information sharing between the firms and the suppliers in order to improve on their quality, responsiveness and generally the firms' performance. It was established that cross-functional integration is significant for all supply chain initiatives and supplier integration. However, the study focused on internal integration.

Previous studies show how specific elements of supply chain integration impact on the firms' performance and supply chain performance. It is evident there is a gap according to the best knowledge of the researcher on the supply chain integration and performance of public universities in Kenya. This study therefore intended to fill the research gap by focusing on the public universities in Kenya.

## 2.6 Summary of the Literature Review and Research Gap

Frohlich & Westbrook (2001)	Effect of customer and supplier chain integration on the performance of manufacturing industry	Simple stratified random sampling was used to identify the lecturers and self-administered questionnaires were used to collect data.	The study concluded that supply chain integration has an influence in the overall performance of manufacturing firms.	The study focused on manufacturing firms
Yunus (2013)	Establish the relationship between supply chain integration and firms' performance in firms in Indonesia	The study adopted descriptive and inferential statistics. Primary data was	The study revealed that there is a highly significant correlation between supply chain integration and firms performance	The study did not relate training with strategy. The findings can also not be

		used to collect data		generalized to other institutions
Lisanza (2013)	To determine the extent of supply chain management integration within the humanitarian organization in East Africa	Simple stratified random sampling was used to identify the lecturers and self-administered questionnaires were used to collect data.	The study realized a positive relationship between supply chain management integration and organizational performance	The study focused on integration, a single aspect of supply chain integration
Nyamoko (2013)	To assess the effect of supply chain integration on performance of manufacturing firms	Random sampling was used to identify the lecturers and self-administered questionnaires were	The study concluded that supply chain integration has an influence in the overall performance of manufacturing	The study focused on manufacturing firms

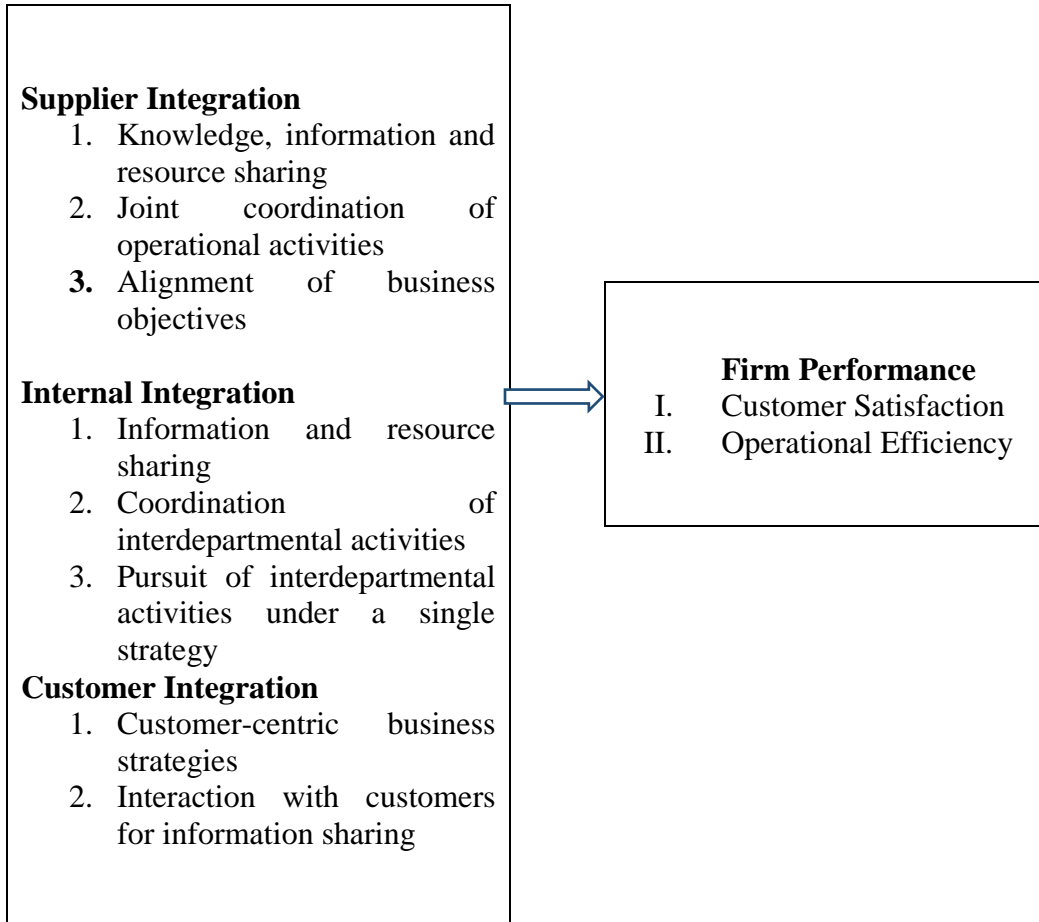
		used to collect data.	firms.	
Cheruiyot (2013)	To establish a significant impact of supply chain integration on supply chain performance in KTDA	Simple stratified random sampling was used to identify the lecturers and self-administered questionnaires were used to collect data.	The study concluded that customer, internal and customer integration has an overall performance of supply chain	The study focused on the supply chain performance
Mbaisi (2016)	To determine the effects of supply chain integration on large manufacturing firms in Kenya	The study adopted descriptive research design in carrying out the research study.	It was established that cross-functional integration is significant for all supply chain initiatives and supplier integration	The study focused on the internal integration

## 2.7 Conceptual Framework

### Supply Chain Integration

#### Independent Variable

#### Dependent variable



Source: Researcher (2017)

## 2.8 Hypothesis of the Study

In order to objectively ensure the consistency with the model of the research study, a null hypothesis is tested (Cooper and Schindler, 2008). The research tends to address the research problem by testing this hypothesis:

**Ho:** Supply chain integration has no significant impact on the organizational performance of the public universities in Kenya.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter presents the research methodology that was employed in seeking answers to the research questions. It addressed the research design that was adopted, the target population of the study, data collection instruments and procedures and the techniques for data analysis.

### **3.2 Research Design**

The research study employed a descriptive survey research design. A descriptive survey involves observation and description of the subject of a study without manipulation of any kind (Kothari, 2004). This design was appropriate for the study, as it facilitated the collection of substantive information regarding supply chain integration in public universities in Kenya.

### **3.3 Population**

The population of the study comprised all the 31 public universities in Kenya, as indicated by the Commission of Higher Education license register (appendix I). A census was carried out given the relatively low population size.

### **3.4 Data Collection**

The study used primary data. The data was collected using a structured questionnaire. The data was collected from supply chain and marketing managers or their equivalents since they were deemed to be well versed with supply chain and customer relationship management activities, and hence had a good understanding of issues related to supply

chain integration. The research targeted to administer 31 questionnaires, one questionnaire in each university of study. The questionnaire comprised three sections.

Section A collected data on demographic characteristics of respondents; section B on extent of supplier, customer and internal integration while section C collected data on the relationship between supply chain integration and organizational performance. The questionnaires was physically administered to the respondents using the “drop and pick later” method. The questionnaire had structured questions that were answered using the form of Likert type scale where respondents were required to indicate their views on a scale of 1 to 5.

### **3.5 Data Analysis**

The data pertaining to customer, supplier and internal integration were coded using the numeric scales that were used by the respondents in responding to the questions posed in the questionnaire. This transformed the data into a quantitative form that permitted analysis using quantitative methods. Section A and B used descriptive statistics including measures of dispersion and central tendency were employed in the analysis. These were the mean and the standard deviation, and they assisted in exploring the underlying features in the data.

Frequencies were adopted in examining the features underlying the data on demographic characteristics of the respondents, which stemmed from the fact that such data were categorical. Regression analysis was used in establishing the relationship between supply chain integration and performance of the surveyed institutions. The analytical model that was used is as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Where:

Y = Composite measure of firm performance encompassing various aspects of efficiency and effectiveness that result from integrating a supply chain.

X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub> =, Supplier, Internal and Customer integration respectively

β<sub>0</sub> = the intercept of the regression model

β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub> = Coefficients of the regression model

**Table 3.1: SUMMARY OF DATA COLLECTION AND ANALYSIS TO BE ADOPTED IN THE QUESTIONNAIRE**

OBJECTIVE	QUESTIONNAIRE	DATA ANALYSIS
General Profile	Section A	Descriptive Statistics
Extent of Supply Chain Integration	Section B	Descriptive Statistics
Relationship between Supply chain Integration and Performance	Section C	Regression Analysis

Source: Researcher (2017)



## **CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION**

### **4.1 Introduction**

In this chapter, the research data and the results of its analysis are presented. The chapter also discusses the data in the context of the insights from the theoretical and empirical literature. This chapter reveals important patterns on how public universities in Kenya have adopted supply chain integration, and the insights thereof provide a good basis for recommending actionable plans that these organizations could use to enhance service delivery.

### **4.2 Descriptive Statistics**

The descriptive statistics in this section were the frequencies, mean, standard deviation and percentages.

#### **4.2.1 Demographic Data**

Out of the 31 respondents that the researcher targeted, 25 completed the questionnaires, translating to a response rate of 80.65%; the researcher deemed this response rate satisfactory considering Kothari's (2004) suggestion that, for survey findings to be reliable, researchers need a response rate of at least 60%. The researcher sought to know the period over which the respondents had worked at their organizations, and table 1 below shows the findings. From table 1, it is apparent that most of the respondents (52%) had worked at their organizations for between 6 and 10 years, while 20% of the respondents had worked in their organizations for between 11 and 15 years. Therefore,

most of the respondents had the work experience required to understand the issues that the researcher was investigating.

**Table 4.1: Work Experience**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5years	7	28.0	28.0	28.0
	6-10 years	13	52.0	52.0	80.0
	11-15 years	5	20.0	20.0	100.0
	Total	25	100.0	100.0	

#### 4.2.2 Supply Chain Integration

The researcher sought the respondents' view on the extent to which their organizations' supply chains were integrated. Table 2 below shows the findings.

**Table 4.2: Extent of Supply Chain Integration**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High	15	60.0	60.0	60.0
	low	1	4.0	4.0	64.0
	Moderate	5	20.0	20.0	84.0
	Very High	4	16.0	16.0	100.0
	Total	25	100.0	100.0	

From table above, the findings suggest that most of the respondents think that the extent of supply chain integration in their organizations is high (60%), while others (20%) think that their organizations' supply chains are integrated to a moderate extent. The resource-based view of the firm considers dynamic resources and capabilities to be integral ingredients to an organizations ability to achieve its objectives (Lynch et al., 2000). Supply chain integration is a dynamic resource that enables organizations to deal with emerging challenges, and, therefore, the respondents' view about the extent of supply chain integration in their organizations shows how public universities consider supply chain integration to be a dynamic resource.

#### **4.2.3 Supplier Integration**

The researcher sought to know how the participants' organizations had integrated suppliers into their supply chains. The participants were asked to indicate, on a 5-point Likert scale, the extent to which they agreed with statements describing how their organizations could integrate suppliers into the supply chain. Table 3 below shows the findings. It shows, the respondents largely agree that supplier integration in their organizations involves information sharing, and this is consistent with Fearon et al. (2010)'s postulation that at the core of supply chain integration is the sharing of data among the actors in a supply chain.

**Table 4.3: Descriptive Statistics-Supplier Integration**

<b>Statement</b>	<b>Mean</b>	<b>Std.</b>
We provide our suppliers with helpful information regarding their operations	3.92	.759

Our information systems are interlinked with those of our suppliers	3.68	.852
We have strategic suppliers for various product and service supplies	3.64	1.075
We regularly interact with our suppliers in mutual information exchanges regarding operating activities	3.64	1.254
We share operational plans with our suppliers	3.52	.823
We share inventory status information with suppliers	3.48	.918
Suppliers' input regarding operational attributes are considered during	3.36	.810
Suppliers are provided with details of service design and operations data	3.36	.952

The findings suggest that the surveyed firms share; inventory status and sales forecast information, production plans, and helpful information on their operations, product design and manufacturing data. This is typical of Fearon et.al's (2010) framework of supplier integration in which such an initiative is underlain by mutual information exchanges between a firm and its suppliers. It was also found that the firms have a great extent of; interlinkages in their information systems and those of their suppliers, strategic suppliers for various product and service supplies, aligned business objectives with those of their suppliers and supplier participation in product development and design.

#### **4.2.4 Internal Integration**

The researcher sought to establish the extent to which the participant organizations had internal integration in the supply chain. Using a 5-point Likert scale, the respondents were asked to indicate how they agreed with statements describing internal integration; table 4 below shows the summary descriptive statistics of the responses.

**Table 4.4: Descriptive Statistics-Internal Integration**

<b>Statement</b>	<b>Mean</b>	<b>Std. Deviation</b>
Employees regularly interact with each other through such means as	3.84	.800
Departmental plans and objectives are set jointly	3.84	.800
The pursuit of various departmental objectives is harmonized	3.80	.816
The activities in various departments are coordinated centrally	3.76	.926
The resources required in task execution are shared among the different	3.72	.678
Different departments engage in information exchanges	3.64	.757
Linkages have been established across various departments with the use of integration tools such as ERP systems	3.60	.866
All employees are allowed to access all information they may require in execution of their tasks	3.52	.963
We utilize IT tools in facilitating information access	3.48	.714
Information systems in different departments are connected into a single	3.44	1.193

From the findings, it is apparent that the respondents largely agree that internal integration has entailed breaking departmental barriers that separate employees and prevent them from collaborating, and facilitating the employees to get and share all the information they need. Indeed, Handfield et al. (2009) argue that the goal of internal integration should be to enhance the effectiveness of decision-making, and achieving this goal requires all employees to have efficient access to relevant organizational data.

Therefore, by ensuring that employees can easily access any information they need, public universities have attained internal integration.

**Table 4.5: Descriptive Statistics-Customer Integration**

Statement	Mean	Std.Dev.
Our competitive strategies are based on customer needs	3.92	.640
We have mechanisms for measuring customer satisfaction	3.88	.833
We frequently measure customer satisfaction levels to track any changes	3.76	.779
We interact with our customers on various internet enabled platforms	3.72	.891
We share information with our customers services being offered at the	3.72	.542
We invite our customers to participate in the design of new products and	3.72	.936
We share details of services and products with our customers	3.68	.802
Customers' satisfaction are tracked from the time of placement to execution	3.60	.816
There are systems that track the progress of delivery of various services and products to our customers	3.56	.768
Delivery status information is shared with our customers	3.52	.823
Customer data is systematically collected for aggregation into an integrated	3.44	.870

The findings suggest that interaction with customers on internet enabled platforms, sharing details of order and delivery status with them, sharing information regarding product usage and other details pertinent to products and consultation with customers during product development are carried out to a great extent. Information sharing is a key element of Lee's (2000) postulation of information integration as one form of supply chain integration. In addition to information sharing with customers, the respondents

agree that their firms have adopted customer-centered business activities, particularly having customer needs as the basis of competitive strategies; continuously measuring customer satisfaction levels.

#### 4.2.5 Performance

The researcher sought to know the respondents' views on how supply chain integration had affected firm performance. The respondents were asked to use a 5-point Likert scale to rate statements describing how supply chain integration impacts firms performance. Table 5 below shows the descriptive statistics of the responses obtained.

**Table 4.6: Descriptive Statistics-Supply Chain Integration and Performance**

Statement	Mean	Std. Deviation
Resource sharing has reduced resource requirements in tasks performance	3.92	.572
Employee interaction has increased creative initiatives among employees	3.88	.666
Improved operational planning has seen an improvement in service delivery	3.80	.577
Real time information exchange with suppliers has led to a reduction in the inventory holding needs	3.64	.569
Less inventory holding needs have reduced costs associated with inventory	3.60	.816
Information sharing with suppliers has improved the capability with which poor supplier performance can be accommodated	3.56	.821
Cost reduction in most activities has improved efficiency in the utilization of resources	3.52	.918

Information access has increased the speed with which decision making can be undertaken within the organization	3.44	1.003
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From the findings, the respondents agree that supply chain integration has enhanced operational efficiency and effectiveness. For instance, resource sharing has made public universities use fewer resources in certain operating activities and tasks, while information sharing has made public universities more effective at decision-making. According to Fearon et al. (2010), supply chain integration enables organizations to leverage data and information to enhance their performance, and this is what the findings in the preceding table suggest. For instance, when suppliers share their operational data with a firm, there is no need for an organization to maintain inventory because it can acquire operational supplies on a just-in-time basis.

### 4.3 Correlation Analysis

The second objective of this study was to find out the relationship between supply chain integration and the performance of public universities. Correlation analysis was performed in order to examine the extent of the relationship between key variables of the study. The following table shows the correlation matrix.

**Table 4:7: Correlation Matrix**

	Firm performance	Supplier integration index	Internal integration index	Customer integration Index
Firm performance	1	0.53	0.27	0.20



Supplier integration index		1	0.51	0.43
Internal integration index			1	0.36
Customer integration index				1

As from the above shows, there is a positive and moderate correlation between firms performance and the supplier integration index (Pearson coefficient = 0.53), and firm performance and the internal integration index, correlate positively (Pearson coefficient = 0.27). Firm performance and the customer integration index, too, correlate positively (Pearson coefficient = 0.20).The supplier integration index and the internal integration index also correlate positively (Pearson coefficient = 0.51), meaning organizations that have integrated their suppliers have also attained a modest internal integration. The supplier integration index and the customer integration index also correlate positively (Pearson coefficient = 0.43). The internal integration index and the customer integration index also correlate positively (Pearson coefficient = 0.36), meaning organization integration that have integrated their internal processes have also attained a modest customer integration.

#### **4.4 Regression Analysis**

In order to establish the relationship between supply chain integration and the performance of public universities, a composite index of supply chain performance was regressed on the indices of supplier integration and customer integration.

#### 4.4.1 Regression Coefficients

Table below shows the coefficients of the regression model.

**Table 4.8: Regression Coefficients**

Model		Unstandardized		Standardized	t	Sig. (P-Value)
		B	Std. Error	Beta		
1	(Constant)	1.218	.396		3.073	.006
	Supplier integration	.361	.202	.462	1.788	.088
	Internal integration	.129	.181	.162	.712	.484
	Customer integration	.195	.223	.238	.876	.006

a. Dependent Variable: Firm performance

$$Y=1.218+0.361 X_1+0.129 X_2+0.195 X_3$$

The researcher employed the t-test of a regression coefficient to determine whether the coefficients of the regression model were significant predictors of the dependent variable. The regression coefficients were tested for significance at the 0.05 level. As table above shows, none of the three regression coefficients is significant because the significance values of the t-test statistics for both coefficients are more than 0.05. Therefore, taken individually, none of the coefficients of the regression model is a significant predictor of firm performance.

#### 4.4.2 Model Summary

Table below summarizes the results of the regression.

**Table 4:9: Regression Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.817 <sup>a</sup>	.667	.619	.25000

a. Predictors: (Constant), supplier integration, internal integration, customer integration

The multiple R for the regression is 0.817, suggesting that there is a strong, positive correlation between the values that the model predicts and the actual values of the dependent variable. The R Square is 0.667, and this means that about 66.7% of the variation in the public universities' performance can be explained by the variation in the extent to which they have attained internal integration, supplier integration and customer integration. The Multiple R and the R Square suggest that supply chain integration affects the performance of public universities.

#### 4.4.3 Analysis of Variance

To establish if the regression model is significant, the researcher used the F test of significance of a regression model. The table below shows the result of the F test of a regression model.

**Table 4.10: ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	2.628	2	.876	14.014	.000 <sup>a</sup>
	Residual	1.312	21	.062		
	Total	3.940	24			

a. Predictors: (Constant), external integration, internal integration

b. Dependent Variable: firm performance

Table 9 shows that the F test statistic used to test the significance of the regression model has a significance value of 0.00. Considering the model was tested for significance (p value) at the 0.05 level, a significance value of 0.00 means that, if the null hypothesis were true, there is no way the researcher would have obtained the kind of data that was obtained in this study. Therefore, the regression model is statistically significant; indicating that supply chain integration has affected the performance of public universities. The regression is statistically significant for it supported by the F critical value 14.014, thus reject the null hypothesis meaning that the regression model is statistically significant.

#### **4.5 Discussion of Findings**

The R Square is 0.667, and this means that about 66.7% of the variation in the public universities' performance can be explained by the variation in the extent to which they have attained internal integration and supplier integration. The significance value of the F-test statistic falls below the significance level at which the regression model was tested for significance, meaning the regression model is significant and it predicts the study's independent variable.

The coefficient of internal integration is 0.129, and it means that, for every unit change in the internal integration index, the performance of the public universities improves by 0.129. Thus, internal integration has an impact on the performance of public universities because it allows them to improve their effectiveness in service delivery and the efficiency with which they use resources to deliver these services.

The coefficient of supplier integration is 0.361, and this means that, for every unit change in the supplier integration index, the performance of public universities improves by 0.361. Therefore, supplier integration is beneficial to public universities because it increases their ability to leverage information as a dynamic resource, and, ultimately, this improves their effectiveness and efficiency.

Findings from the analysis is in collaboration in the studies of Bargchi and Larsen (2002) in that integration of supply chain results leads to high responsive to customers' demands, reduction in cycle time, reduction in the operational costs and increased customer service levels. It also collaborate with Frohlich & Westbrook (2001) showing that supply chain integration is essential in increasing the customer service level and operational efficiency.

As observed from the analysis, customer integration, supplier integration and internal

integration are the elements of supply chain integration that influence the organization performance through relationship linkages and information integration (Bowersox et.al.2002).

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

In the preceding chapter, the researcher presented the research data, analyzed it and drew necessary insights. In this chapter, the researcher summarizes the study findings and draws the conclusion on the research questions. The chapter also offers recommendations for improving service delivery in public universities in Kenya.

### **5.2 Summary**

The findings suggest that public universities have adopted supply chain integration by integrating their internal processes as well as integrating their suppliers into their operations. The dominant aspect of internal integration is the breakdown of lines that have traditionally separated various departments. Once departments have been integrated, it becomes easy for employees to share necessary information, and this not only ensures employees make operational decisions in a short time, but it also helps the universities to attain high levels of efficiency in resource utilization. Supplier integration has seen public universities share important operational information with their suppliers, and, just like in the case of internal integration, it has enhanced decision-making effectiveness by reducing information asymmetries between the public universities and their suppliers. The synergies resulting from the cooperation between public universities and their suppliers has enabled them to turn information into a dynamic resource that helps them adapt to, and address, new challenges.

From the findings, it is clear that internal and external integration have enhanced the performance of public universities. The regression analysis showed that there is a high correlation between the predicted values of the dependent variables and the actual values

of the variable that had been used to make those predictions, meaning the regression model was a good representation of the outcomes of internal integration and supplier integration in public universities. The test of the significance of the regression coefficients also showed interesting insights. None of the two coefficients of the regression model is significant, suggesting that, taken alone, the independent variables of the model do not have an impact on the performance of public universities. However, despite the non-significance of the individual coefficients of the regression model, the regression model itself is significant, suggesting that the synergies from supplier integration and internal integration are helpful for public universities.

### **5.3 Conclusion**

Largely, public universities have integrated their supply chains. The integration has taken the form of supplier integration and internal integration. In supply chain integration, the stakeholders in a supply chain share important operational information; effective sharing of such information demands that the public universities break down internal and external barriers that could impede information sharing. Supply chain integration has enabled public universities to enhance their efficiency and effectiveness in service delivery. With internal integration and supplier integration, employees of public universities do not have to wait long to make important operational and tactical decisions because information flows seamlessly and it is easy to find.

### **5.4 Recommendations**

Considering the impact of supply chain integration in public universities, these institutions should extend their approaches to supply chain integration. The findings from this study have shown that the dominant elements of supply chain integration are



information sharing and integration of organizational departments. If public universities were to adopt more elements of integration, there is no doubt they would achieve more in terms of operational efficiency and effectiveness. One way the public universities can extend supplier chain integration is through joint decision-making with the suppliers where both parties agree on their annual operational plans and employ tactical strategies that are mutually beneficial.

### **5.5 Limitations of the Study**

A limitation of the study was that it did not include some variables that affect the performance of public universities, and it is the reason why the regression model could not explain a substantive proportion of the variation in the dependent variable. Including some variables would have helped reduce the proportion of variation in the dependent variable that the regression model could not explain. Public universities operate in a context that is different from that of commercial entities, and this means the addition of variables that reflect the idiosyncrasies of public universities would have improved the explanatory power of the regression model.

### **5.6 Suggestions for Further Research**

This study should be done but the regression model should incorporate some variables that reflect the unique context of public universities that differentiates them from commercial organizations. Supply chain management is a concept that emerged from the techniques that commercial entities used in managing their operations, meaning most of the supply chain management practices are largely applicable in commercial entities. However, these practices can still find use in non-commercial enterprises, which is why

this study has to be replicated using variables that reflect the unique context of a non-commercial entity.

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## APPENDICES

### APPENDIX I: QUESTIONNAIRE

#### Introduction

This questionnaire is intended for use in collecting data in pursuit of the objectives of the study titled “Supply Chain Integration and Performance of public universities in Kenya”. It has three sections each containing questions on general survey participant information, supply chain integration and relationship of supply chain integration to the organizational performance. Kindly complete the questionnaire as per the instructions. Your participation is highly appreciated.

#### Section A: General Information

1. Company Name \_\_\_\_\_

2. What is your Job designation in this company? (Tick as appropriate)

Supply Chain Manager

Procurement Officer

Operations Manager

Logistics Manager

Marketing Manager

Other (Specify) \_\_\_\_\_

3. For how long have you held the position? (Tick as appropriate)

1-5 years

6-10 years

11-15 years

Over 20 years

Other (Specify) \_\_\_\_\_

**Section B: Extent of Supply Chain Integration**

4. How do you rate the extent to which the supply chain of your institutions products and services is integrated (tick where appropriate)

Very high

High

Moderate

Low

Don't Know

5. The following are statements reflecting specific aspects of supplier integration in a supply chain. Kindly indicate your level of agreement with them according to the following scale:

1-not at all, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	We share sales forecast information with our suppliers					
2	We share procurement plans with our suppliers					
3	We share inventory status information with suppliers					

4	Suppliers' input regarding product/services attributes are considered during product/services development					
5	Suppliers are provided with details of product design and manufacturing data					
6	We provide our suppliers with helpful information regarding their operations and service delivery					
7	Our institutions objectives are aligned to those of our suppliers					
8	Our information systems are interlinked with those of our suppliers					
9	We have strategic suppliers for various product and service supplies					
10	We regularly interact with our suppliers in mutual information exchanges regarding operating activities					

Any other? Please state \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

6. Below are statements describing elements of internal integration within an organization? Please indicate the level to which you agree with each of them on the following scale;

1-not at all, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent.

No.	Statement	1	2	3	4	5
1	All employees are allowed to access all information they may require in execution of their tasks					
2	We utilize IT tools in facilitating information access					
3	Information systems in different departments are connected into a single department					
4	Employees regularly interact with each other through such means as meetings, email					
5	Departmental plans and objectives are set jointly					



6	The pursuit of various departmental objectives is harmonized					
7	The activities in various departments are coordinated centrally					
8	The resources required in task execution are shared among the different departments					
9	Different departments engage in information exchanges					
10	Linkages have been established across various departments with the use of integration tools such as ERP systems					

Any other? Please state \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Please indicate the extent to which you agree with the following statements regarding the extent to which customers have been integrated into the supply chain of your institutions, using the scale below;

1-not at all, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	Our competitive strategies are based on customer needs					
2	We have mechanisms for measuring customer satisfaction					
3	We frequently measure customer satisfaction levels to track any changes					
4	We interact with our customers on various internet enabled platforms					
5	We share information with our customers services being offered at the institution					
6	We invite our customers to participate in the design of new products and services					

7	We share details of services and products with our customers					
8	Customers' satisfaction are tracked from the time of placement to execution					
9	There are systems that track the progress of delivery of various services and products to our customers					
10	Delivery status information is shared with our customers					
11	Customer data is systematically collected for aggregation into an integrated database					

Any other? Please state \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Section C: Performance**

8. Below are statements describing on Performance. Kindly indicated the level to which you agree with them in accordance to the following scale:

1-not at all, 2-low extent, 3-moderate extent, 4-large extent, 5-very large extent

No.	Statement	1	2	3	4	5
1	There is an increased level of flexibility that influences the operations					
2	There is a reductions of wastes associated with the operations of the service delivery					
3	There is increased information sharing with other department in order to enhance operational efficiency					
4	There is a decline of overall administrations costs					
5	There is increased speed with which decision making can be undertaken within the firm					
6	There is high efficiency of assets utilization					
7	There is increased creative initiatives among employees					

8	There is high response to dynamic customer needs					
9	There is an accurate demand forecasting of items and supplies being required by different departments in the firm					
10	There is increased customer satisfaction levels					

Any other? Please state \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**THANK YOU FOR YOUR TIME**

## **APPENDIX II**

### **PUBLIC UNIVERSITIES IN KENYA**

1. University of Nairobi - UON
2. Kenyatta University - KU
3. Moi University - MU
4. Egerton University - EU
5. JKUAT - Jomo Kenyatta University of Agriculture and Technology
6. Maseno University - MSU
7. Masinde Muliro University of Science and Technology - MMUST
8. Technical University of Kenya - TUK
9. Pwani University - PU
10. Dedan Kimathi University of Technology - DKUT
11. Technical University of Mombasa - TUM
12. Chuka University - CU
13. Kisii University - KSU
14. Maasai Mara University - MMU
15. Meru University of Science and Technology - MUST
16. University of Kabianga - KBU
17. Jaramogi Oginga Odinga University of Science and Technology - JOOUST
18. South Eastern Kenya University - SEKU
19. Multimedia University of Kenya - MMUK
20. Laikipia University - LKU
21. Karatina University - KRU
22. University of Eldoret - UOE
23. Taita Taveta University College - TTUC
24. Muran'ga University College - MRUC
25. Kirinyaga University College - KYUC
26. Cooperative University College of Kenya - COPUCK
27. Kibabii University - (KIBU)
28. Garissa University College of Kenya - GUC

29. Rongo University College of Kenya - RUC
30. Embu University College of Kenya - EUC
31. Machakos University College of Kenya - MCKUC

**Source:** Commission for University Education (2017)