

**INFORMATION TECHNOLOGY AND ORGANIZATIONAL PERFORMANCE:
A CASE STUDY OF KENYA AIRPORTS AUTHORITY**

Benard Omoro Bosire

The Management University of Africa, Kenya

&

Prof. Emmanuel Awuor

The Management University of Africa, Kenya

ABSTRACT

This study concentrated on the technological roles and performance of supply chain management in Kenya Airports Authority. The descriptive research design was used in the research study. The main data collection instrument was a structured questionnaire and phone interviews, which were used to collect data on various departments such as engineering, information and communication technology, human resources, procurement, corporate planning, and finance. To accomplish this, the research study limited itself to Kenya Airports Authority employees, with a target population of 240. The questionnaires were distributed online to senior managers, middle level managers, lower-level management, and non-management staff using a census sampling method Cronbach Alpha of 0.70 at 95% confidence level was used to assess the instrument's reliability. The collected data was coded for ease of analysis, and both inferential and descriptive statistics were generated using the SSPSS computer packages version 23. To make inference, perform a regression analysis on the dependent variable (supply chain performance) and independent variables (accuracy, speed, operational costs, and information exchange). The study found a 0.701 positive and statistically significant relationship between technological roles and supply chain performance, which is greater than the acceptable figure of 0.05. The findings show that there is a strong correlation between the two and that they rely heavily on one another. According to the findings of the study, departmental functions are inclined to improve supply chain performance through the use of technology to the greatest extent possible. The main recommendation is for organizations, particularly those in the service industry, to invest in modern technology, staff training, and infrastructure, as this will make their work easier and allow them to meet the needs of their customers while achieving organizational goals.

Key words: *Technological roles, technological advancement, artificial intelligence, Supply chain performance, supply chain, emerging technologies, accuracy, speed, operational cost and information exchange.*

INTRODUCTION

Technology in the supply chain can assist to improve supply chain activities, operations, reduce lead time achieve accuracy, speed, efficiency, cut costs higher standards of information sharing thus a firm will meet customer satisfaction and create a competitive advantage if properly implemented and generate superior company performance Kenneth and Laudon, (2016). Technology also ensures integration of existing technologies and new packages to enable processes to run concurrently and thus achieve the firm's goals. This model helps a lot in increasing customer service streamline supply chain and reduces costs. The new technology must fit into the organizational policies, goals, practices and people to use optimally. The topic "Role of technology attributes to firm's performance" has not been focused directly in research instead many researchers have focused on effects of ICT, Impact and performance. As it is to Logistics firms Kenya Airports Authority has not been left behind in applying Information technology in their supply chain activities Cooper and Schindler, (2013). I have conducted research to understand and evaluate the correlation between Technological roles and supply chain performance.

Several studies have been done to investigate information technology and supply chain in specific areas for example Munizu, et al., (2019) inferred those practices of supply chain increase company's ability to build strategic relationships with suppliers, customer relationship, information sharing level, and flexibility in fulfilling customer orders can affect company competitiveness. In other words, those practices can lead to effort in creating best company competitiveness in the market.

Supply chain refers to a physical network, namely a group of companies that supply a set of raw materials, manufacture goods, and distribute them to end customers, whereas supply chain management refers to strategies, approaches, methods, and

tools used in managing supply chains in order to maximize the value obtained by all company members in the overall supply chain system Chopra and Meindl (2011). Supply chain management, as a system, integrated all activities in the organization, beginning with the procurement of raw materials and services, then transforming them into semi-finished products, end-products, and finally delivering them to end-customers (Heizer & Render, 2015).

Every company can gain a competitive advantage by optimizing resources for the best supply chain management and long-term company competitiveness Hello and Pujawan (2016). Technically, supply chain management necessitates complete commitment from either managers or employees. Then, in order to achieve the best performance, it can be adopted by all industries in both developed and developing countries. In practice, however, there are some differences in orientation between countries, such as cost-cutting and customer-orientation policies (Kot, Goldbach and Ślusarczyk, 2018). Supply chain management entails all members, from suppliers to customers, either directly or indirectly through the fulfilment of customer orders. Companies can reduce all cost components incurred in company operations by implementing an efficient supply chain. It has the potential to improve product quality and of delivery to customers (Chopra & Meindl, 2011).

The hypothesis here is whether or not there is a relationship between supply chain performance and accuracy, speed, operational costs, and information sharing. The technological gap will be bridged by investing in technological infrastructure, implementing modern applications, and empowering the staff in charge of this process, all of which will have an impact on closing the gap (Storey and Chen, 2012). The study's findings and recommendations will be extremely beneficial to management because they have the potential to generate relevant information that will improve accuracy, speed, cost reduction, and information sharing in the supply chain management process, specifically purchase order processing.

Management at Kenya Airports Authority may gain insight into strategies for increasing technology adoption. The study's findings are critical for KAA policymakers and stakeholders because they provide critical data for senior

management in developing policies and procedures. Implement best supply chain management practices and the appropriate infrastructure for the organization. This research is applicable to both the manufacturing and service industries. The findings should be used to determine which technological roles; strategies a service industry should invest in order to be successful in business as eluded by Yang G., (2012). It will serve as a guide for those who make decisions, develop strategies, and develop new technologies. The study's findings will aid in identifying areas where costs can be reduced. Because this is the most common problem for many organizations, the findings have a solution. When technology is used correctly, it ensures efficiency and accuracy. As a result of the study's findings, academics will have a better understanding of the role of technology in Supply Chain Management efficiency. The findings will also create a favourable environment for future related studies, as well as a foundation for further knowledge on the subject studied. Future academicians, researchers, and scholars may find the findings useful in contributing to the body of knowledge on the subject. The bottom-line question is that what effects the independent variables has on supply chain performance in Kenya Airports Authority.

Statement of the Problem

The supply chain activities are controlled by the roles of technology that is accurate, quickly but carefully executed, flexible, and easy to understand. Reduces operational costs, is integrated and used by all departments, provides critical information for decision making, and is linked to customers, resulting in an effective and efficient mechanism. Customers can obtain information more easily with the help of well-designed supply chain technology systems.

Other sections can use the data to make decisions, generate reports, develop policies, and implement controls that adhere to standards. This applies to any system that, as Aldegis suggests, uses technology to integrate its activities (Aldegis, 2018). Despite the adoption of information technology in almost all departments of the Kenya Airports Authority at the moment, observations have revealed that not all organizational objectives have been realized and felt by users. It is important to note that some

applications, among others, are not performing as expected, causing some consequences for shareholders, internal users, and suppliers. Kenya Airports Authority departments appear to be primarily concerned with the flow of information and the procurement of goods from one point to another, while controls and training appear to be overlooked. Furthermore, several studies have investigated Information Technology and supply chain in specific geographical areas. Mzoughi et al. (2018) conduct a survey of 216 Tunisian managers to investigate the impact of supply chain management and Enterprise Resource Systems on organizational performance and competitive advantage in Tunisia. Their findings highlight the significance of Supply Chain Management and Enterprise Resource Planning system adoption, as well as their positive impact on organizational performance and competitive advantage in Tunisian firms.

Reyes, Raisinghani and Singh, (2012), describe the importance of inter and intra supply chain management through collaboration with supply chain partners and entities both upstream and downstream in order to integrate the information systems from a global supply chain perspective.

Technology has brought accuracy, effectiveness, speed, reduced operational costs with good overall performance. This has been made possible by the exchange of information among stakeholders, as stated by Hofman (2014) in his report, supply chain success is the result of information exchange among firms and their supply chain management. The companies which want to be responsive, efficient they need to adopt technology as an important driver, technology play very important role in designing a competitive strategy. Timely, accurate information is critical in business environment of today now than at any time before. Every manager in any organization is motivated to use information technology in their day-to-day activities in order to compete with others in the market. This creates fear of competition and also demonstrates the importance of information technology in the business world. It will provide a firm with a competitive advantage over the competition in a business environment (Fasanghari and Kamal, 2018). The gap this research intends to address is whether technology has any effect on supply chain performance. This statement

corroborates with the main objective which states that the study was to evaluate the influence of the role of Technology on Supply Chain Management performance in Kenya Airports Authority and examine whether it has any effect on accuracy of Purchase Order processing, Speed in Purchase Order processing, Operational costs and information exchange at KAA and its business partners.

LITERATURE REVIEW

Theoretical Framework

The theoretical literature review evaluates previous research conducted by other academicians and assists in making well-informed statements about the relationship between the independent variables and the dependent variable, in this case the performance of Kenya Airports Authority's purchase order processing and supply chain management.

Theories are developed to explain, predict, and comprehend phenomena, as well as to challenge and extend existing knowledge within the confines of critical boundary assumptions in many cases Gabriel and Abend (2018). The theoretical framework is the structure that can hold or support a research study's theory. This instrument also introduces and describes the theory that explains why the research problem under study exists Swanson & Richard (2013).

According to McLuhan and Marshall (2014), System means something to look at. It has to have a very high visual gradient to be systematized. But there was no system in pre-Descartes philosophy. Plato had no system. Aristotle did not have a system. The interdisciplinary study of systems, which are related groups of interconnected and interdependent parts, whether natural or artificial, each system is limited by space and time, influenced by its environment, defined by its structure and purpose and expressed by how it works. A system can be more than the sum of its parts if it expresses synergies or emergent behaviour. In computer and information science, a system is a hardware system, software system, or combination that has components such as its structure and observable communications between processes such as their

behaviour. An example should make it clear again: There are counting systems, e.g. for Roman numerals, and various systems for storing documents or catalogs and various library systems. Trunks, an example of which is the Dewey decimal classification, which still fits the definition of components, which in this case are connected to each other to facilitate the flow of information.

METHODOLOGY

The study used a simple random sampling technique to select the departments to be studied. To ensure that the elements selected are representative of the population. Sampling is a method or technique for selecting a predetermined number of subjects from a defined population to represent that population. The random sampling technique, according to Orodho (2003), is simple and easy to apply, making the research process simpler and faster. The process of selecting a group of people for a study in such a way that the people chosen represent the larger group from which they were drawn is known as sampling Mugenda & Mugenda (2009). Data was collected using a questionnaire, and researchers screened the data by going through all of the returned questionnaires and posting the data on Excel and later subjected it to analysis using the SPSS model to obtain percentages, mean, median, and standard deviation, as well as coefficient correlation also by checking the results using the ANOVA system by means of screening all four variables in the same system. When the data on independent variables was examined, it was discovered that there was a high level of relationship between the variables and supply chain performance, confirming our hypothesis that there is a relationship between independent variables and dependent variables.

The participants of this research were majorly Kenya Airports Authority employees chosen randomly from Kenya Airports Authority Headquarters, Jomo Kenyatta International Airport, Moi International Airport and Kisumu International Airport. Their age ranges from 25 years being the youngest to 59 years the oldest. In this age bracket the list comprised of both Male and female employees. Educational levels were Secondary, Diploma, Bachelor's degree and PHD holders. The participants were selected randomly from staff emails and by pre-phone communication were served

with a questionnaire online which they filled online and returned online. The independent variables were accuracy in Purchase Order processing, Speed in Purchase Order processing, Operational costs in Purchase Order processing and Information exchange in Purchase Order processing and Dependent variable was Supply chain performance. The selection used Likert scale ranging from (1- 5) thus (1) strongly disagree, (2) disagree, (3) undecided, (4) agree and (5) strongly agree. Data analysis was done based on the measures given by the participants by calculating the percentages and means. Research participants shall not be subjected to harm in any way whatsoever; dignity and respect must prevail; get consent from the participants; privacy shall be observed; confidentiality should be observed; anonymity from both individuals and organizations should be ensured and any deception or exaggeration on aims and objectives of the research is avoided; affiliations of any form, sources of funding, as well as possible conflicts of interests should be declared; any communication in relation to the research shall be done with honesty, transparency, misleading information and no bias in data representation. Inclusion the research communication was done as per the laid done ethical principles.

RESULTS

Supply chain performance

The study sought to investigate the impact of technology on the performance of supply chain management roles. Firmly disagree and disagree were interpreted as disagreeing together, agree and firmly agree were grouped and interpreted as agreeing, and undecided was interpreted alone Table 1 displays the results obtained.

Tables and figures

Table 1: Supply chain performance

Objectives	SD	D	UD	A	SA
We have shared believe on accuracy in Purchase Order Processing	0%	5%	5%	15%	75%
Enabled Speed In Purchase Order Processing	13%	15%	7%	13%	52%
Controls to ensure minimal operational Costs	6%	20%	4%	25%	45%
We trust in Information Exchange in purchase order processing	9%	8%	0%	5%	78%

Table 1 demonstrates that the majority of employees agreed that in the organization, employees have shared a trust in information sharing, with a percentage score of 78 percent implying that having shared information improves purchase order processing.

The findings also revealed that a sizable proportion of employees agreed that enabling speed in purchase order processing improves supply chain management performance. Controlling operational costs in the supply chain brings costs down to manageable levels. Finally, information exchange has a positive impact on supply chain management performance when it is shared on time, effectively, and at the right location.

Accuracy in purchase order process

The study investigated the effect of purchase order processing accuracy on supply chain management performance at Kenya Airports Authority. A comparison of the means of variables describing the accuracy of purchase order processing is used to achieve this goal. The performance of supply chain management at Kenya Airports Authority is the independent variable under consideration here. The respondents were asked to respond to item testing questions. In the data analysis, descriptive statistics with a standard deviation were used. Variables with a mean close to 5 indicated firmly agree (FA), 4 indicated agree (A), and 3 indicated undecided (U), whereas those with 2 indicated disagree (D), and 1 indicated firmly disagree (FD). In addition, standard deviation was used to indicate the respondents' consensus. The descriptive data are shown in Table 2.

Table 2: Accuracy in purchase order process

Item	FD %	D%	U%	A%	FA%	Total percentage
Accuracy						
A1	4.54	0	4.54	59.09	31.83	100%
A2	18.23	9.09	9.09	31.81	31.81	100%
A3	31.81	22.72	4.54	36.36	4.54	100%
A4	0	0	31.83	27.27	40.90	100%
A5	22.77	22.77	31.81	13.63	9.09	100%
A6	0	9.09	9.09	18.18	63.64	100%
Average	13%	11%	15%	31%	30%	

As shown in Table 2 above, the majority of respondents 59.09% agree that Purchase Order processing is accurate, followed by 31.83% who firmly agree with the statement, while 4.54% are undecided with the same statement. The other 4.54% firmly disagree with the statement while 0% did disagree. It further reveals that there is consistent and accuracy in payment processing at Kenya Airports Authority with 31.81%

respondents who firmly agree with the statement and tie with those who agree to the statement while firmly disagree at 18.23% and Disagree tie with Undecided at 9.09%. Based on the results of the above analysis, with an average percentage of (31% & 30%) demonstrates a high level of accuracy in Purchase Order processing in KAA.

Speed in purchase order process

It was clear that the speed with which Purchase Order should be processed had an impact on the improvement of Supply Chain Management activities at Kenya Airports Authority.

Table 3: Speed in purchase order process

Item	FD %	D%	U%	A%	FA%	Total percentage
Speed						
S1	0	16.27	23.74	9.09	50.90	100%
S2	18.18	9.09	4.54	27.29	40.90	100%
S3	0	0	45.45	31.83	22.72	100%
S4	9.09	27.29	27.27	22.72	13.63	100%
S5	0	36.37	13.63	36.37	13.63	100%
S6	4.54	4.54	22.74	59.09	9.09	100%
Average	5%	16%	23%	31%	25%	

According to Table 7 above, the average percentages those participants who agreed that speed of purchase order processing is necessary to avoid delays, approvals, get ready information and suppliers received Purchase orders online the greatest percentage agreed to the statements at 31% while 25% firmly agreed. At 23% were undecided while 16% Disagreed to the statements. The two highest average percentages (31% & 25%) indicates that a large proportion of respondents recognize the importance of speed in Purchase Order processing, in order to avoid delays hence suppliers will be receiving them in time and make timely deliveries.

Operational costs in purchase order process

Table 4: Operational costs in purchase order process

Item	FD %	D%	U%	A%	FA%	Total percentage
OPCOSTS						
O1	0	36.36	9.09	36.36	18.19	100%
O2	18.18	0	13.63	22.73	45.37	100%
O3	4.54	4.54	0	27.29	63.63	100%
O4	18.18	0	13.63	13.63	54.56	100%
O5	40.82	18.19	18.18	18.18	4.54	100%
O6	0	4.54	9.09	44.90	41.47	100%
Average	13%	11%	8%	27%	38%	

Table 4 above, shows that majority of respondents at an average percentage of 38% firmly agreed that at Kenya Airports Authority inventory management is properly managed, employees are paid allowances within 2 working days, employees are paid salaries by 26th day of every month, operational costs are settled at the close of every day, contractors are paid after 28 days of submission of payment demand and Kenya Airports Authority has an effective risk assessment policy. The findings indicate that operational costs are well managed at the source and bills settled as per the organization policy.

Information Exchange in purchase order process

Table 5: Information Exchange in purchase order process

Item	FD %	D%	U%	A%	FA%	Total percentage
Information						
IE1	4.54	18.18	22.74	27.27	27.27	100%
IE2	4.54	40.90	4.54	31.83	18.18	100%
IE3	9.09	13.63	14.20	44.90	18.18	100%
IE4	9.09	4.54	13.63	22.74	50.00	100%
IE5	18.18	9.09	9.09	13.63	50.01	100%
IE6	13.63	13.63	0	31.84	40.90	100%
Average	10%	17%	11%	29%	34%	

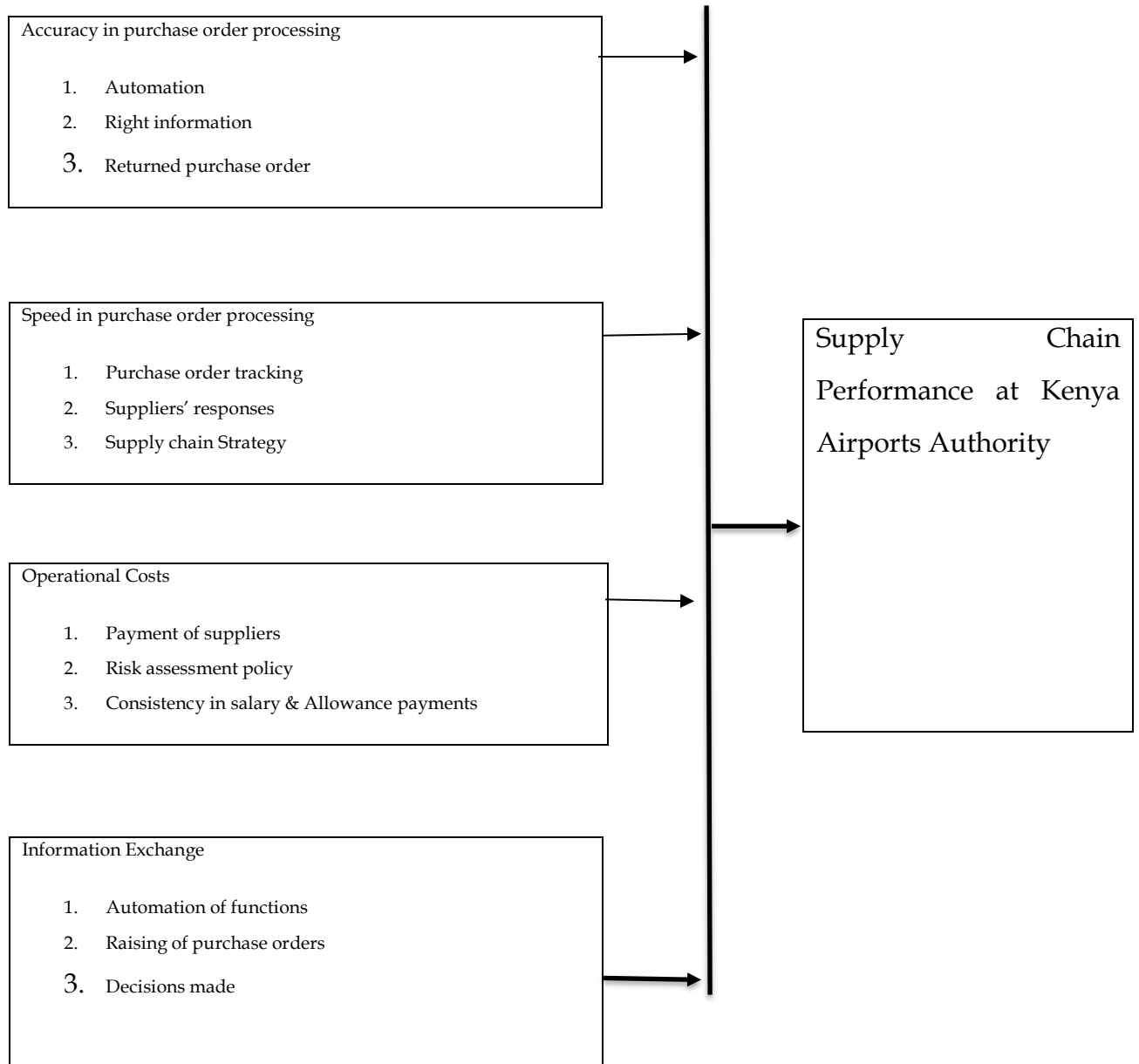
According to the findings from the above table 5, the majority of respondents (34%) firmly agreed that there is automated procurement experience, suppliers are empowered through vendor portals, workload is reduced, reliable exchange of information, time decisions and feedback is received in time in processing Purchase Order. While 29% agreed with the statements, 17% disagree, 11% were undecided and 10% firmly disagreed. The findings indicate that information exchange is critical in the processing of purchase orders hence improves supply chain performance.

Figure 1: Conceptual framework

Independent Variables

Dependent

Variable



The figure above illustrates the independent variables and dependent variable and their relationship to one another.

Regression

In our further data analysis, we used SPSS, a regression model, and ANOVA to do the analysis. In our analysis presentation, we used figures and tables, as well as a few tests, significance levels, and Standard Deviation calculations. Table 6 presents model summary, Anova and results of Regression.

Table 6: Model Summary

Model	R	R Square	Adjusted Square	R	Std. Error of estimate	Durbin-Watson
1		.828a	.686		.388	1.851

Predictors: (Constant), organizational objectives

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	1646.011	4	.412	2.729	.000b
2	Residual	75432.123	5	.151		
	Total	77078134	9			

a. Dependent variable: Supply chain performance

Table 7: Presents the ANOVA results

Predictors: (Constant), organizational objectives

Model		Unstandardized coefficients		Standardized coefficients		
		B	Std. Error	Beta	t	
1	(constant)	.175	.271		.647	.524
	Org. objectives	.245	.077	.257	.309	.030

Dependent Variable: Supply Chain performance

According to the study findings, an integrated system improves communication and information exchange within the organization, with suppliers, and with other customers, making it more efficient and effective if not properly will cost a firm its achievements. According to the findings, organizational objectives were statistically significant in predicting the good supply chain performance. The company's tradition, through its norms, values, assumptions, and symbols, establishes how its members interpret and perceive the truth within and around their company, as well as how they behave in that truth. Organizational culture is important because it is used in external and internal communications within a company. By knowing better, the behaviour of the company's tradition, it will easily identify the necessary information systems organization. The findings also revealed a positive and significant relationship between organizational objectives and supply chain performance ($=.245, p=0.0300.05$). According to the coefficient regression, if organizational objectives increase by one unit, supply chain performance decreases by .268 units.

The organizational objectives are responsible for 68.6 percent of the high supply chain performance. This high performance is affiliated to good supply chain collaboration, coordination, accuracy and information sharing. However, it has to be noted that poor supply chain management will bring down high organizational performance.

The ANOVA results for all variables show a highly significant relationship between the variables at $F= 2.729$ and $P= 0.000$, implying that there is a strong relationship between the four variables and supply chain performance in Kenya Airports Authority. This lends support to the findings of Macharia N. W. et al. (2015), who investigated the relationship between customer service delivery and information technology in logistics firms. It was discovered that there is a high correlation between the variables.

DISCUSSION

This chapter provides a synopsis of the entire study. The study's main findings are summarized, and conclusions drawn. The recommendations based on these findings are discussed, and areas for additional research are suggested findings are as below:

Information exchange in Purchase Order processing

According to the findings of the study, the higher the level of Information Technology usage in departments, the more effective and efficient they are. As a result, the use of IT improves the performance of Kenya Airports Authority departments. Organizations with integrated information systems outperform organizations without integrated information systems. This makes it possible for the organization to gather data and use it in purchase order processing otherwise without ready and sufficient information the process will delay.

Accuracy in Purchase Order processing

The study found that the use of Systems Applications and Products in Data Processing application in Enterprise Resource Planning system increase customer's confidence, reduces cost and secure on the security bonds imposed on the system when the departments carry out their supply chain activities. This improves the performance of firms in terms of increased profitability and increased security hence customer confidence. If accuracy is not factored in the process, there will arise complaints and errors.

Speed in Purchase Order processing

The study found high relationship between customer deliver and the organization performance. All departments using Information Technology at a point of offering services to a customer did show a better performance. Information Technology is integrated in customer service delivery applications that include but not limited to invoices, Purchase Order, information exchange among other areas. Speed is important as it leads to timely deliveries and meets customer needs.

Operational costs in Purchase Order processing

The study found that the use of document (Purchase Order) tracking system increase customers' confidence, and reduces costs from time management. It also creates security boundaries on the Systems in the fact that there are administrative rights given to those employees who deal with the Purchase Order processing. This improves the performance of the departments in terms of saved time, costs, efficiency and accuracy and therefore, results in an increased profitability, security hence customer confidence. Operational costs are monitored well however, if not controlled will cost an organization to lose market grip and face making losses.

Performance of Supply Chain Management

Supply chain performance is an extended supply chain to meet end-customer requirements, such as on-time product availability and all inventory and capacity required by the supply chain to deliver this service quickly. Refers to an activity. Supply chain performance transcends corporate boundaries as it covers basic materials, components, subassemblies, finished products, and distribution to end customers through a variety of channels. Supply chain performance is an extended supply chain to meet end-customer requirements, such as on-time product availability and all inventory and capacity required by the supply chain to deliver this service quickly. Refers to an activity. Supply chain performance transcends corporate boundaries as it covers basic materials, components, subassemblies, finished products, and distribution to end customers through a variety of channels. It also goes beyond traditional functional organizational lines such as procurement, manufacturing, sales, marketing and sales. In order to win them in the new environment, the supply chain needs to be continually improved. To do this, you need key performance indicators or metrics that help improve global performance in your supply chain, rather than narrow company-specific or feature-specific metrics that prevent improvements across your chain. Known metrics are qualitative and quantitative metrics when it comes to customer satisfaction and quality examples are Lead time, supply chain response time, flexibility, resource utilization, and delivery

performance. The supply chain activities are more like a tree with a multitude of branches and a complex root system that all work together to transform raw material to products delivered to customers. Organizations is able to gather required information on the entire supply chain management and respond quickly to certainties of market changes, thereby gain competitive advantage when effectively utilizing Supply Chain Management. Data availability and visibility allows for a single point of contact with data, allowing for fast and accurate decisions based on supply chain data, as well as cooperation with partners to accomplish the key aim of information technology in supply chain management.

Conclusion

The study found that the level of information usage among Kenya Airports Authority departments contributed to the supply chain performance. Use of information technology to perfect accuracy and speed resulted to better performances in departments. Customer service delivery was tremendously improved. And from their feedback much of Kenya Airports Authority customers were satisfied with services offered by the Authority. Their responses to Purchase Orders also showed that they are getting them in time and with the right information their quick response automatically improves performance of Kenya Airports Authority in supply chain. Lastly information integration systems brought all applications to one set computer hence reduced data search time, waiting hours therefore reducing administrative costs and this had contributed reduction of operational costs to minimum. This factor also improves the overall supply chain performance in Kenya Airports Authority.

Recommendations

The organization's objectives describe the procedures and methodologies used in preparing documents and generating supply chain information. The study suggests that clear guidelines and procedures be developed to be followed when preparing these documents and generating supply chain information. There should be a mechanism in place to ensure that acceptable security, professional ethics, confidentiality, and standards are met.

REFERENCES

- Abend & Gabriel (2018), The meaning of theory. *Sociological Theory* 26 June 2008: 173 - 199;
- Aldegis, A. M. (2018). Impact of Accounting Information Systems' Quality on the Relationship between Organizational Culture and Accounting Information in Jordanian Industrial Public Shareholding Companies. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 8(1), 70-80.
- Chen et.al., (2012) Business intelligence and analytics: from big data to big impact. *management information system quarterly* 36(4), 1165 - 1188.
- Chopra, S. & Meindl, P. (2011). *Supply Chain Management: Strategy, Planning, and Operations*, 3rd ed. New Jersey, USA: Pearson Education.
- Cooper & Schindler, (2013) *Business Research Methods*. New Delhi: Tata McGraw.
- Cox, T. & Ghonein, K. (2006) the Agile Supply Chain; Competing in Volatile Markets", *Journal of academic Industrial Marketing Management*, 29(1) 37-38.
- Fasanghari, R. & Kamal, C. (2018) assessing the impact of information technology on supply chain management. *World applied sciences journal*, 4(1), 87-93 Han.
- Heizer, Jay & Render B. (2015). *Operations Management: Sustainability and Supply Chain Management*. 11th ed. Jakarta: Salemba Empat Press.
- Hello & Pujawan (2016). *Operations and Supply Chain Management: An International Journal* DOI:10.31387/oscm0260175
- Hofman D. (2014). Hierarchy of supply chain metrics, *Supply Chain Manage. Rev.* September (2014) 28-37.
- Kot, S., Goldbach, I. R., & Ślusarczyk, B. (2018). Supply chain management in SMEs - Polish and Romanian approach. *Economics and Sociology*, 11(4), 142-156. doi:10.14254/2071-789X.2018/11-4/9.

- Laudon & Laudon, (2016). Management information systems: Managing the digital firm.
- Macharia N. W, et.al. (2015). The of information technology on performance of logistics firms in Nairobi County *International Journal of Scientific and Research Publications, Volume 5, Issue 4, April 2015 1* ISSN 2250-3153 www.ijsrp.org.
- McLuhan, & Marshall (2014). *The Hot and Cool Interview*. In Moos, Michel (ed.). Media Research: Technology, Art and Communication: Critical Voices in Art, Theory and Culture. Critical Voices in Art, Theory and Culture. Routledge. p. 74. ISBN 9781134393145. Retrieved 2015-05-06.
- Munganda O. & Muganda A (2009). Research methods: Quantitative and Qualitative Approaches. Nairobi: Acts Press.
- Munizu, et al., (2019). The impact of information technology application on supply chain integration and competitive advantage: Indonesian fishery industry context. *QUALITY Access to Success*. 20 (169), 151-156.
- Mzoughi, N., Bahri, N. and Ghachem, M. (2008) "Impact of Supply Chain Management and ERP on Organizational Performance and Competitive Advantage: Case of Tunisian Companies", *Journal of Global Information Technology Management*, 2(17), 24-46.
- Orodho, J. (2003). Essentials of Educational and Social Sciences Research Mthod. Nairobi: Masola Publishers.
- Pujawan, I.N. (2010). Supply Chain Management. Surabaya: Guna Widya Press. Saha, S., Panda, S., Modak, N. M., & Basu, M. (2015). Mail-in-rebate coupled with revenue sharing and downward direct discount for supply chain coordination. *International Journal of Operational Research*, 23(4), 451-476.
- Reyes, P., Raisinghani, M. & Singh, M. (2012) "Global supply chain management in the telecommunications industry: The role of information technology in integration of supply chain entities", *Journal of Global Information Technology Management*, 5(2), 48-67.

Swanson & Richard (2013). *Theory building in Applied Disciplines*. San Francisco, CA: Berrett – Koehler publisher 2013.

Yang G. (2012) Relationships between e- commerce and supply chain management In. K. Haenakon(ed.). *Advances in technology and management. Advances in intelligent and soft computing* (pp.653-658) Berlin. Springs. Doi: 10.1007/978-3-642-29637-6_87.

This page left intentionally blank