



# KNOWLEDGE MANAGEMENT SYSTEM STRATEGIES TO SUSTAIN A SUPPLY CHAIN

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## ABSTRACT

Information technology systems used to manage organizational knowledge are referred to as knowledge management systems (KMS). In other words, they are ICT systems created to support and improve the organizational processes of knowledge production, storage/retrieval, transmission and application. This research thesis was geared towards investigating the Application of Knowledge Management System Strategies to support a sustainable supply chain at the Kenya Ports Authorities. It presented a new conceptualization of knowledge management in network technologies and knowledge management as a strategic framework. The conceptualization and the framework are built on the resource based view and knowledge based view which have the ability to support organizations in strategically managing knowledge and knowledge processes to gain and sustain competitive advantage. Sustainable development was built on the triple bottom line theory since ultimate sustainability can only be achieved when environmental protection, social equity and economic profitability coexist without one area taking over any of the others. This descriptive-analytical study used a sample survey to investigate the knowledge management system strategies to support a sustainable supply chain at the Kenya ports authority. This was done on a targeted population of 600 employees using structured questionnaires and 10 senior stakeholders using interviews. In total, 420 staff members responded to the survey, which represented about 70% of the targeted population. The interviews had a full turn out due to patient and careful scheduling. The data sets were analyzed using IBM's SPSS version 26 (Statistical package for social sciences). Qualitative data analysis was done using content analysis on the emerging independent variables (ICT systems, knowledge management and stakeholder engagement) and dependent variable. Then inferential statistics, which included regression and correlation analysis, were carried out to derive the influence of knowledge management system strategies on sustainability. There was a significantly positive correlation between ICT systems and the dependent variable ( $\beta_1=0.362$ ,  $p=.000$ ). Also, stakeholder

engagement had a very significant correlation with supply chain sustainability ( $\beta_3 = 0.580$ ,  $p=.000$ ). In conclusion, the findings indicated that knowledge management on its own had a slight significance in terms of influencing supply chain sustainability. This was mainly due to its complex nature as a variable. The integration of ICT with

knowledge management creates a knowledge management system which is more logical and efficient. The study recommends that the Kenya ports authority implements an effective knowledge management system so as to leverage on the industry's best practices, expertise and information systems strategy to support a sustainable supply chain.

**Keywords:** supply chain, knowledge, knowledge management, knowledge management system and Information communication technology.

## 1. INTRODUCTION

### 1.1 A Knowledge-based society

The 21st century has been described by a knowledge-based society with Information Communication Technologies (ICTs) being the tools of trade for knowledge and information workers. Knowledge management (KM), be it in the public or private sector, is essential in the current social, economic and cultural realities of the business world. Knowledge creation, capture, sharing and utilization is at the core of every political, social, economic and cultural aspects of the society. These realities are reflected in the public and private sectors of the society as the utilization of knowledge resources determines the competitiveness, ability to research and innovate, the organizational learning and skills upgrade among others. Accordingly, there is need for organizations and the government to adopt and embrace knowledge management practice as the tool for survival in the competitive and ever changing business environment. Particularly in the public sector, knowledge has been lost through employee exits in large part because of weak succession plans, a lack of KM

practices, and a general lack of understanding of its advantages.

According to Ponzi and Koenig (2002), Knowledge Management (KM) can be seen as the newest approach in the information technology realm. The cycle of information is that data is organized into information which when refined and given meaning and interrelations established gives knowledge. Knowledge management, according to Koenig (2002), is a discipline that promotes a thorough approach for locating, listing, evaluating, retrieving, and disseminating all of an organization's information assets. These assets include things like databases, records, rules, protocols, and previously untapped expertise and knowledge in particular employees. While else there has been increased emphasis for the adoption of knowledge management strategies (KMSs) in the public and private sector, the uptake and embrace of the same by the public sector has been slow. These knowledge management systems could be instrumental in creating robust and sustainable management systems in virtually all sectors. Among the sectors of interest in the present study are supply chains. A supply chain is the web of people, organizations, companies, resources, tasks, activities, and technical developments involved in the manufacture and distribution of an item or service. The term "supply-chain sustainability" refers to the potential impact a company's supply chain may have in advancing principles such as anti-corruption, moral work practices, human rights, and environmental improvement. The objective of sustainable supply chain management and delivery to the user is the integration of environmentally and financially sound practices throughout the entire supply chain lifecycle, from product design and development to material selection, including raw material extraction or agricultural production, manufacturing, packaging, and transportation. Knowledge is the explicit and methodical management of essential facts and information, together with the processes involved in its creation, arrangement, distribution, use, and exploitation (Skyrme & Amidon, 1997). Currently, it is believed that information is the key resource whose successful application defines the success of the company (Michailova & Nielsen, 2006). If knowledge is not shared, it has little organizational value. It is said to be a crucial competitive asset that supports a company's expansion and long-term competitive advantage (Grant & Baden-Fuller, 2004). (Kogut, 1993). A firm's ability to establish and maintain a competitive advantage depends critically on its capacity to gather, apply, and integrate specialized information. Leveraging knowledge is a method for producing innovation in processes, goods, and services, as well as for organizational market adaption and successful decision-making (Salleh & Goh, 2002). It entails the development and improvement of processes, useful tools, and other resources that support the management of knowledge broadly speaking at all levels and in all areas of the company. Organizations must improve their specific technical expertise, knowledge application techniques and the balance of economic systems and international marketplaces in order to survive in today's fast-paced world. With research, development, innovation, and the use of world-class achievements, this can be realized. In today's complicated and variable world, innovation is

regarded as a critical component for firms that aids in achieving value and a competitive advantage (Mirghafoori et al., 2010). Globalization is one of the reasons boosting the significance of innovation, in fact. For continuous innovation in production, services, and niche products, there is external rivalry. Furthermore, IT advancements play an important role in accelerating innovation.

Sharing knowledge makes social enterprises more inventive and helps them become more observant of opportunities (Huckman & Staats, 2011). Ports, whether at sea, on land, in rivers or on lakes, are essential conduits for communication and transportation and as such, they fuel economic growth not just in their own countries and areas, but also globally. The Kenya Ports Authority (KPA), which oversees the ports of Kenya, is not an exception to this rule. The demand to incorporate sustainable options into supply-chain management is expanding. A number of seaports in the Indian Ocean are run by the Kenya Ports Authority, including Lamu, Malindi, Kilifi, Mtwapa, Kiunga, Shimoni, Funzi, and Vanga. At Embakasi, Eldoret, and Kisumu, KPA also oversees Inland Waterways and Inland Container Depots (KPA, 2021). As a result, the KPA is now seen as both a strategic asset by the government and a major contributor to the economic prosperity of the nation. Furthermore, it serves as a gateway and point of entry for the regional economies of nearby landlocked nations including Uganda, South Sudan, Ethiopia, Burundi, and Rwanda.

## 1.2 Supply chain

A supply chain is the network of all the individuals, groups, businesses, resources, activities, and technological advancements involved in the production and delivery of a good or service. It covers every stage of the procedure, from the final distribution to the consumer to the transfer of raw materials from the supplier to the producer (Hayes, 2022). Supply chain management entails the efficient supervision and control of the movement of goods and services from their raw state into finished commodities. If these procedures are carried out with precision, they lead to optimized customer value and help in achieving a competitive edge. Companies also engage in this crucial process to lower their overall business costs and have a very streamlined production cycle.

All product components are delivered where and when they are needed via effective supply chain systems. Businesses that make items that need a variety of parts from numerous vendors may find the flow of manufacturing expenses to be particularly pertinent. Reliable vendors are necessary for an effective supply-chain management process. They make a product that complies with the manufacturer's criteria and deliver it on schedule.

Knowledge management strategies are vital in positioning the private and public sector towards better survival in the competitive and dynamic local, regional, continental and global economies. Economic development groups can utilize KM tactics to improve internal communications within local businesses, encourage tacit knowledge capture, and improve external communications of local companies, including marketing. They can use such tools,

more crucially, to discover and cultivate local intellectual assets, including assisting in the creation of information goods and locating business and entrepreneurial prospects. A local economic cluster can be developed using KM techniques.

## 2. PROBLEM STATEMENT

Business competition has shifted in recent decades from between individual enterprises to supply chains (SCs). Today, it is even more important to coordinate and co-manage business resources, operations and innovative endeavors at the SC level given the problems of environmental, social and economic sustainability. On the other hand, knowledge, which is a critical economic resource for companies in the post-industrial information economy, needs to be properly managed not only in individual firms but also across supply chains. There is a gross lack in our knowledge on how to manage knowledge and knowledge processes for a sustainable and competitive advantage. Millions of people in Africa depend heavily on the oceans, rivers and lakes. If effectively and sustainably managed, the blue economy could provide the world economy a boost of up to \$1.5 trillion. The idea behind the blue economy that hosts the Kenya ports authority seeks to promote economic development, social inclusiveness and improved quality of life while also ensuring the environmental sustainability of the ocean and coastal region.

Thirty-eight of the fifty-four countries in Africa are coastal states. The majority of imports and exports from and to Kenya take place by water. The aquatic and marine habitats of our country are frequently discussed on the political scene. Still mostly undeveloped, the country's natural resources are now recognized for their potential to foster equitable and sustainable development. This study has selected the Kenya ports Authority (KPA) to be our case study. The high levels of container congestion at the port demonstrates the high level of inefficiencies KPA is now experiencing. The Port's operations fall far short of providing excellent services causing the corporation to perform way below par. Over and above mere port operation performance, there is an issue of sustainability, which is a long term strategy and the current interventions are mainly reactive and decisive strategies. It is in this context that the study sought to fill the existing gap in this area of seaport services and long term sustainability by investigating the knowledge management system strategies to support a sustainable supply chain in the Kenya ports authority.

## 3. LITERATURE REVIEW

Reviewing the relevant literature was vitally important since it helped in comprehending the body of knowledge around the research issue and the creation of a case regarding the significance of the research (Bryman, 2012). To help the reader understand what previous academics have already accomplished in terms of technology adoption and dissemination in supply chain management, this chapter methodically analyzed the pertinent theoretical literature. This section also looked into the empirical literature relating with the

implementation of a network-based KM system to support a sustainable supply chain in blue economies. Though the main issue was to assess the knowledge management system strategies to support a sustainable supply at the Kenya ports authority By adhering to the fundamental boundary assumptions, theories are produced to explain, predict and interpret phenomena as well as, frequently, to challenge and expand our current understanding. The theoretical framework introduces and describes the underlying theory of the research topic under investigation. A theoretical framework is composed of concepts, their definitions, and the current theories that are used in the particular research (Sekaran, 2010).

This part examines the theoretical underpinnings of the study and discusses several technology adoption models. The Theory of Planned Behavior (TPB) and the Technological Acceptance Model are two of them (TAM) Innovation Diffusion (DOI) and the Unified Theory of Technology Adoption and Use (iii) (UTAUT) (v) The technology organizational and environmental role models and the triple bottom line concept.

### 3.1: The Theory of Planned Behaviour

Mobile money has transformed the landscape of financial The intention to use a new technology is the subject of this idea. It is presumptive that a person must demonstrate a willingness to use an innovation before adopting it. According to the hypothesis, there are three separate factors that could influence whether an innovation is adopted. The first factor is attitude toward the behavior, or how much a person agrees or disagrees with the in issue behavior (Ajzen, 1991). The second factor is a subjective norm, which is the perceived social pressure to engage in or refrain from engaging in a behavior. This demonstrates the impact the environment has on a subject's decision to act a certain way. The third variable in the paradigm is perceived behavior control. This speaks to how easy or difficult an activity is thought to be to do. It is hypothesized that perceived behavior control reflects both prior experiences and predicted challenges. (Ajzen, 1991).

The competence of port employees, the availability of facilities, and technical support are the independent factors in the model that map most closely to the independent variables in this study. Whether a port employee is willing to use ICTs in the KM learning process or not depends on their level of competency. When port administration or other stakeholders contribute resources, they anticipate that the materials will be used in the teaching and learning process by port employees. The port workers are under some pressure to act in the desired manner as a result. Technical support increases ICT usage confidence among port employees, which correlates with the third independent variable of perceived behavior control. Early anxieties about implementing ICTs in their daily work may cause port employees to be wary of the idea and even be opposed to it. However, adoption becomes the rule rather than the exception as

they realize its benefits, including as efficacy in lesson preparation and delivery as well as archiving of notes (with minimal editing).

Also, port staff will use technology and incorporate it into their teaching and learning processes as a result of improved competency levels and evolving lesson delivery strategies. Port workers that have embraced using technology in their daily work could apply this strategy. Port workers may begin using technology if they are willing to do so and current peer trends favor employing ICTs for the teaching and learning process. A growing number of users, especially port employees, have been drawn to ICTs as their use's complexity continues to decrease. So, the application of ICTs in knowledge management on the supply chain management process among port employees in KPA is informed by the theory of planned behavior.

### 3.1: Technology Acceptance Model

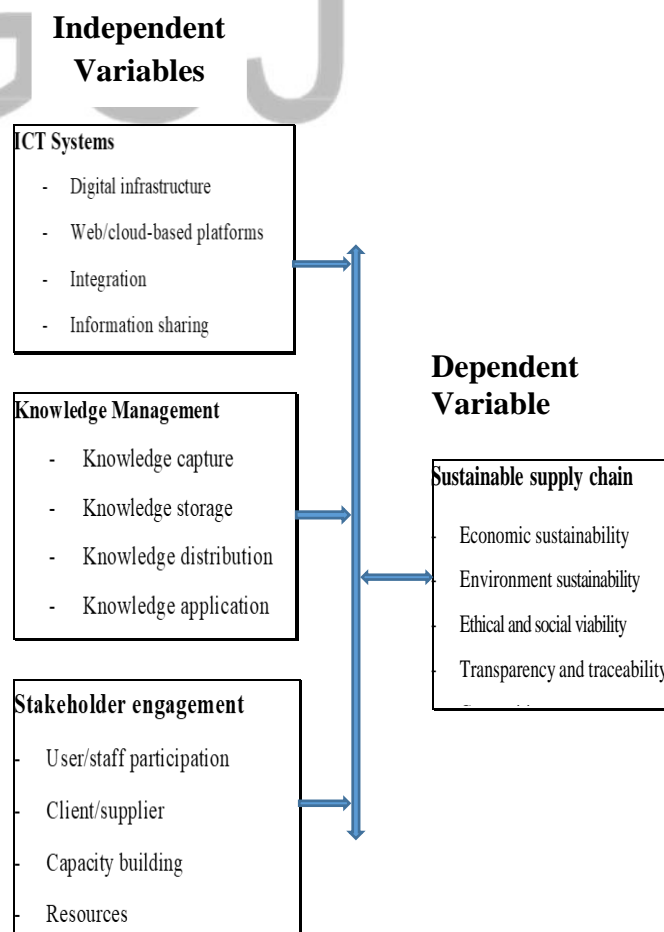
TAM claims that the perceived utility and usability of new technology have an effect on how well it is received by people (Davis, 1989). Perceived usefulness refers to how much a user believes using a particular technology would improve his capacity to perform his job. But, perceived usability measures how easy someone believes it will be to use a particular technology (Davis, 1989). It utilizes the Theory of Reasoned Action in the context of information systems (TRA). According to the theory, there are several variables at work when a person is introduced to new technology. Among other factors, perceived value and simplicity of use will influence how and when a person uses technology. Economic, supplier, customer, and competitive considerations are not taken into account by TAM. The independent variables of sustainable supply chain management, knowledge management, and network-based KM frameworks can be modeled using the TAM elements of perceived utility and perceived ease of use. Sustainable supply chain management leads to ease of use, and the facilities' existence teaches SCM employees about the importance of ICTs in the teaching and learning process. The paradigm states that for a human to embrace an invention, they must be convinced that it would improve performance and be easy to use. The person is considered to be aware of the benefits of the technology and knowledgeable about its principles. The use of ICTs in knowledge management and supply chain management by a growing number of businesses is raising awareness of the benefits that could result from the practice. Trainers may use ICTs and join the revolution with ease thanks to this understanding and rising levels of SCM personnel competency. Seeing the advantages of ICTs in SCM practice, many SCM professionals have enrolled in universities to gain the skills necessary to use ICTs. As a result, there are now more SCM employees who are incorporating ICTs into SCM procedures.

### 3.2 The Unified Theory of Acceptance and Use of Technology

Performance expectations, effort expectations, social influence, and facilitation conditions are the four independent variables that UTAUT identifies as having an impact on the adoption of new technology (Venkatesh et al, 2003). The degree to which a person expects that utilizing a system will enable him or her to improve job

performance is known as performance expectancy. The quantity of work necessary to use the specified invention constitutes its expected effort. The social impact measures how much a person believes other people should employ the new technology. The ultimate definition of enabling conditions is the conviction that a structure and technical foundation exist to facilitate system usage. The following illustration shows how the UTAUT model contends that a number of interconnected elements affect how quickly people accept new technologies. combining the models from the Technology Acceptance Theory and the Theory of Planned Behavior (UTAUT). With respect to predicting behavioral intention to use a technology and actual technology employed primarily in organizational circumstances, it identifies four moderators: age, gender, experience, and voluntariness. UTAUT2 was created and examined by (Venkatesh, Thong, & Xu, 2018). It includes fresh ideas that emphasize cutting-edge theoretical mechanisms including hedonic motivation, price value, and habit. The hypothesis has been utilized and accepted in consumer contexts (Venkatesh et al., 2018), online low-cost airline ticket purchases (Escobar-Rodriguez & Carvajal-Trujillo, 2014), as well as Saudi Arabian students' approval of eLearning (Nassuora, 2013). This paradigm supports current infrastructure, social influence, and work effectiveness. SCM stakeholders have recently learned how effectively ICTs can be used in SCM practices and have been steadily acquiring the skills needed to raise their level of expertise.

### Conceptual Framework



## Figure 1: Conceptual Framework

### 4. METHODOLOGY

A study design is the precise method that is employed to conduct the investigation. It ensures that the study is pertinent to the subject and should use affordable techniques (Kothari, 2004). It serves as a plan of the steps necessary to gather and analyze data in order to meet the study's objectives. The researcher's technique must be reliable, true, accurate, economical and cost-effective while replying to inquiries. (Kumar, 2011). A descriptive research design was adopted for this investigation. The goal of the descriptive study design was to gather relevant and accurate information on the current state of the development and to derive a sound general conclusion from the information obtained. The study also used a case study research approach to look into the Kenyan ports authority's knowledge management system strategies for supporting a sustainable supply chain. An in-depth analysis of a person, organization, institution, or phenomena is known as a case study (Mugenda & Mugenda, 2003). The study chose to use a case study because of its ability to collect in-depth information on the subject. Case studies are more detailed and since the study sought to collect information on Knowledge management system strategies to support a sustainable supply chain at the Kenya ports authority, the research design became effective and favorable.

This research technique uses numerous sources of evidence to conduct an empirical analysis of a specific contemporary issue in its actual setting (Robson, 2002). A case study is helpful for a researcher to have a deep awareness of the context of the research and the techniques being used, according to Morris and Wood (1991). Case studies are excellent at examining existing theory because they can lead to questions like "what," "how," and "why." Case studies can be used by researchers to support brand-new hypotheses).

There are no statistical tests to measure validity. All assessments of validity were subject to opinions based on the judgment of the researcher. Nevertheless, there were at least two types of validity that were addressed to assess, these were the face validity and the content validity. These two perspectives were undertaken in the study process. Factor analysis was used to measure if constructs had satisfactory validity and reliability.

#### 4.1 Research procedures

Every research project starts with a pilot study since it aids in the planning and adjustment of the primary study instruments. Several target areas regularly do feasibility assessments. Every significant trial must begin with some piloting or a small-scale inquiry to determine whether it is feasible to perform a more extensive study (Thabane et al., 2010). After being pilot tested by ten non-participant respondents at the Kenya Maritime Authority for accuracy and correctness, the questionnaires were deployed. The questions were broken down into pieces for each particular topic that has to be examined. The questionnaire had closed-ended questions. Based on the amount of information derived from the survey and first

interview, if need be, there was to be a follow up interview for clarification.

A test's validity is determined by how well it captures the intended outcome. Its main concern is about the factors under research being accurately represented. The questionnaire for the study used both content and face validity (Borg & Gall, 2007). All validity checks were based on the researcher's judgment and opinions. Face validity, looked at the possibility that a question would be misread or misunderstood. Pre-testing survey tools is a great way to increase the possibility of face validity and content validity, which will help determine whether the tools will give enough coverage to examine the use of knowledge management systems in supporting a sustainable supply chain at the KPA. Reliability is a measure of consistency. Giving the same tool to the same respondents again was the initial stage in a test-retest measurement. The test-retest criteria were used by the researcher to evaluate the reliability of the research instruments. The consistency between the two administrations were used to evaluate the instrument's reliability. Finally, we assessed dependability using internal consistency proportions. The queries were categorically divided into two groups. The instrument used has a number of designs that are meant to closely mirror one another's construction. The two groups of questions built a reliable half-and-half relationship.

### 5. RESULTS

#### 5.1 Demographics

A 30 percent study sample size of 1,943 relevant employee respondents should be sufficient. This is a total of 584 targeted respondents. However, we added an extra 16 respondents to cater for attrition, hence the effective sample size was about 600 respondents. 600 participants in the study were selected from the Kenya Ports Authority supply chain. Out of the 600 sample participants in the study, 420 completed the questionnaires, yielding a response rate of 70%. A 30% non-response was achieved via 180 questionnaires that were not returned. It was determined from the study that while there were 55.7% men and 44.3% women among the respondents. According to the study, the majority of respondents were between the ages of 30-39, which accounted for 38.6% of the total respondents, followed by those between the ages of 24-29, who made up 24.3% of the total, and those between the ages of 40 and 50, who made up 20.0%. 17.1% of those surveyed were over 50.

#### 5.2 Correlation analysis

The Pearson's coefficient was used to verify the existence or non-existence of linear correlation between and among the quantitative variables as indicated above. There was some evidence of multicollinearity among the explanatory variables since the correlations among them are strong enough hence, all the variables can be incorporated into the subsequent regression analysis.

Two of the independent variables; ICT systems ( $r = 0.585$ ,  $p < 0.05$ ) and Stakeholder engagement ( $r = 0.452$ ,  $p < 0.05$ ) were significantly related to supply chain

sustainability. The result show that ICT systems ( $r = 0.585$ ) had the highest relationship with supply chain sustainability, followed by Stakeholder engagement ( $r = 0.452$ ) but knowledge management ( $r = -0.144$ ) had little significance. The relationship between each of the independent variables were also considered. ICT systems and Knowledge management ( $r = 0.007$ ) was very small as the correlation coefficient ( $r$ ) was very low. However, knowledge management and stakeholder engagement was significant ( $r = 0.373$ ) was reasonably high.

#### 5.4 Regression Model

Multiple regression was then carried out on the independent variables against the dependent variable (supply chain sustainability at the Kenya ports authority) to estimate the model, since they had shown to have had significant relationships, the regression equation:

$$Y = \beta_0 + b_1X_1 + b_2X_2 + b_3X_3 + \epsilon$$

Where:

Y = was the value of the Dependent variable that was being explained (supply chain sustainability)

$\beta_0$  = Y-intercept or Constant Term

$\beta_1, \beta_2, \beta_3$  = are the Slopes for  $X_1, X_2, X_3$  (Beta coefficients)

$X_1$  = first independent variable that was explaining the variance in Y (ICT systems)

$X_2$  = second independent variable that was explaining the variance in Y (Knowledge management)

$X_3$  = is the third independent variable that was explaining the variance in Y (Stakeholder engagement)

$\epsilon$  = error of prediction.

#### ANOVA,

The study's Analysis of Variance (ANOVA) results were produced using the model equation to check the study model's goodness of fit. According to the ANOVA table, the model is able to forecast supply chain sustainability using the Kenya Ports Authority's predictor variables. Sig. column is .000b. This demonstrates that the regression model's statistical significance, which was less than 0.05, strongly predicts the outcome variable. The data and the model fit each other well. The sum of the squared residuals is 14.586, which is the residual's sum of squares. The estimate's squared standard error is 0.221, the mean square residual. The total sum of squares, 28.063, is the sum of the squared differences between the observed values of Y and the mean of Y.

The regression coefficients (beta-coefficients) were used to interpret the goodness of fit at 0.05 significance level. when all the regression coefficients are zero (i.e.  $\beta_1 = \beta_2 = \beta_3 = 0$ ) then the model is fit otherwise if any of the regression coefficients is not zero ( $\beta_1 \neq 0$ ) then the model is fit for explaining the supply chain sustainability at the KPA. The results in Table 4.11 show that p-value = .000 and since p-value < 0.05, indicating that at 5% significance level, at least one of the predictors; ICT systems, knowledge management and stakeholder engagement factors are useful in predicting the supply chain sustainability at the Kenya ports authority.

## 6. DEDUCTION

The survey also showed that KPA used tactics in its effort to meet top-notch standards. These tactics included comparing port operations to those of the best-performing ports, carrying out extensive port improvement planning, creating a port master plan, high-level organizational structuring, improving cargo handling equipment, and investing in IT for both port operations and procedures. But very little directly by way of achieving a sustainable supply chain.

The second phase of the study reveals that the reliability and sustainability of the network infrastructure was critical in achieving sustainable port operations. The analysis showed that ICT systems innovations changed with changing user and customer needs. Dominant areas of innovations are seen through social media platforms, easy to navigate website and the customized computer automated terminal operation system. According to the report, innovations have primarily been employed to provide new sources of income, influenced communication and connectivity (through networked personal devices), and improved port operations. Regarding digital inclusion, the study found that the access that users have to important information has been significantly impacted by the digital divide. Majority of the respondents indicated that the measures being taken to increase digital inclusion in the supply chain were commendable.

As it is the case with most state owned corporations, it was noted that a severe resistance to change was hampering complete automation of services and processes at the port. In the findings, it was again revealed that most users were not aware of the digital resources available at their disposal and this seriously affected the integration of systems with port processes. Apart from a serious issue of information segregation, the analysis also showed a problem with the security of necessary information. ICTs are now a way of life and a requirement to achieve sustainability. Customer driven efficiencies in processes, delivery of products and services is what makes institutions adopt digital innovations. The analysis revealed that knowledge management as a whole was not used efficiently to attain best performance from known practices.

The regression analysis results of all study variables indicated that the stakeholder engagement factor greatly contributed to supporting a sustainable supply chain at the Kenya ports authority as the relationship was statistically significant ( $\beta_3 = 0.580, p = .000$ ) while the ICT systems factor also had some significant influence on the dependent variable ( $\beta_1 = 0.362, p = .000$ ). The findings reveal that the stated variables had a positive influence on the dependent variable because p-value = .000 and since p-value < 0.05, it indicates a 5% significance level meaning that at least one of the predictors; user engagement or ICT systems factor are useful in predicting the supply chain sustainability at the Kenya ports authority.

## 7. CONCLUSION

Based on the study findings, a sustainable supply chain is critical for the long term survival of the Kenya ports authority and any other corporation. The study concludes that ICT systems are very influential in supporting a sustainable supply chain. The correlation analysis shows that it has a significant influence of 0.585 on supply chain sustainability. This shows that most respondents believe in the absence of ICT driven systems there will be a lot of inefficiencies and delays in port operations. ICT is a key enabler of all services and departments. The study found out that the Kenya Ports Authority launched a change management process that was necessitated by the competition in the environment and the need to embrace technology in order to remain relevant in the current business situation. The IT strategy was at the center of the changes and it was implemented in phases for easier adoption and integration. The report suggests that further training and study trips be used to foster communication between KPA employees and those working in top-tier service ports. The personnel can then discover how to deliver services more effectively. The study suggests that in order to structure one's own products to benefit from weaknesses and prevent direct competition with strengths, one must first understand the market strengths of competitors. The report also suggests that KPA needs competent leadership who can take advantage of the benefits of the evolving information age in order to adapt to environmental changes.

Stakeholders should use collaborative platforms to establish digital platforms that enable collaboration among supply chain partners, allowing them to share information, best practices and sustainability initiatives. Collaborative efforts can lead to better resource utilization and reduced environmental impact. The government, being the largest stakeholder, should also encourage the adoption of digital technologies by enhancing internet access, digital infrastructure and online communication platforms such as supplier collaborative platforms. This will create platforms that allow suppliers to share their sustainability practices, certifications and compliance data. This enables companies to make more informed decisions when selecting suppliers and fosters a culture of sustainability throughout the supply chain.

Finally, it is recommended that the Kenya ports authority have a Centralized Knowledge Repository that will create a centralized digital platform where all relevant information, best practices, case studies and research related to supply chain sustainability are stored. This repository can be easily accessible to all stakeholders involved in the supply chain, ensuring that everyone has access to the latest information and resources. This will also encourage visibility and transparency. Supply Chain Visibility Platforms that implement digital platforms that provide real-time visibility into the entire supply chain, allowing stakeholders to track the movement of goods, monitor environmental conditions and identify potential disruptions. These platforms can help optimize routes, reduce transportation emissions and enhance overall supply chain efficiency.

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## Inferential Analysis

Table 1: Pearson Correlation

	Y	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>
(Y) Supply chain sustainability	1.000	.585**	-.144	.452**
(X <sub>1</sub> ) ICT systems		1.000	.007	.368**
(X <sub>2</sub> ) Knowledge management			1.000	.373**
(X <sub>3</sub> ) Stakeholder engagement				1.000

Table 2: Regression Model

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.693a	.480	.457	.47011	.480	20.327	3	66	.000

Table 3: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.477	3	4.492	20.327	.000b
	Residual	14.586	66	.221		
	Total	28.063	69			

a. Dependent Variable: Sustainable supply chain

b. Predictors: (Constant), ICT systems, knowledge management and stakeholder engagement

Table 4: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.223	.520		2.354	.022
ICT	.362	.080	.439	4.550	.000
Knowledge	-.207	.068	-.296	-3.059	.003
Stakeholder	.580	.151	.401	3.850	<b>.000</b>

Dependent Variable: Supply chain sustainability