International Journal of
Supply Chain and Logistics
(IJSCL)

Economic Benefits of Integrating Supply Chain in the Electricity Sub-Sector in Kenya

International Journal of Supply Chain and Logistics
ISSN 2520-3983 (Online)
Vol. 7, Issue No.1, pp 37 - 59, 2023 www.carijournals.org

Economic Benefits of Integrating Supply Chain in the Electricity Sub-Sector in Kenya

Jackson Njau Waweru
Department of Business and Entrepreneurship, School of Business, Karatina University, Kenya
Correspondence: Jackson Njau Waweru
Karatina University,Department of Management & Social Sciences;
Kenya, Institute of Energy Studies & Research, Kenya Power & Lighting Company Plc.
Tel: +254 722 877974. e-mail:njau6527@gmail.com; njau65@yahoo.co.uk;
JNWaweru@kplc.co.ke; https://orcid.org/0000-0002-2626-080X

Abstract

Purpose: With a declining purchasing power, ravage by calamities and unfavourable political environment, the electricity sub-sector in Africa has witnessed dwindling fortunes in the recent past. Although average access to electricity in the region has been rising steadily, tariffs have been increasing while government tariffs subsidies have become unsustainable, forcing an introspection, to turn the tides. This article investigated the relationship between integrated logistics systems in supply chain management and business economic benefits in the electricity subsector in Kenya. The resource-based view theory of competitive advantage and the institutional theory of systems and structures were used to address the role of integrated logistics systems as a major driver of competitiveness in supply chain activities.

Methodology: Descriptive research design and regression analysis were applied to ascertain the association between quality management practices, resource activation, and capability level on one hand and business economic benefits (BEB) in form of customer satisfaction, cost reduction, and cycle time reduction on the other.

Findings: The results indicate that there is significant statistical relationship between integrated logistics systems and overall performance in the energy sub-sector in Kenya. Specifically; quality management practice, resource activation level and capability levels positively and significantly influence cycle time reduction; quality management practice and resource activation level positively and significantly influence quality of customer satisfaction in a firm's operations. The overall regression model is of the form: P =5065 + 604Q +155R +74C, where P is overall performance; Q is quality management practice; R is resource activation level and C is capability level. Therefore integrated logistics systems are an imperative component of supply chain as it accrues overall business economic benefits in, inventory management, customer satisfaction, and efficacy in business operations. Integrated logistics systems enhances a firm's competitiveness and facilitates the attainment of competitive advantage. Investing in integrated logistics systems should therefore be a top priority for firms keen on growth.

Unique contribution to theory, practice and policy: The research expands knowledge in the growing logistics and supply chain integration sphere in the service industry and beyond. It acts as a benchmark for further studies in the electricity subsector and other segments of the economy to inform policy and decision-making. The study calls for firms to embrace

integrated logistics systems and invest in training and capacity building for its personnel to catalyze firm and customer value.

Keywords: *Integrated Logistics Systems, supply chain management, business economic benefits, quality management practices, electricity sub-sector.*

1.0 Introduction

With a diminishing purchasing power, raze by calamities and inauspicious political environment, the electricity sub-sector in Africa has witnessed declining fortunes in the recent past. Although average access to electricity in the region has witnessed an upward trajectory, prices have been increasing while government tariffs subsidies have proven unsustainable. This calls for firms in the sub-sector to do in-depth self-analysis seeking for economic benefits which may help turn the current economic downward trends (African Development Bank Group 2022).

Integrated logistics systems is an integral part of supply chain integration. Kim, at al. (2020). This involves the information and communication among all stakeholders in thematic areas of customer, collaboration, communication and cooperation in the supply chain continuum of order processing; shipping notifications and updates; lean inventory; warehouse management; supplier management; analytics and reports; security features; transportation and logistics; user management; user contract management and compliance and audit, that catalysis customer value management (Spychalska-Wojtkiewicz, 2020).

Supply chain integration (SCI) entails managing diverse activities to link business processes to reduce wastage and errors and build an efficient supply chain network (Yuen & Thai, 2017). The overall aim of SCI is to simplify and enhance the connectivity of business processes. Existing studies such as Kim (2013); Tseng and Liao (2015); and Seo, Dinwoodie & Roe (2015) acknowledge studies which posit that SCI positively influences operational performance – reduction in costs, improved quality, flexibility, and delivery of desired operational outcomes. Despite these assertions, other authors such as Flynn, Huo and Zhao (2010) and Yuen and Thai (2016) indicate the uncommon negative or non-significant findings according to reports by other scholars. These inconsistent findings from different scholars necessitate additional research to inform policy-making among organizations.

Value creation is an integral aspect of the activities that organizations seek to implement, and this extends to multiple stakeholders whose interests need to be satisfied by the firm. In such cases, a reliable and timely flow of materials and information, among other resources, in a well-coordinated and structured way, is highly desired. Duong and Ha (2021) affirm that in the quickly expanding globalization, coupled with dynamics of the social-economic environment, companies that are dynamic, especially those focusing on effectiveness and efficiency of their supply chains, face both opportunities and threats.

The opportunities include business economic benefits such as increased access to capital, and technology applications. At the same time, the challenges may entail but are not limited to uncertainties, complexities, and stiff competition from supply chain at the global level. Diverse sources of risks, such as political, social-cultural, and business risk, might result in inefficiencies in supply chains. To mitigate these risks and effectively tend towards achieving business goals, firms strive to implement collective power among stakeholders through adoption of supply chain integration strategies.

2.0 Theoretical Framework

2.1 Resource-Based Theory

This theory was proposed by Penrose in 1959 (Kor & Mahoney, 2004) and explained an organization's ability to attain sustainable competitive advantage. To achieve a competitive advantage, firms have to possess unique resources that are rare, valuable, inimitable, and cannot be substituted. Penrose's (1959) *Theory of the growth of the Firm* is notable for providing the roots that form modern resource-based view (RBV), which explains the diverse perspectives that support RBV. Reliance on RBV has also been pivotal in establishing a reliable managerial framework that has elevated the determination of the internal resource strategic mix. Firms, therefore, have a higher chance of improving and advancing themselves through competitive advantage (Barney's (1991). According to RBV, the heterogenous nature of firms is a result of their heterogeneous resources, which necessitates the application of different strategies during the distribution process. The theory's emphasis, therefore, lies on the firm's assets, capabilities and competencies, which are responsible for generating an improved competitive advantage. Such rare and valuable resources form the core upon which the firm's progress can be ascertained and improved.

RBV's original proposition held that firms have a high chance of winning should they ascertain the proper use of resources which can be improved through diversification and production (Penrose, 1959). The theory is, therefore, integral in forming a reliable estimate of how many resources the firm has and the internal environment responsible for improving productivity towards profitability. An excellent example is the Apple Inc. vs Samsung Electronic Inc. competition, where, despite the two companies operating in the same environment, market and consumers, a continued difference exists with one company holding more influence over the other in the market.

The relevance of this theory in this study arises from the need to determine how ILS, as a resource, may enhance the supply chain's efficiency in ILS thematic areas including warehousing, warehouse management system, real-time location system, inventory management system and reverse logistics, for effective inventory management – especially in the context of Kenya's electricity subsector. Adopting ILS then becomes a crucial facet of ESS and how the same can be integrated into the supply chain management processes to achieve sustainable economic benefits is vital.

2.2 Institutional Theory

Meyer and Rowan (1977) postulated the institutional theory, arguing that institutional settings impose pressure on firms to abide by the existing social standards and grow their legitimacy. Firms can achieve this through streamlined logistics and supply chain relationships. This approach helps organizations to effectively address varying requirements, preferences and expectations along all supply chain stages. The theory's relevance is grounded on institutional pressures that enhance the need for the integration of logistics activities and, thus, reduce supply chain uncertainties resulting from informational or knowledge gaps. Kim, Lee, and Hwang (2020) note that effective logistics integration reduces inefficiencies and promotes effective governance and overall supply chain performance.

3.0 Literature Review

Integrated logistics systems when employed in its thematic areas including warehousing, warehouse management system, real-time location system, inventory management system and reverse logistics, determine the extent to which an organization cooperates with its logistics service providers (LSPs) to manage the intra-and inter-organizational processes. Taking a system approach theory of management, firms must interact and interlink with others to better achieve their goals. Logistics integration encompasses dynamically coordinated business processes that support procurement, inventory management, and augmenting supply chain performance (Som, Cobblah & Anyigba, 2019).

3.0.1 Quality Management Practices (QMP)

The current evidence-based literature has highlighted the significance of supply chain management with a close focus on logistics in spurring firms' competitiveness (Keskin et al., 2021; Aziz et al., 2020). Business trends like strategic partnerships with suppliers, customer relationship management, sharing information, and postponement are imperative building blocks for attaining a competitive edge. Seamless logistics and supply chain management influence a firm's competitive priorities - customer satisfaction, and smooth movement of goods and/or services (World Bank Report, 2017). According to Vetrivel, (2020), inventory management is a vital aspect that determines the success or otherwise of a business.
The Lean six sigma concept developed by Wheat, Mills & Carnell (2003) in their book "*Leaning into Six Sigma: A Parable of the Journey to Six Sigma and a Lean Enterprise*" combins the two management styles; lean and six sigma approach by Bill Smith (1980). To enhance efficiency in a supply chain, a paradigm shift into lean thinking is imperative. Lean thinking works to reduce costs, improve quality, and transform the bottom line by identifying and eliminating waste in the value process. Major waste areas may include over-stocking; over-production; over-processing; Intellect underutilization; waiting time; unnecessary motion; unnecessary movement of materials; and defects, (Wheat, at al., 2003).

Overstocking is excess inventory resulting from work in process being completed before it is needed. This takes up more space, more risk of damage and obsolescence, more curring costs, higher interests, handling costs, avoidable paperwork and motion. Strategies against overstocking include laying empasis on pull techniques where downstream processes produce as per the demand from upstream; effective demand forecasting and monitoring methods; effective supplier management and an elaborate bottlenecks identification and fixing mechanism (Wheat, at al., 2003). Overproduction or producing more than what demand is able to take-up emanates from wrong forecasting methods, wrong production schedules and faulty processes. As a result, the company is swarmed with excessive batches, time overspends, and product storage costs (Som, et al., 2019). Just-in-time modelling and aligning production schedules with customer demands approaches are viable solutions to overproduction (Wheat, at al., 2003).

Over-processing by doing more work than is necessary, against the value chain principle, that organizations exist to create value for their customers, occurs owing to human errors, duplication of data and reports and unnecessary back and forth flow of queries concerning the same report or document and leads to longer cycle times. Lean supply chain paradigm proposes use of simple, low-cost tools, cell manufacturing, consolidation and combining steps as far as possible. Value stream mapping and standardizing processes can easily cure this menace (Wheat, at al., 2003). Intellect underutilization wastes the skills of the workforce. The key to prosperity for any organization is its people. Organizations seek to hire the best, train to be the best and create motivator factors to get the best motivated workforce which seeks self improvement and achieving highest quality output for customers. Constantly involving those who do the job to generate new ideas, to improve the product and to understand and resolve challenges has the potential to catapult an organization's returns manyfolds (Wheat, at al., 2003).

Waiting time, where a worker in the process chain waits to commence the next action in the process, resulting to wasted worker time may lead to process failure, longer process completion time, inefficiency of man and machines. Courses for waiting may be poor work allocation, insufficient workforce, poor communication, poor resource planning and machine downtime. Proper work allocation, good comminication processeses, effective workforce planning, proper systems for machinery maintenance, and effective people and material resource planning will eliminate waiting time (Wheat, at al., 2003). On the other hand, unnecessary motion wastes result from unwanted movement of tools and or employees, resulting from faulty space layout, misplaced tools, parts, inventories, fixtures and other resources. Motion wasts increases risk of injury and completion time. Engaging experienced industrial engineers, skilled in logistics to design process flows and factory/office layouts can minimize motion wastes (Wheat, at al., 2003).

Unnessesary movement of materials, products, goods or work-in-progress results to increased production time, transport costs, and take-up more floor space than necessary. Such movements may emanate from poor space management, poor machine design and set-up and flawed process fow. This further affects the company's productivity (Som, et al., 2019). Notable solutions to such a conundrum include constant review of space layout, well thought automated or mechanized seamless spaghetti and swim-lane charts in the production process. (Wheat, at al., 2003). Defects emanate from errors made on a task. Defects results in costly reworks, recalls, scrap, and extra manufacturing costs. Defects have felled many firms and doing it right the first time is the survival policy. However, they occure due to ineffective skills transfer, improper process documentation, weak quality contral mechanisms substandard inputs and weak systems of internal control. Effective people management and skills transfer, documenting and regular reviewing of standard operating procedures, robust quality control mechanisms, standard inputs and strengthening systems of internal control will minimize and facilitate early detection of defects (Wheat, at al., 2003).

3.0.2 Resource Activation Level (RAL)

Supply chain components outlining their functions in the delivery quality customer service to end users has always been difficult. However, Sarder (2021) argues that logistics customer service in supply chain management enhances communication with the trading partners and the end customer. Companies in the supply chain serve two roles; as customers of the prior entity and, in turn, serve as supplies for the following link in the supply chain. Customer service is the combination of all logistics activities and the related costs, revenue generated, and profits for the company. Managing the supply chain and logistics systems effectively, whether in the services or manufacturing sector is of utmost significance.

Abdul, Iortimbir, Oladipo, and Olota, (2019) investigated the role of logistics management on business performance using Dangote Flour Mills Plc as a case study. The researchers found a significantly positive connection amid information flow, organizational effectiveness, and employee efficiency. Reduction in costs, enhanced customer satisfaction, and reduced cycle times are some of the recurring benefits of adopting integrated logistics systems. These findings reaffirm that factors linked to logistics management need to be considered in firms' strategic plans as they contribute to sustainable development for the industry in question and the economy as a whole.

3.0.3 Capability Level (CL)

Chen, Daughtery, and Landry (2009) argued that the attention placed on logistics integration should be taken in the context of realigning a firm's operating structures and that immense productivity may be accomplished when essential supply chain competencies are developed. Kim, Lee, and Hwang (2020) studied Korean manufacturing firms, where they investigated performance in the supply chain in relation with integration of logistics. The authors noted that trust, satisfaction, and commitment to logistics integration enhance firms' service capabilities. Building strategic relationships help firms augment their business and operational performance. These findings corroborate those of Saragih, Tarigan, Pratama, Wardati, and Silalahi, (2020) who conducted a study on Indonesian death service firms and concluded that trust, innovativeness, and strong buyer-supplier relationships enhance firm performance.

Total quality management (TQM) and supply chain management are integral aspects that organizations have to focus on to achieve customer satisfaction, strengthen supplier relationships, and embrace continuous improvement in a firm's operations. Thai and Jie (2018) analyzed the effect of TQM and SCI practices on the performance of container shipping companies in Singapore. The scholars found out that TQM and SCI positively influence service quality and firm performance through reduced operational costs, reduced cycle times, and improved customer service due to meeting their varying needs.

Information systems and technology tools including enterprise resource planning (ERP), electronic data interchange (EDI), and customer relationship management (CRM) tools provide the capability for collaboration and exchange of transactional information among firms. These features are vital in enhancing firms' prospects of achieving competitiveness, improve the quality of customer service, and reduce overall operational costs. As Wabuge and Osoro (2020) rightly put it, logistics integration through the adoption of IS/IT promotes process automation, cost reduction, and accuracy in handling organizational processes.

3.0.4 Business Economic Benefits (BEB)

Inventory management is a critical business activity in supply chain processes as it ensures maintaining stock levels at minimized costs while improving the value-adding measures of customer satisfaction. The increasing rate of technology adoption is one of the factors that influence inventory management practices. Inventory management is related to logistics coordination aimed at minimizing unexpected variations in demand and guaranteeing proper levels of customer satisfaction in the distribution network. Appropriate inventory management significantly and positively influence supply chain sustainability; due to reduction in cycle times, cost, and wastages (Munyaka & Yadavalli, 2022).

According to Kmiecik (2022), inventory management based on big data and integrated logistics systems can result in benefits such as augmented operational efficiency, profit and sales maximization, improved customer satisfaction rates, and reduced IT infrastructure expenses. Integrated logistics systems ensure satisfactory accuracy and could support harmonization of operations linking the wider network of the supply chains to sellers. As Becerra, Mula, and Sanchis (2022) argue, sustainable inventory management relates to decisions that not only focus on improving profitability but also on reducing environmental and social impacts. Thus, integrated logistics systems and supply chains should focus on income increases and waste prevention and decisions on lead times, replenishment quantities, and costs. Malak-Rawlikowska et al (2019), urgues that short supply chains results to more economic and social benefits for food supply chains, while Gołaś (2020) concurs.

Attia (2018) argues that international rivalry has increased intensely in the last two decades, forcing firms to streamline their internal operations by integrating suppliers in their supply chains. The supply chains are not just used to guarantee the right product or service is distributed to the right place but to improve company performance too. Opoku, Abboah, and Owusu (2021) note that inventory management reinforces internal controls to ensure optimum and quality inventory while delivering quality value for customers. Economic order quantity and strategic supplier partnerships are some of the preferable models for inventory management in developing countries (Opoku, Abboah & Owusu, 2021).

Logistics and supply chain integration enables firms to achieve ambidexterity (Aslam, Blome, Roscoe, & Azhar, 2018), such that they are aligned and efficient in managing their internal and external business demands while also being adaptive enough to changes in the business environment. This concept has been extended to the logistics and supply chain systems; supply chain ambidexterity. This strategic approach ensures simultaneous adoption of supply chain flexibility and efficiency through rapidly responding to short-term changes in demand (agility) and adjusting to long-term market changes by restricting the supply chain (adaptability). These concepts ensure reduction in inventory holding costs and thus, enhance a firm's operational performance.

3.0.5 Resource Activation Level and BEB

Liu, Huang and Li (2022) investigated the economic shock from Covid-19 using electricity consumption in China as the basis of analysis. The authors noted that supply chains and inventories ought to be adjusted as the market environment changes. This assertion means that innovative measures need to be taken, given the significance of electricity in modern societies. Electricity use is significantly correlated with expansion of the economy and development and this is specially the case in developing countries (Lawal, Ozturk, Olanipekun, & Asaleye, 2020).

Waweru J. N. (2013), Waweru J. (2014) carried out a study evaluating both the perceived and substantial impact of Integrated Logistics Systems (ILS) on management effectiveness targeting the Electricity Sub-Sector (ESS) in Kenya. Specifically, the study explored business economic benefits in the sector that resulted from the ILS. Moreover, the various targeted elements included cost reduction, customer service and cycle time, which depended on the quality of the ILS management process. Other notable inclusions were the resource activation level of the ILS and capability levels of the ILS. Such a framework hinges on a resource-based view influenced by business economic benefit and ILS. The study relied on a combination of qualitative and quantitative data with the target population, including staff from the ESS system. Moreover, the SPSS tool was integral in data analysis, with correlation ANOVA and regressional analysis used in the data analysis process. The results from the study held that ILS was integral in influencing positive progress and development in the ESS system. The improved business practice could also stem from a reliable implementation of the ILS.

Muvaka and Henry (2018) investigated notable ways to bridge green supply chain management gaps while targeting Kenya Electricity Generating Company Limited (KenGen). The research design adopted was a case study, with a population of 166 employees of KenGen with geographical confinement to Nairobi. Questionnaires were administered to validate the use of quantitative data before using the SPSS tool in the analytical process. The information display took the form of bar charts, pie charts and graphs. According to the study results, the introduction of green packaging is more accommodating than other practices due to environmental friendliness. As such, Kenya's electricity-generating companies are asked to invest further in patterns that echo ecological protection. However, supply chain control is integral to realizing such a goal.

Inventory management has become an integral part of every organization as it ensures smooth running and serves as a link between the production and distribution processes in a firm. Dedunu and Weerasinghae (2018) investigated the association amid inventory management and firm performance and noted that there is a significant positive relationship between return on assets, company growth, and gross profit margin and inventory management. These studies reiterate the need for effective inventory management in organizations; particularly with the integration or logistics and supply chain management systems.

3.0.6 Quality Management Practices and BEB

Ayman, Alfar and Alhyari (2021) investigated how supply chain quality managment and supply chain agility and supply chain innovation influence firm performance. The authors noted that supply chain quality management plays an imperative role across the entire supply chain network. Firms need to have supply chain capabilities to accomplish significant outcomes in terms of enhanced business economic benefits. These benefits could be in terms of quality customer service, reduced costs, and minimized operational cycle times. The energy subsector in Kenya can leverage the quality management practices, resource activation levels, and capability levels through ensuring that supply chains are innovative, dynamic, and felxible. Besides, employees across the supply chain need to be equipped with requisite skills and knowledge to faciliate efficiency in business operations.

Oromo and Mwangangi (2017) investigated how supplier development affected procurement performance while targeting Kenya Electricity Generating Company Limited (KenGen). A descriptive research design was adopted for the study while targeting 160 KenGen staff members as the sample size. Qualitative and quantitative research data were collected before SPSS was used in analysing the data. According to the study results, creating supplier incentives was an excellent strategy in ensuring commitment to the supply process. Moreover, incentives could be diverse, with suppliers getting the option of picking their preferences, which ought to be within the company's expectations. Such integration ensures that logistics are combined with supply chain processes, elevating the relevance of relying on such processes for improved productivity.

Murage (2011) studied the supply chain management environment and its influence on production in commercial electricity supply in Kenya. Reports by the Energy Regulatory Commission (ERC) held that notable influencers that necessitated a more improved supply chain system include the high cost of human power due to increased cost of living, delays and energy disruptions and growing customer-related pressure. The study, therefore, delved into understanding the supply chain in Kenya's electricity sector while suggesting potential solutions to increase productivity. A descriptive research design was adopted for the study. Additionally, all power firms in the country were targeted to be part of the study. The study concluded that Kenya's commercial electricity utilities adopted different practices aligned with a reliable Supply Chain model. As such, the logistics were tied to the supply chain, ensuring that a collaboration with the various practices and the supply chain process achieved more dependable results while lessening the negative impact on the company's processes.

3.1 Conceptual Framework

This study uses determinants of integrated logistics systems as the independent variables, while business economic benefits (BEB) is the dependent variable. While multiple factors influence BEB, this study is confined to quality management practices, resource activation level, and capability level, as shown in conceptual framework fig.1 below:

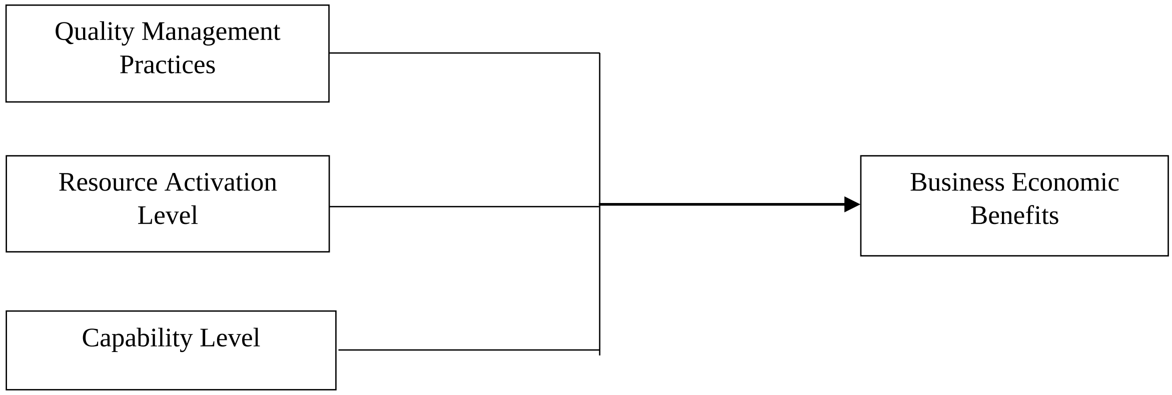

Fig. 1: Conceptual Framework

3.2 Operationalization of Research Variables and Hypotheses Development

3.2.1 Quality management practices

Quality decision-making enhances a firm's economic benefits through customer service excellence, reduced costs, and cycle time reduction. Performance targets and quality internal operations determine efficiency and effectiveness in terms of reduced wastage, customer satisfaction, and improved productivity.

3.2.2 Resource Activation Level

The level of automation, customer connectivity to the ESS, and third-party contracting are some determinants for ascertaining the extent of resource activation. Automation ensures efficiency, cost reduction, and customer satisfaction; it entails internal business processes linked to how well service providers within the ESS supply chain collaborate and ensure customer connectivity.

3.2.3 Capability Level

The integrated logistics system user must be cognizant of the system to use it effectively. There ought to be top management commitment and continuous knowledge sharing with all stakeholders regarding the integrated logistics system. Once participants within the supply chain understand how to use the system, there is a likelihood of increased customer satisfaction, cost reduction, and cycle time reduction – all indicators of improved firm performance.

3.2.4 Business Economic Benefits

For this study, customer satisfaction reduction in cycle time and cost reduction, are the leading indicators of business economic benefits in the ESS. Improved customer service leads to positive customer perception of the company and ultimately an increase in turnover - overall firm performance. Cost reduction implies higher profit margins for the company and potentially augmented competitiveness. Reduced cycle time, primarily from automation of internal business processes, accrues BEB as it involves increased turnover.

Cycle time is the time it takes to complete one task, made up of one or more processes. It is the summation of process time, inspection time, movement time and queue time of a product. Cycle time is a key performance indicator for manufacturing businesses. The lesser the cycle time, the more beneficial to the firm. According to Siva et al (2017), by mapping past state with current improvements, future states will demonstrate a trajectory of improved cycle time and consequent economic benefits.

Cost reduction directly impacts the price on any product. New cost saving avenues are the dream of any business venture. The major reason for implementation of ILS in warehousing, warehouse management system, real-time location system, inventory management system and reverse logistics usually is the anticipated cost reduction.

3.2.5 Problem statement

Implementing ILS in the ESS face intimidating challenges such as globalization and high failure rate (Abugabah, and Sanzogni, 2009). Kenya's and South Africa's ESS, like many other jurisdictions, has invested heavily in ILS. Such investments notwithstanding, the sector has recorded above-average tariffs, high operating costs, bottom-line decline and annual stock holding costs continues to escalate, thereby adversely impacting on stakeholders. Implementing ILS was intended to improve service delivery to inventory users, reduce material handling costs, and cycle time. It was supposed to accelerate cost reductions in operations, time efficiency and to consolidate gains in term of business economic benefits. This far, scholary attempts to document ILS impact has received minimal attention. This research therefore sought to determine the influence of ILS, in improving service delivery, cycle time and reducing costs, on the energy sub-sector in Kenya.

3.2.6 Hypotheses

The following null hypotheses are relevant:

H_{01}: *There is no significant relationship between integrated logistics systems and customer satisfaction in the energy sub-sector in Kenya.*

H_{01}: *There is no significant relationship between integrated logistics systems and cycle time reduction in the energy sub-sector in Kenya.*

H_{01}: *There is no significant relationship between integrated logistics systems and cost reduction in the energy sub-sector in Kenya.*

H_{01}: *There is no significant relationship between integrated logistics systems and overall performance of the energy sub-sector in Kenya.*

This paper has four other section. Following the introduction section is the methodology which provides the research and sampling design and the analytical models here employed. Another section then presents the descriptive statistics of the data used in this analysis. After this section is a section on result and discussion. Herein are the the inferential analysis results and their interpretation. Finally, a section provides the conclusions and recommendations of the study.

4.0 Methodology

A descriptive research design was used and cross-sectional data from a study population of 13,800 employees from all the ESS warehouses in Nairobi, Kenya, was collected. The target population entailed all staff in management who use the ILS. Purposive sampling was used to ascertain employees who use ILS and are in management levels within the ESS. Nairobi, being the hub of major commercial activities in Kenya, was used in this study, and from a sample frame of 644 employees, 94 employees were sampled using Krejcie and Morgan's (1970) formula. Valid responses from 70 employees were used, representing a response rate of 74.5% (Table 5.1)

Both primary and secondary data were used in this study to enhance the validity and credibility of the findings. Primary data was collected through Likert-scale questionnaires based on previously validated scales. A pilot study was conducted before the actual data collection exercise, allowing the researcher to ascertain the validity and reliability of the instrument. Cronbach's alpha coefficient was used to determine the internal consistency of the measurement scales. Errors identified during the pilot study were identified and rectified to ensure the validity and reliability of the findings from this study.

5.0 Results and Discussion – Hypotheses Testing

5.1 Descriptive Statistics

As shown on table 5.1, data was sourced from four companies; Rural Electrification Company (REC), Kenya Transmission Company (KETRACO), Kenya Electricity Generating Company Limited (KenGen), and Kenya Power and Lighting Company Plc (KPLC). Below is the distribution of the respondents to the questionnaires (Table 5.1)

Table 1: Response Rate

Organization	Sample	Respondents	Percent (%)
REC	7	6	85.7%
KETRACO	7	5	71.4%
KenGen	12	8	66.7%
KPLC	68	51	75.0%
Total	94	70	74.5%

In table 5.2, regarding the level of education, while a majority, 87% of the respondents had Polytechnic/College education and above, only an insignificant minority of 12.9% of the respondents had Secondary/High School level of education and below. The study noted that a higher level of education broadens the understanding of the ILS and would, therefore, play a significant role in attaining a firm's business economic benefits – through increased customer satisfaction, reduction in costs, and cycle times. The table below provides a summary of the educational levels of the sampled employees.

International Journal of Supply Chain and Logistics
ISSN 2520-3983 (Online)
Vol. 7, Issue No.1, pp 37 - 59, 2023
www.carijournals.org

Table 2: Respondents' Level of Education

Level of Education	Frequency	Percent	Cumulative percent
Primary School	3	4.3	4.3
Secondary/High School	6	8.6	12.9
Polytechnic/College	13	18.6	31.4
University	48	68.6	100.0
Total	70	100.0	

As shown in table 5.3, the author sought to determine the mix of the users of the ILS and noted that 54.3% are either warehouse managers or operatives who interact with the ILS system daily. The 45.7% were customers. These findings indicate a good spread of respondents between users and customers of the ILS. Representation of both users and customers was vital to assist the researcher in getting opinions from both groups. The results show the nature of interaction with ILS to manage inventory.

Table 3 Nature of the Respondents

	Frequency	Percent	Cumulative Percent
Customer	32	45.7%	45.7%
Warehouse in-charge	38	54.3%	100.0%
Total	70	100.0%	

5.2 Empirical Findings

The model summary results of the four regressions is presented in table 5.4. For the regression of customer satisfaction on quality management practice, resource activation level and capability levels, our findings indicate a positive correlation coefficient R of 0.696, implying a relatively high positive association between the predictor and the dependent variable. The R spuare value of 0.484 means that 48.4% of the variability observed in the dependent variable can be explained by our regression model. Further, the adjusted R square improves the prediction power of the model by eliminating insignificant variables in the computation. Therefore our adjusted R value of 0.460 means that 46.0% of the variability observed in the dependent variable, customer satisfaction, can be explained by our adjusted regression model, after eliminating insignificant and confounding variables.

For the regression of cycle time on quality management practice, resource activation level and capability levels, our findings indicate a positive correlation coefficient R of 0.777, implying a relatively high positive association between the predictor and the dependent variable. The R square value of 0.603 means that 60.3% of the variability observed in the dependent variable can be explained by our regression model. Further, the adjusted R square improves the prediction power of the model by eliminating insignificant variables in the computation. Therefore our value of 0.585 means that 58.5% of the variability observed in the dependent variable, cycle time, can be explained by ouradjusted regression model, after eliminating insignificant and confounding variables.

For the regression of cost reduction on quality management practice, resource activation level and capability levels, our findings indicate a positive correlation coefficient R of 0.193, implying a relatively low positive association between the predictor and the dependent variable. The R square value of 0.037 means that 3.7% of the variability observed in the dependent variable can be explained by our regression model. Further, the adjusted R square improves the prediction power of the model by eliminating insignificant variables in the computation. Therefore our value of -0.006 means that 0.6% of the variability observed in the dependent variable, cost, can be explained by our adjusted regression model, after eliminating insignificant and confounding variables.

For the regression of overall performance on quality management practice, resource activation level and capability levels, our findings indicate a positive correlation coefficient R of 0.729, implying a relatively high positive association between the predictor and the dependent variable. The R square value of 0.531 means that 53.1% of the variability observed in the dependent variable can be explained by our regression model. Further, the adjusted R square improves the prediction power of the model by eliminating insignificant variables in the computation. Therefore our value of 0.509 means that 50.9% of the variability observed in the dependent variable, overall performance, can be explained by our adjusted regression model, after eliminating insignificant and confounding variables.

Table 4: Model Summary for Regression of Customer Satisfaction; Cycle Time;.Cost; Overall Performance; on Quality Management Practice, Resource Activation level and Capability Levels

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.696[a]	.484	.460	2.41230
2	.777[a]	.603	.585	4.61461
3	.193[a]	.037	-.006	4.31470
4	.729[a]	.531	.509	3.67485

a. Predictors: (Constant), Quality Management Practice; Resource Activation level; Capability Levels.

b. Dependent Variable: Customer Satisfaction[1]; Cycle Time[2];.Cost[3]; Overall Performance[4]

Table 5.6.1 presents the ANOVA output and the t-test results of the coefficients of the customer satisfaction regression. The linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (20.614) is highly significant, where P-value <0.05. We therefore rejected the null hypothesis and concluded that the model has predictive power, since it explains to a significant level, the variations in customer satisfaction of the ESS. From the t-test coefficients table, we observe that: QMP regression coefficient is positive and significant with (β = 0.507, t-value =4.687, P<0.05); RAL regression coefficient is positive and significant with (β = 0.205, t-value =1.996, P<0.05); CL regression coefficient is positive and not significant with (β = 0.124, t-value =1.277, P>0.05). Therefore, then null hypothesis that *there is no significant relationship between integrated logistics systems and customer satisfaction in the energy sub-sector in Kenya* is rejected, accepting the alternative. Consequently, our model is of the form: CS = 3065 + 507Q + 205R +124C where CS is customer satisfaction; Q is quality management practice; R is resource activation level and C is capability level.

Table 5.6.2 presents the ANOVA output and the t-test results of the coefficients of the cycle time regression. The linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (33.461) is highly significant, where P-value <0.05. We therefore rejected the null hypothesis and concluded that the model has predictive power, since it explains to a significant level, the variations in cycle time of the ESS. From the t-test coefficients table, we observe that: QMP regression coefficient is positive and significant with (β = 0.443, t-value =4.665, P<0.05); RAL regression coefficient is positive and significant with (β = 0.339, t-value =3.768, P<0.05); CL regression coefficient is positive and not significant with (β = 0.194, t-value =2.274, P<0.05). Therefore, then null hypothesis that *There is no significant relationship between integrated logistics systems and reduction of cycle time in the energy sub-sector in Kenya* is rejected, accepting the alternative. Consequently, our final model is of the form: CT = -2907 + 443Q + 339R +194C where CT is Cycle time; Q is quality management practice; R is resource activation level and C is capability level

Table 5.6.3 presents the ANOVA output and the t-test results of the coefficients of the cost reduction regression. The linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (0.853) is insignificant, where P-value >0.05. We therefore accept the null hypothesis and concluded that the model has no predictive power,. This is further confirmed from the t-test coefficients table, we observe that: QMP regression coefficient is positive and not significant with (β = 0.183, t-value =1.238, P>0.05); RAL regression coefficient is negative and not significant with (β = -0.203, t-value =-1.452, P>0.05); CL regression coefficient is negative and not significant with (β = - 0.005, t-value = -0.035, P>0.05). Therefore, the null hypothesis that *There is no significant relationship between integrated logistics systems and*

International Journal of Supply Chain and Logistics
ISSN 2520-3983 (Online)
Vol. 7, Issue No.1, pp 37 - 59, 2023 www.carijournals.org

cost reduction in the energy sub-sector in Kenya is accepted. Consequently, a final model is of no consequence.

Table 5.6.4 presents the ANOVA output and the t-test results of the coefficients of the overall multiple regression. The linear regression F-test has the null hypothesis that the model explains zero variance in the dependent variable, (Thus, $R^2 = 0$). Since observed F-test statistic (24.882) is highly significant, where P-value <0.05. We therefore rejected the null hypothesis and concluded that the model has predictive power, since it explains to a significant level, the variations in overall performance of the ESS. From the t-test coefficients table, we observe that: QMP regression coefficient is positive and significant with ($\beta = 0.604$, t-value =5.852, P<0.05); RAL regression coefficient is positive and not significant with ($\beta = 0.155$, t-value =1.587, P>0.05); CL regression coefficient is positive and not significant with ($\beta = 0.074$, t-value =0.795, P>0.05). Therefore, then null hypothesis that *There is no significant relationship between integrated logistics systems and overall performance in the energy sub-sector in Kenya* is rejected, accepting the alternative. Consequently, our final model is of the form: OP =5065 + 604Q +155R +74C where OP is overall performance; Q is quality management practice; R is resource activation level and C is capability level.

International Journal of Supply Chain and Logistics
ISSN 2520-3983 (Online)
Vol. 7, Issue No.1, pp 37 - 59, 2023

Table 6: ANOVA and t-test Coefficients Output for Multiple Regression of Customer Satisfaction[1]; Cycle Time[2];.Cost[3;] Ovedrall Performance[4] on Determinants of Business Economic Benefits - Quality Management Practice (QMP); Resource Activation level (RAL); Capability Levels (CL)

Model		ANOVA					Coefficients				
		Sum of Square	Df	Mean Square	F	Sig	Unstandardized Coefficients		Standardized Coefficients		
							B	Std. Error	Beta	T	Sig.
1	Regression	359.876	3	119.959	20.614	.000[b]					
	Residual	384.067	66	5.819							
	Total	743.943	69								
	(Constant)						3.065	2.241		1.368	.176
	QMP						.289	.062	.507	4.687	.000
	RAL						.301	.151	.205	1.996	.050
	CL						.274	.214	.124	1.277	.206
2	Regression	2137.641	3	712.547	33.461	.000[b]					
	Residual	1405.445	66	21.295							
	Total	3543.086	69								
	(Constant)						-2.907	4.287		-.678	.500
	QMP						.551	.118	.443	4.665	.000
	RAL						1.087	.288	.339	3.768	.000
	CL						.933	.410	.194	2.274	.026
3	Regression	47.644	3	15.881	.853	.470[b]					
	Residual	1228.698	66	18.617							
	Total	1276.343	69								
	(Constant)						31.234	4.008		7.792	.000

	QMP						.137	.110	.183	1.238	.220
	RAL						-.392	.270	-.203	-1.452	.151
	CL						-.014	.384	-.005	-.035	.972
4	Regression	1008.072	3	336.024	24.882	.000b					
	Residual	891.299	66	13.505							
	Total	1899.371	69								
	(Constant)						5.065	3.414		1.484	.143
	QMP						.550	.094	.604	5.852	.000
	RAL						.364	.230	.155	1.587	.117
	CL						.260	.327	.074	.795	.429

a. Dependent Variables: Customer Satisfaction[1]; Cycle Time[2];.Cost[3]; Overall Performance[4]
b. Predictors: (Constant) Quality Management Practice (QMP); Resource Activation level (RAL); Capability Levels (CL).

The findings in this study corroborate those of Mellat-Prasat and Spillan (2014), who argued that logistics and supply chain integration is an imperative inter-firm practice that augments organizational performance. Indeed, by adopting integrated logistics systems, firms' supply chains are streamlined, improving customer service and satisfaction, making business processes more efficient through automation, and ultimately accruing overall business economic benefits. Adopting total quality management practices ensures continuous improvement in business processes, strengthened supplier relationships, customer satisfaction, and eventually, attainment of a competitive edge relative to the other industry participants.

6.0 Conclusion

In conclusion, there is significant relationship between integrated logistics systems and customer satisfaction in the energy sub-sector. That there is significant relationship between integrated logistics systems and cycle time reduction in the energy sub-sector. That there is significant relationship between integrated logistics systems and overall performance of the energy sub-sector in Kenya. That there is no significant relationship between integrated logistics systems and cost reduction in the energy sub-sector in Kenya.

Logistics integration is an imperative concept in supply chain management for manufacturing firms and the services sector. This research sought to determine the influence of the ILS on the stock management in the ESS in Kenya. Opinions of the ILS owners, users, and customers concerning quality warehouse customer service delivery, reducing costs, and cycle time were sought. ILS was measured in terms of the quality of management practices, resource activation level, and capability level. The results show that quality management practices positively and significantly affect customer service, cost reduction, cycle time reduction and overall performance. Resource activation level has a positive and significant relationship with customer satisfaction and cycle time reduction but no significant relationship with cost reduction and overall performance. In addition, capability level has a positive and significant effect on cycle time reduction but no significant effect on customer satisfaction, cost reduction and overall performance. The results are summarized underneath:

Table 7: Regression Analysis per Objective

Predictor \ Dependent	Customer Satisfaction (CS)	Cycle Time (CT)	Cost (C)	Overall Performance (OP)
Quality Management Practice (QMP)	Significant	Significant	Insignificant	Significant
Resource Activation Level (RAL)	Significant	Significant	Insignificant	Insignificant
Capability Level (CL)	Insignificant	Significant	Insignificant	Insignificant

Adopting quality management practices, resource activation, and stepping up employee capabilities influence a firm's competitive position. Firms, not only in the ESS sector, can improve their competitive advantage through ILS integration in company-wide and external processes. Employees, especially those within the logistics and supply chain system, are operating in a dynamic, competitive, and tumultuous business environment requiring continuous learning and making informed decisions. Based on the findings of this study, investment in integrated logistics systems should be a priority for firms to achieve a competitive advantage. Subsequent scholars may consider widening the context/scope of this study to cover more sub-sectors or replicate this study in other economic sectors or countries to aid generalization.

References

Abdul, F. A., Iortimbir, A. I., Oladipo, G. T., & Olota, O. O. (2019). Impact of logistics management on organizational performance (A case study of Dangote Flour Mills Plc, Nigeria). *Journal of Sustainable Development in Africa*, *21*(1), 36-49.

Abugabah, A. & Sanzogni, L. (2009). The impact of information system on user performance: A critical review and theoretical model: *Pro. International Conference on Information Systems (ICIS) World Academy of Science, Engineering and Technology, (57),* 809 – 819.

African Development Bank Group (2022). Africa Economic outlook 2022: Supporting Climate Resilience and a Just Energy Transition in Africa**.** https://www.afdb.org/en/knowledge/publications/african-economic-outlook. Accessed 29.01.2023

Aslam, H., Blome, C., Roscoe, S., & Azhar, T. M. (2018). Dynamic supply chain capabilities: How market sensing, supply chain agility and adaptability affect supply chain ambidexterity. *International Journal of Operations & Production Management*, 38(12). 226- 2285. ISSN 0144-3577

Attia, A. (2018). Supply logistics integration in the saudi food industry. [Supply logistics integration] *Business Process Management Journal, 24*(4), 1007-1022. doi:https://doi.org/10.1108/BPMJ-01-2017-0016

Ayman, B. A., Alfar, N. A., & Alhyari, S. (2021). The effect of supply chain quality management on supply chain performance: The indirect roles of supply chain agility and innovation. [Effect of supply chain quality management] *International Journal of Physical Distribution & Logistics Management*, *51*(7), 785-812. doi:https://doi.org/10.1108/IJPDLM-01-2020-0011

Aziz, N. I. H. A., Hanafiah, M. M., Gheewala, S. H., & Ismail, H. (2020). Bioenergy for a cleaner future: A case study of sustainable biogas supply chain in the Malaysian Energy Sector. *Sustainability*, *12*(8), 3213.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Becerra, P., Mula, J., & Sanchis, R. (2022). Sustainable Inventory Management in Supply Chains: Trends and Further Research. *Sustainability*, *14*(5), 2613.

Chen, H., Daugherty, P. J., & Landry, T. D. (2009). Supply chain process integration: a theoretical framework. *Journal of business logistics*, *30*(2), 27-46.

Dedunu, H. H., & Weerasinghae, I. M. S. (2018). The effect of inventory management on company performance reference to listed manufacturing companies in Sri Lanka. *International Journal of Management Sciences and Business Research*, *7*(7), 49-54.

Duong, N. H., & Ha, Q. A. (2021). The links between supply chain risk management practices, supply chain integration and supply chain performance in Southern Vietnam: A moderation effect of supply chain social sustainability. *Cogent Business & Management*, *8*(1) 1-27. DOI:10.1080/23311975.2021.1999556

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. *Journal of operations management*, *28*(1), 58-71.

Gołaś, Z. (2020). The effect of inventory management on profitability: Evidence from the Polish food industry: Case study. *Agricultural Economics*, *66*(5), 234-242

Keskin H., Ayar Senturk H., Tatoglu E., Golgeci I., Kalaycioglu O., & Etlioglu H.T. (2021). The simultaneous effect of firm capabilities and competitive strategies on export performance: the role of competitive advantages and competitive intensity. *International Marketing Review,* 38(6), 1242-1266. doi: 10.1108/IMR-09-2019-0227

Kim, D. Y. (2013). Relationship between supply chain integration and performance. *Operations Management Research*, *6*(1), 74-90.

Kim, S.T., Lee, H.H. & Hwang, T. (2020). Logistics integration in the supply chain: a resource dependence theory perspective. *International Journal of Quality Innovation*, 6:5 p1-12. https://doi.org/10.1186/s40887-020-00039-w

Kmiecik, M. (2022). Logistics coordination based on inventory management and transportation planning by third-party logistics (3PL). *Sustainability*, *14*(13), 8134. doi:https://doi.org/10.3390/su14138134

Kor, Y. Y., & Mahoney, J. T. (2004). Edith Penrose's (1959) contributions to the resource-based view of strategic management. *Journal of management studies*, *41*(1), 183-191.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, *30*(3), 607-610.

Lawal, A. I., Ozturk, I., Olanipekun, I. O., & Asaleye, A. J. (2020). Examining the linkages between electricity consumption and economic growth in African economies. *Energy*, 208, 118363. https://doi.org/10.1016/j.energy.2020.118363

Liu, L., Huang, J., & Li, H. (2022). Estimating the real shock to the economy from COVID-19: The example of electricity use in china. *Technological and Economic Development of Economy*, *28*(5), 1221-1241. doi:https://doi.org/10.3846/tede.2022.17027

Malak-Rawlikowska, A., Majewski, E., Wąs, A., Gołaś, M., Kloczko-Gajewska, A., Borgen, S. O., & Wavresky, P. (2019). *Quantitative assessment of economic, social and environmental sustainability of short food supply chains and impact on rural territories* (Doctoral dissertation, European Union's Horizon 2020).

Mellat-Parast, M., & Spillan, J. E. (2014). Logistics and supply chain process integration as a source of competitive advantage: An empirical analysis. *The international journal of logistics management,* 25(2) 289 - 314. http://dx.doi.org/10.1108/IJLM-07-2012-0066

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American journal of sociology*, *83*(2), 340-363.

Munyaka, J. B., & Yadavalli, V. S. S. (2022). Inventory Management Concepts and Implementations: A Systematic Review. *South African Journal of Industrial Engineering*, *33*(2), 15-36. doi:https://doi.org/10.7166/33-2-2527

Murage, J. N. (2011). *Commercial electricity supply chain management practices in kenya* (Doctoral dissertation).

Muvaka, M. K., & Henry, B. (2018). Green Supply Chain Practices as a Supply Chain Performance Tool in State Corporations in Kenya: Case Study of Kenya Electricity Generating Company Limited. *International Journal of Social Sciences Management and Entrepreneurship (IJSSME)*, *1*(1).

Opoku, R. K., Abboah, C. K. B., & Owusu, R. T. (2021). Inventory management strategies of food manufacturing industries in a developing economy. *LogForum*, *17*(1).

Oromo, F. A., & Mwangangi, P. (2017). Effect of supplier development on procurement performance in public sector in Kenya: A case of Kenya electricity generating company limited (kengen). *International journal of supply chain management*, *2*(2), 42-59.

Penrose, E. (1959). *The Theory of the Growth of the Firm*. Basil Blackwell, Oxford.

Saragih, J., Tarigan, A., Pratama, I., Wardati, J., & Silalahi, E. F. (2020). The impact of total quality management, supply chain management practices and operations capability on firm performance. *Polish Journal of Management Studies*, *21*.

Sarder M. D. (2021). Logistics customer services. *Logistics Transportation Systems*, 197–217. https://doi.org/10.1016/B978-0-12-815974-3.00008-3

Seo, Y. J., Dinwoodie, J., & Roe, M. (2015). Measures of supply chain collaboration in container logistics. *Maritime Economics & Logistics*, *17*(3), 292-314.

Siva, R., Patan MNK., Kumar, MPL., Purusothaman M., Pichai SA. & Jegathish Y. (2017). Process improvement by cycle time reduction through Lean Methodology, IOP Conf. Ser.: Mater. Sci. Eng. 197 012064. 1Department of Mechanical Engineering, Satyabhama University, Chennai 600119, Tamil nadu, India. * E-mail :siva.mech@sathyabamauniversity.ac.in

Som, J. O., Cobblah, C., & Anyigba, H. (2019). The effect of supply chain integration on supply chain performance. *Available at SSRN 3454081*.

Spychalska-Wojtkiewicz, M. (2020). The relation between sustainable development trends and customer value management. *Sustainability, 12(14), 5496*.

Thai, V. & Jie, F. (2018). The impact of total quality management and supply chain integration on firm performance of container shipping companies in Singapore. *Asia Pacific Journal of Marketing and Logistics*, 30(3), 605-626. https://doi.org/10.1108/APJML-09-2017-0202

Tseng, P. H., & Liao, C. H. (2015). Supply chain integration, information technology, market orientation and firm performance in container shipping firms. *The International Journal of Logistics Management*, 26(1) 82-106. DOI:10.1108/IJLM-09-2012-0088

Vetrivel, S.C. (2020). Analysis on inventory control and management strategies in knitwear companies. *Journal of Gedrage & organisatie review, 33(2), 2708-2719.*

Wabuge, J.& Osoro, A. (2020). Factors affecting organizations' logistic outsourcing in the supply chain management in Kenya: A case of Kenya seed Company Limited. *International Journal of Scientific and Research Publications* (IJSRP), 10(2), 255-261. https://doi.org/10.29322/ijsrp. 10.02.2020.p9836

Waweru, J. N. (2013). *Impact of integrated logistics system on effective management of inventory in electricity Sub-sector in Kenya*. [Masters dissertation, KCA University]. Official KCAU Institutional Repository. URI: http://41.89.49.13:8080/xmlui/handle/123456789/690

Waweru, J. (2014). Impact of integrated logistics system on effective management of inventory in electricity Sub-sector in Kenya. [Masters dissertation, KCA University. Semantic scholar, https://www.semanticscholar.org/paper/Impact-of-integrated-logistics-system-on-effective-Waweru/c3c99711bbd5d45eaf2586fab82635b21ef463fc

Wheat, B., Mills, C., & Carnell, M. (2003). *Leaning into Six Sigma: a parable of the journey to Six Sigma and a lean enterprise*. McGraw Hill Professional.

World Bank report (2017). *Skills to Support the Transport and Logistics Sector; Toward Productive, Efficient and Competitive Transport and Logistics Sector in Uganda*, Washington, DC, available at: https://openknowledge.worldbank.org/handle/10986/28945.

Yuen, K. F., & Van Thai, V. (2016). The influence of supply chain integration on operational performance: A comparison between product and service supply chains. *The International Journal of Logistics Management, 28(2), 444-463.*

Yuen, K. F., & Thai, V. V. (2017). Corporate social responsibility and service quality provision in shipping firms: financial synergies or trade-offs?. *Maritime Policy & Management*, *44*(1), 131-146.