

EFFECT OF E-WAREHOUSING ON PERFORMANCE OF PUBLIC HEALTH INSTITUTIONS IN KIAMBU COUNTY, KENYA

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Abstract

Purpose: *The main objective of this study was to determine effect of E-Warehousing on performance of Public Health Institutions in Kiambu County.*

Materials and methods; *this research used descriptive research design. In research, a descriptive research design refers to the collection and presentation of detailed information about a particular participant or small group, frequently including the accounts of subjects themselves. The descriptive research design is normally used because it places more emphasis on a full contextual analysis of a few elements and conditions and their interrelations, which relies on qualitative data. Primary research data was gathered using questionnaires. The questionnaires containing both open-ended and close-ended questions were administered. The research data was analyzed using qualitative techniques. This was done using descriptive statistics with the help of the Statistical Package for Social Sciences (SPSS) version 23. The responses in the questionnaire were coded into common themes to facilitate analysis. The coded data was then entered into the SPSS program to generate measures of central tendency (mode and mean) and measures of dispersion such as percentages and ranks. Presentation of the quantitative analysis results was done in form of pie charts and bar graphs. Multiple regression analysis was used to establish the relations between the independent and dependent variables.*

Results: *The study established that E-Warehousing enables the execution of a real-time warehouse management system that greatly minimize the paperwork conventionally which are associated with warehouse functions and also makes sure timely and perfect flow of inventory and information. E-Warehousing provides a comprehensive range of fulfilment, warehousing and distribution services for the Public Health Institutions.*

Recommendations: *The study recommends that implementing E-Warehousing should help Public Health Institutions reduce labour costs, improve inventory accuracy, improve flexibility and responsiveness, decrease errors in picking and shipping goods, and improve customer service.*

Keywords: *E-Warehousing, Material Resource Planning, Automated storage/retrieval, Distribution Resource Planning*

1. INTRODUCTION

1.1 Background of the study

This study focused on the effect of warehousing operations on Performance of Public Health Institutions in Kiambu County; Kenya. This chapter covers the background information of the study, in which a description of the current state of warehousing operations globally, regionally and locally is provided. This is followed up

with the problem statement, the general and specific objectives of the study. The significance of the study, the scope of the study as well as the limitations of the study. According to Puspasari (2014) defines that the warehouse is the interface area for production lines, market, customers and suppliers, and the business environment in general. Goods inwards (GI), constituting part of the warehouse activities is the department responsible for booking-in the incoming parts from external suppliers. After the production process is improved, the resources in the warehouse are balanced to link the internal or external transfer of physical items.

1.1.1 Kiambu County Public Health

There are a total number of 119 health facilities spread across the county. Under the public facilities, the county has one level-five hospital namely Kiambu District Hospital. The target population will comprise of 119 health facilities, which comprise of public health institutions in Kiambu County Their Level-Five Hospital-1, District Hospital-6, Health Centres-24 and Dispensaries-76 and 10 Mission Hospitals. The doctor/population ratio in the county is 1:17,000 and the nurse/population ratio stands at 1: 1,300. The average distance to the health facility is seven Km and the facilities are well accessed since the road network is good (Kenya Healthcare Federation, 2016).

A well-functioning health information system is one that ensures the production, analysis, dissemination, and use of reliable and timely information on health determinants, health systems performance and health status (Kiplagat, 2015). With the Promulgation of the Constitution in 2010, devolution in the 47 counties brought with it a wide range of change for development in the country. Various sectors of the counties were strengthened, Health being chief among them. Keeping in line with Kiambu County's plan, to have its health centers fully automated to ease of service delivery, the Information and Communications Technology (ICT) Department is on track, driving this initiative home by having all warehouse management systems and equipped with electronic medical records system (Karimi & Namusonge, 2014). The changes observed include improving the monitoring and evaluation of health services in dispensaries and health centers. The ability to track warehouse inbound operation in terms of drugs movement and storage, revenues collected and drug inventories. Provision of real time access to reports and utilization of services, staff productivity, and facility financial data. This far, several facilities have been networked with both Level 4 and 5 Hospitals to ensure that pharmaceutical inventory levels are monitored (Kiplagat, 2015).

1.1.2 Public Health Institution

According to Burke and Thomson (2012) states that the federal government plays a large role in the public health system in the country. It surveys the population's health status and health needs, sets policies and standards, passes laws and regulations, supports biomedical and health services research, helps finance and sometimes delivers personal health services, provides technical assistance and resources to state and local health systems, provides protection against international health threats, and supports international efforts toward global health. The Centers for Disease Control, the main assessment and epidemiologic unit for the nation, directly serves the population as well as providing technical assistance to states and localities. The National Center for Health Statistics within the Centers for Disease Control is the main authority for collecting, analyzing, and disseminating health data. The Agency for Toxic Substances and Disease Registry an assessment unit focuses on environmentally related diseases. The National Institutes of Health, the primary research arm of the government, both conducts research and supports research projects across the nation. The Food and Drug Administration directly tests and assesses safety of food, drugs, and a wide variety of consumer goods and sets standards for safe use of these items (Swanson, 2013). Complex warehousing operation requires

a control structure that has a great deal of information, data, and knowledge of products, processes, customers, and resources readily available. Therefore, Optimization strategies are utilized to position product availability and delivery as a competitive advantage while also optimizing the cost trade-offs associated with transportation, facilities, equipment, workforce, and other critical cost variables.

Public Health in South-East Asia region, has been dedicated to in India on efficiency and effectiveness of Warehouse Management in the context of Supply Chain Management of the public health facilities at AIHH & PH have the unique support of its field laboratories, namely, Urban Health Center, Chetla and Rural Health Unit & Training Center, Singur. according to More (2016) found that that timely and accurate information about products, resources and processes are essential to operationalize a planning and control structure that effectively and efficiently achieves the high performance of warehouse operations with the health system in India required in today's marketplace

Annan, Otchere, and Quansah (2013) noted that in Ghana, logistics planning, forecasting, procurement, storage and the distribution of goods are performed by the regional health directorates. This has resulted in ineffectiveness and inefficiencies within the logistics management system that has a negative affect such as poor cost control in inventory management and poor quality of care delivered to the public. Most public healthcare delivery institutions in developing countries experience scarcity of funds and a shortage of proper supply chain mechanisms which in effect compromise the quality of healthcare delivery to patients (Annan et al., 2013).

The storage facilities for the pharmaceutical product as in Tanzania do comply with the good Storage Practice of medicines according to the International Committee on Harmonization (ICH) with respect to temperature and relative humidity. The increasing attention now is being given to the possible effects of storage and transport on the stability of the pharmaceutical product. It is hoped that this will improve confidence in the community about the quality of drug products that are supplied to patients (Nzinza, 2013).

Kenya's health care system is structured in a step-wise manner so that complicated cases are referred to a higher level. Gaps in the system are filled by private and church run units. Dispensaries and private clinics, Health centres, Sub-district hospitals and nursing homes, District hospital and private hospitals, Provincial hospital and National hospital (Kenya Healthcare Federation, 2016). Kenya has 47 counties, each with a county hospital which is the referral point for the district hospitals. These are regional centres which provide specialized care including intensive care and life support and specialist consultations.

1.1.3 The Concept of Performance of public health Institutions

Performance refers to the accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed. In a contract, performance is deemed to be the fulfillment of an obligation, in a manner that releases the performer from all liabilities under the contract (Annan et al., 2013). Performance should not be measured by only financial indicators but also by other non-financial metrics such as employee and customer satisfaction, customer retention, public image and improvement of business processes (Kaplan & Norton, 1996). Supply Chain Management (SCM) practices are categorized into demand management, customer relationship management, supplier relationship management, capacity and resource management, service performance, information and technology management, service supply chain finance, and order process management (Chong and Sin, 2010). A Supply Chain encompasses all activities in fulfilling customer demands and requests. These activities are associated with the flow and transformation of goods from the raw materials stage, through to the end user, as well as the associated information and funds flow. There

are four stages in a supply chain: the supply network, the internal supply chain (which are manufacturing plants), distribution systems, and the end users. Moving up and down the stages are the four flows: material flow, service flow, information flow, and funds flow (Saifidun, 2012)

Ramaa and Rngawamy (2012) noted that in the supply chain, warehousing function is very critical as it acts as a node in linking the material flows between the supplier and customer. In today's competitive market environment companies are continuously forced to improve their warehousing operations. Warehouses play a vital role because they function as nodes that direct the flow of materials within a distribution network (More, 2016). The effects of organizing warehousing activities can directly be seen in customer service levels, lead times, and the cost structure of a company. Warehousing influences the performance of an entire supply chain.

Many firms are automating their basic warehousing functions to achieve the increase in throughput rates or inventory turns required for their warehousing operations to be cost-effective. It is necessary to allocate warehouse resources efficiently and effectively to enhance productivity and reduce the operating costs of the warehouse. One vital area determining the efficiency of the warehouse is the determination of the proper storage locations for potentially thousands of products in a warehouse (Lidström, 2013).

1.1.4 Warehousing Operations

The general warehousing concept includes the storage and retrieval operations, the organizational aspects, the mechanization equipment for materials handling, media for material storage, and the building itself, which is necessary to protect the goods' environments (Piasecki, 2015). The task of distribution consists of moving goods from the production line to the customer in an acceptable time and doing it economically. Optimum or near-optimum solutions are difficult to find and often involve more than errand running ingredients for the shortest path as well as the removal of unnecessary waiting time. Inventory control, production control, and warehouse management are the underlying methodologies that affect the industrial success of distribution organizations. Both the physical processes of material handling and stocking, as well as the underlying methodologies, are commonly denoted by the word warehousing (Pearson, 2010).

In today's complex supply chain network, warehouses are the essential component for linking different supply chain partners to formulate the seamless integration of the whole supply chain and ensure the smooth flow of products inside the network. It is because warehouses focus on different critical logistics functions such as inventory management and location, receipts from suppliers, deliveries to downstream customers, processing of orders, management of labor, management of equipment and management of the processes to perform these functions in the warehouse. Handling these functions effectively and efficiently can lead to helping to satisfy demands from the suppliers as well as from the customers (Annan et al., 2013).

1.2 Statement of the Problem

In the financial years 2015/2016, Kiambu County Public Healthcare warehouses had Ksh. 800,000 worth of expired drugs representing 1% of the total procurement value. This has been attributed to frequent stock outs, over supply, over stocking, stock obsolescence, poor forecasting, stock pilferage, poor responsiveness to customer needs and lack of proper ICT application systems resulting into poor performance. (Kiplagat, 2015).

Lack of the pharmaceutical product at the point of need has led to an unnecessary loss of lives that could otherwise have been prevented. In Kiambu County, there have been numerous complaints on the non-availability of the pharmaceuticals and non-pharmaceuticals. There have been instances where staffs have

schemed off some commodities especially drugs which have been attributed to poor warehouse management systems and lack of automating warehouse tracking system (Kenya Healthcare Federation, 2016).

The reports further note that in the same period. The laboratory is stocked with reagents and components purchased for Kenya Shillings 3 million with non-pharmaceutical costing Kenya Shillings 5,000,000.00 with short expiry. The non-pharmaceuticals, including cleansing materials and sanitary products, which are purchased at a cost of Kenya Shillings 1,200,000.00 per financial year. Kiambu ICT report indicated that transition from manual to automate warehouse systems, has been a much welcome move. It has assisted facilities to provide better inventory management, reduction of warehouse operating cost to 63%, reduction labor turn over to 33 % and increased in order cycle time from 6days to 3 days from the level 4 and 5 centralized warehouses (Kiplagat, 2015).

The challenges highlighted by the Kenya Healthcare Federation, (2016) report review and the previous researches cited herein limit Kiambu County Public healthcare desire to achieve warehouse operations effectiveness and efficiency. It is therefore worth conducting a research that will look into the effect of warehousing operations on Performance of Public Health Institutions in Kiambu County; Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

To examine the effect of e-warehousing on Performance of Public Health Institutions in Kiambu County; Kenya

1.3.2 Specific Objectives

- i. To assess the effect of Material Resource Planning on Performance of Public Health Institutions in Kiambu County
- ii. To establish the effect of Automated storage/retrieval on Performance of Public Health Institutions in Kiambu County
- iii. To determine the effect of Distribution Resource Planning on Performance of Public Health Institutions in Kiambu County

1.4 Conceptual Framework

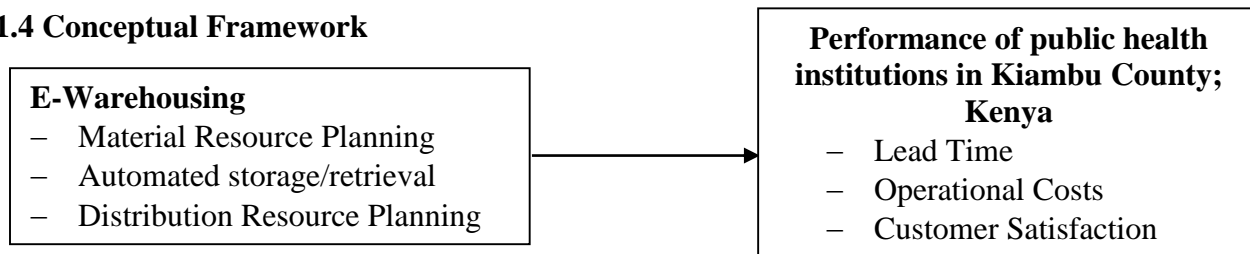


Figure 2. 1 Conceptual Framework

Independent Variables

Dependent Variable

2.0 METHODOLOGY

This research used descriptive research design. In research, a descriptive research design refers to the collection and presentation of detailed information about a particular participant or small group, frequently including the accounts of subjects themselves. The descriptive research design is normally used because it places more

emphasis on a full contextual analysis of a few elements and conditions and their interrelations, which relies on qualitative data. Primary research data was gathered using questionnaires. The questionnaires containing both open-ended and close-ended questions were administered. The research data was analysed using qualitative techniques. This was done using descriptive statistics with the help of the Statistical Package for Social Sciences (SPSS) version 23. The responses in the questionnaire were coded into common themes to facilitate analysis. The coded data was then entered into the SPSS program to generate measures of central tendency (mode and mean) and measures of dispersion such as percentages and ranks. Presentation of the quantitative analysis results was done in form of pie charts and bar graphs. Multiple regression analysis was used to establish the relations between the independent and dependent variables.

3.0 RESEARCH FINDINGS , ANALYSIS AND DISCUSSION

3.1 Introduction

This chapter presents analysis and findings of the study as set out in the research methodology. The study sought to establish the effect of warehousing operations on Performance of Public Health Institutions in Kiambu County; Kenya. The data was gathered exclusively from questionnaire as the research instrument designed in line with the objectives of the study.

3.2 Response Rate

The study targeted a population of 119 employee in either procurement, drugs store, pharmacy store, warehouse managers or warehouse officers in Kiambu health facilities. Out of the 119 distributed questionnaires 97 were filled and returned. This translated to a response rate of 81.5%. This implied that the response was good enough and representative of the population and conforms with Mugenda and Mugenda (2013) that a response rate of 70% and above is excellent. Based on the above assertions, the studies 81.5% response rate was considered adequate for the study. To enhance high response rate, the study used various techniques were such as drop and pick methods, phone calls, emails and snow balling.

Table 3:1.Response Rate

Response	Frequency	Percentage
Returned questionnaires	97	81.5
Unreturned questionnaires	22	18.5
Total	119	100

3.3 Reliability Results

Table 3.2 illustrates the findings of the study concerning the reliability analysis. In this study, reliability was ensured through pilot testing on a sample of 11 respondents who were not part of the final study. This represents 9% of the sample as recommended by Mugenda and Mugenda (2012). The 11 respondents were selected from 119 public health facilities in Kiambu County. From the findings, the coefficient for E-Warehousing was 0.761, coefficient for Inventory control systems was 0.811, coefficient for Warehouse Design was 0.793 and coefficient for inbound operations was 0.711 as shown in table 3.2. This implied that the language used on the questionnaire was simple to avoid any ambiguity and misunderstanding the validity of the instrument was established by expert input. The study used Cronbach alpha Coefficient to assess the internal consistency among the research instruments. Alpha equals zero when the true score is not measured and there is only an error component. The coefficient was higher than 0.70 threshold, showing that the instruments were reliable.

Table 3:2.Reliability results

Variable	Cronbach's	No of Item	Remarks
E-Warehousing	.761	5	Accepted
Inventory control systems	.811	5	Accepted
Warehouse Design	.793	5	Accepted
Inbound operations	.711	5	Accepted
Overall	.760		

3.3.1 Validity of the Instrument

The study established the content validity of the questionnaire to establish if all measures represents all facets of a given social construct before using it to collect data. Experts in supply chain field and supervisor’s opinion was used to test content validity. The comments made on the questionnaire were included before reliability test was conducted. This helped the questionnaire to be clear and distinct in a position to capture what it was intended to capture as argued by Mugenda and Mugenda (2012) where he argues that argue that the validity of an instrument is demonstrated when that instrument performs its designed purpose.

3.4 Demographic Findings

3.4.1 Health Institutions Level

The study sought on the respondent’s current Health Institutions Level they are working in Kiambu County from the findings as indicated in Table 3.4, majority of the respondent were working in Dispensaries 61.9 % of the respondents, 18.6% of the respondents were working in Health Centers, 6.2 % of the respondents were working in District Hospital. 10.3% of the respondents were working in Mission Hospitals and 3.1% of the respondents were working in Level-Five Hospital. The study findings are in line with those of Osei-Mensah, (2016) that Monitor operations to ensure that staff members comply with administrative policies and procedures, safety rules, union contracts, environmental policies, or government regulations

Table 3:3 Health Institutions Level

Type/Level	Frequency	Percentages
Level-Five Hospital	3	3.1%
Mission Hospitals	10	10.3%
District Hospital	6	6.2%
Health Centers	18	18.6%
Dispensaries	60	61.9%
Total	97	100

Source; M.O.H ,(2017)

3.5 Descriptive Analysis

Descriptive statistics are a set of brief descriptive coefficients that summarizes a given data set, which can either be a representation of the entire population or a sample. The measures used to describe the data set are measures of central tendency and measures of variability or dispersion. The respondents were asked to indicate whether they agree or disagree on the statements based on a Likert scale of 1 to 5 where 1=Strongly Disagree,

2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree. The results of the study were presented as per the objectives of the study.

3.5.1 E-Warehousing

Table 3.4 shows the respondents response on the level to which they were in agreement with the given statements that relate to the influence of E-Warehousing on Performance of Public Health Institutions in Kiambu County. From the findings majority of the respondents to a great extent agreed that a proper warehouse management system leads to improved performance supported by a mean of 3.82 and standard deviation of 0.87. From the finding, it was established that use of ICT in warehousing allows the free flow of information within the supply chain with a mean score of 4.08 and standard deviation 0.98. The findings indicated that to a great extent the respondents agreed that e-warehousing systems facilitate management in their daily planning, organizing, staffing, directing, and controlling the utilization of available resources with a mean score of 3.89 and standard deviation of 1.05.

From the findings, it was clearly observed that the systems support individual location number, picking sequence, type of use picking, reserve storage were been used with a score of 4.01 and standard deviation of 1.05. The respondents to a moderate extent indicate that the system allow Planning - finalizing the daily plan for receiving dock activity, selecting the workload/orders to be processed in the day or shift with score of 4.12 and standard deviation of 0.98. From the findings, it was established that the systems providing the opportunity to respond to problems in a timely way, and report data for performance analysis with mean of 3.96 and standard deviation of 0.87. This implied that e-warehousing enabled Estimating the Quantifiable Characteristics of Products, Information - Estimating sizes, distances, and quantities; or determining time, costs, resources, or materials needed to perform a work activity. The study concurred with those of Zwehlile (2013) that ensuring the documented processes and procedures are embedded in the e-warehousing and are consistently applied, used and appropriate for the nature of the work and service level intentions of the company.

Table 3:4. E-Warehousing

Statement	Min	Max	Mean	StD
A proper warehouse management system will lead to improved supply chain performance	2.00	5.00	3.82	0.87
The use of ICT in warehousing allows the free flow of information within the supply chain	3.00	4.00	4.08	0.98
Accuracy in inventory records is achieved through the use of ICT	3.00	4.00	3.68	0.83
Organization use software application designed to support and optimizes warehouse functionality and distribution centre management.	1.00	4.00	3.90	0.78
E-warehousing systems facilitate management in their daily planning, organizing, staffing, directing, and controlling the utilization of available resources	3.00	5.00	3.89	1.05
The systems support individual location number, picking sequence, type of use (picking, reserve storage	2.00	4.00	4.01	1.05
The system allow Planning - finalizing the daily plan for receiving dock activity, selecting the workload/orders to be processed in the day or shift	1.00	5.00	4.12	0.98

The systems sequencing the orders to be picked Organizing orders for picking can be accomplished in many ways	2.00	5.00	4.13	0.92
The systems providing the opportunity to respond to problems in a timely way, and report data for performance analysis.	1.00	5.00	3.96	0.87

3.6 Model Summary

Regression analysis was used to express the relationship between the independent and dependent variables. The dependent variable was Performance of Public Health Institutions in Kiambu County; Kenya measured by the increase in performance which is attributable to E-warehousing operations. The independent variables were the contributions of Material Resource Planning, Automated Storage/Retrieval and Distribution Resource Planning. The ability of independent variables to explain the changes in dependent variables was measured by adjusted R-square as shown in table. From table 3.5, it is clear to see that the independent variables explained 66.5% of variations in the dependent variable as shown by the R-square (0.665). Therefore 33.5 % of the variations in the dependent variable were due to other factors not considered by the model. This is because Performance of Public Health Institution increase is multi-dimensional factor and may be due to actions taken by other departments or latent factors within the supply chain departments.

4.6.4 Coefficient Analysis

From regression results in Table 3.6, the 2.552 represented the constant, which predicted value of Performance of Public Health Institution when all E-Warehouse effects remain constant at zero (0). This implied that Performance of Public Health Institutions in Kiambu County; Kenya Would be at 2.552 holding effects of Material Resource Planning, Automated Storage / Retrieval, and Distribution Resource Planning.

The study found that Material Resource Planning has significance positive influence on Performance of Public Health Institutions in Kiambu County as indicated by $\beta_1= .110$, $p=0.000<0.05$, $t=1.232$ The implication is that a unit increase in Material Resource Planning would led to a significant increase in Performance of Public Health Institutions by $\beta_1=.110$.

From coefficient results the study found that Automated Storage and Retrieval systems has a significance positive influence on Performance of Public Health Institutions as indicated by $\beta_2= 0.338$, $p=0.001<0.05$, $t=4.014$. The implication was that a unit increase in Automated Storage and Retrieval systems would results into increase in Performance of Public Health Institutions by $\beta_2= 0.338$.

From the regression coefficient findings, the study revealed that Distribution Resource Planning, would have a significant positive influence on performance of Public Health Facilities as indicated by $\beta_3=0.062$, $p = 0.000<0.05$, $t=.577$ The implication is that an increase in Distribution Resource Planning, would lead to an increase in Performance of Public Health Institutions in Kiambu County.

Table 3:5. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.816a	.665	.654	.373

a. Dependent Variable: Performance of Public Health Institutions

b. Predictors: (Constant), Material Resource Planning, Automated Storage and Retrieval,

Distribution Resource Planning

Table 3:6. Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.552	.175		14.587	.000
Material Resource Planning	.110	.089	.198	1.232	.000
Automated Storage and Retrieval	.338	.084	.538	4.014	.001
Distribution Resource Planning	.062	.108	.108	.577	.000

The established regression equation was;

$$Y = 2.552 + 0.110X_1 + 0.338X_2 + 0.062X_3 + e$$

Where: Y = performance;

a= constant;

Regression Coefficients= b1, b2, b3 and b4

X₁ = Material Resource Planning

X₂ = Automated Storage and Retrieval

X₃ = Distribution Resource Planning

e = error term

4.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1 Introduction

This chapter describes the summary of the study, conclusions and recommendations of the study. The main purpose of the study was to determine the effect of warehousing operations on Performance of Public Health Institutions in Kiambu County; Kenya. The study also determined the influence of independent variables Material Resource Planning, Inventory control systems, Distribution Resource Planning, and Automated Storage and Retrieval on the dependent variable, Performance of Public Health Institutions in Kiambu County.

4.2 Summary of the Finding

In this chapter, the researcher makes a summary of the study then draws a conclusion and gives recommendations based on the research findings and analysis done in the previous chapter. The main purpose of the study was to examine the effect of warehousing operations on Performance of Public Health Institutions in Kiambu County; Kenya. The research was conducted at the Public Health Institutions in Kiambu County. The choice of Kiambu county was because it covers areas that are densely populated, health facilities is an absolutely a necessity and more so how the medical commodities items are procured and how they are stored and distributed to all health facilities.

4.2.1 E-Warehousing

The study established that E-Warehousing enables the execution of a real-time warehouse management system that greatly minimize the paperwork conventionally which are associated with warehouse functions and also makes sure timely and perfect flow of inventory and information. E-Warehousing provides a comprehensive range of fulfillment, warehousing and distribution services for the Public Health Institutions. From storing, packing and sending orders for the Public Health Institutions through to flexible pallet, crate and loose bulk storage and distribution Warehousing activities assist Public Health Institutions in Kiambu County; Kenya to tracking products throughout the entire storage and distribution process. These systems span from simple computer automation systems to high-end, feature-rich management programs that improve order picking, facilitate better dock logistics, and monitor inventory management.

4.3 Conclusions

The study concluded that E-Warehousing plays a significant role in growing Public Health Institutions in Kiambu supply chain operation fast and strong. Help manage routing of the products from the pick-up point to the end point. This integration enables Public Health Institutions in Kiambu to develop pull-based supply chains, rather than push-based supply chains. Demand driven supply chains are driven by customer demand, which allows the Public Health Institutions in Kiambu more flexibility and responsiveness, while a push-based supply chain is driven by long-term projections of customer demand. Execution of a warehouse management system helps Public Health Institutions to improve their competitive advantage by minimizing labor expenses, enhancing customer service, improving inventory accuracy, increasing flexibility, and responsiveness.

4.4 Recommendations

The study recommends that implementing E-Warehousing should help Public Health Institutions reduce labor costs, improve inventory accuracy, improve flexibility and responsiveness, decrease errors in picking and shipping goods, and improve customer service. Modern warehouse management systems operate with real-time data, allowing the Public Health Institutions to manage the most current information on activities like orders, shipments, receipts and any movement of goods. A warehouse management system allows a firm to manage inventory in real time, with data as existing as the latest order, shipment, or receipt and any movement in between.

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