INFLUENCE OF GLOBAL STANDARDS IMPLEMENTATION ON PERFORMANCE OF PUBLIC HEALTH PROCUREMENT AGENCY IN KENYA: A CASE OF KENYA MEDICAL SUPPLIES AGENCY

Collins .O. Agoro

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DECLARATION

This research thesis is my own original work and has not been used nor presented for any award in any other university.

Signature: ……. Date: 07/12/2022 ……

Collins .O. Agoro

L50/33743/2019

This research thesis is presented for examination with my approval as the university supervisor.

Signature: …… Date: 07/12/2022 ……

Dr. Naomi Mwangi, Senior Lecturer, University of Nairobi

DEDICATION

This thesis is dedicated to my loving and supportive family: My wife Joy, My Father Jack, My mum Grace, My sisters Emily & Cynthia, my brother Godfrey, I owe this great success to them.

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The success of this thesis is because of the guidance and support of several individuals, who in one way or another, had a tremendous contribution and extended their unreserved assistance to me throughout the duration of this project. Firstly, I would like to thank my supervisor, Dr. Naomi Mwangi for her invaluable insights and supervision throughout this assignment. Her positive and timely feedback steered me in the right direction. Completing this work without her assistance would truly have been a challenge. Secondly, I wish to thank the University of Nairobi for the opportunity to study in this great institution. This has been a once in a lifetime opportunity and for that, I am forever indebted to them.

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ACRONYMS AND ABBREVIATIONS

GDSN:	Global Data Synchronization Network
GLN:	Global Location Number
GS1:	Not for Profit, International Organization
GTIN:	Global Trade Item Number
KEMSA:	Kenya Medical Supplies Agency
LMIC:	Low Middle Income Countries
MOH:	Ministry of Health
MMIS:	Material Management Information Systems
PPB:	Pharmacy and Poisons Board

ABSTRACT

Trying to monitor the trade on counterfeit and falsified medicines is a challenging affair; however, there exist sufficient evidence that it is not lifestyle drugs alone that are at the center of these vice. Aggressive health challenges, including near death experiences (O'Hagan & Garlington, 2018). The purpose of this study was to determine influence of global standards implementation on performance of public health procurement agency in Kenya: a case of Kenya medical supplies agency. The objectives of this study were to determine the influence of Product identification implementation on the performance of public health procurement agency in Kenya; establish the influence of product capture implementation on the performance of public health procurement agency and to examine the influence of Product data sharing implementation on the performance of health procurement agency. The research design largely embraced descriptive survey design featuring both the qualitative and quantitative characteristics. According to Kothari (2004) describing facts and characteristics falls under a descriptive survey when it targets individuals, group or situations To affirm it more, Lokesh (1984) made an assertion highlighting that descriptive studies are designed to obtain precise and pertinent information in line with the status of phenomena and whenever general conclusions from the facts discovered can be drawn. Putting into focus Kombo and Tromp (2006), when we are focusing on population, we depict it as the aggregate accumulation of components about which we wish to make deductions. To ensure a high outcome is obtained, the scoped population will comprise of various technical, operational and management staff working in public health procurement agency and health regulatory agency allied to procurement operations in Kenya. The best method that was selected was purposive sampling which was appropriate in developing the research sample to be interrogated and discussed. This method which forms part of the non-probability sampling techniques (Dull & Reinhardt, 2014). The members were selected putting emphasis on their knowledge, relationships and expertise regarding the topic of Global standards and their experience in its implementation in the public health procurement agency. The study determined the sample from the population by applying Sekeran (2003) sample determination table .For a population of 75 people, based on the pre calculation done from the table by Sekaran, the sample size was 62 respondents. Following that line of thought, the researcher then selected 103 respondents from the various partner organizations. The result obtained to justify the criteria of selection was such that those staff who have been involved in public heath procurement engagements were eligible. Use of questionnaire for survey research was the best instrument for data collection (Bowling, 1997), because the information was collected at a natural setting. To achieve maximum output based on information and experiences, the questions were designed based on stakeholder experiences in public health supply chain and procurement projects. The selection of the tool was guided by certain parameters such as data to be collected, easily accessible of such data, as well as the objective of the study. The justification of use of the questionnaires was mainly due to variables that could not be easily viewed. It established the importance of Global standards implementation in procurement agency and further highlighted the positive outcome of its implementation. It further established that efficiency of procurement systems increased in the end and there was effective inventory management of procurement commodities. Furthermore, there was also a reduction of stock-outs in the public health supply chain and finally it led to the faster detection and elimination of counterfeit commodities from the legal supply chain process. Global standards implementation is key in ensuring that we will have safe, secure and reliable supply chains.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The attack of the United States on September 11, 2001 affected various aspects in the society including how businesses are run on a global scale. Supply chains have become robust, complicated, automated and they involve many organizations both locally and internationally(Williams et al., 2008). An area of interest is that many organizations in the United States are already involved in global supply chain initiatives with the support of state department(Hu et al., 2016).

It is prudent to understand that when we talk about strengthening the supply chain, it involves use of technology, to ensure that the ecosystems are well protected and work optimally (Mcgarrell & Ekwall, n.d.).

In recent years, criminally activities have risen targeting the pharmaceutical ecosystem leading to the manufacturing and distribution of counterfeit or fake medicines. It is estimated that the counterfeit business amounts to billions of dollars per year. The direction that the world is going is to ensure that development of a supply chain ecosystem that is safe and efficient should be on course. Therefore, there has been discussions around the quantity of medicines that are genuinely manufactured and distributed within the legal supply chain ecosystems (Mages & Kubic, 2016).

The implementation of Global Healthcare Standards is anchored in the fact that patients need to receive commodities that are safe and genuine, which eventually will not have any negative health effects to the patient themselves when consumed.

The products that fall under the Global healthcare standards regulation provide unique security feature that rubber stamp the existing regulation found in a particular jurisdiction(Giunipero & Eltantawy, 2004). This means that the quality of the product in that particular ecosystem is controlled depending on the Global healthcare standard applied at that particular time. Therefore, there is an assurance that there will be end-to-end product visibility during its movement throughout the supply chain and therefore guarantees the safety of the product that is eventually received by the end user(Jüttner et al., 2003). Eventually, this leads to a 'high-level quality control systems all the way from the manufacturer, distributor and at the point of dispense. This will eventually raise the bar against the emergence of illegal medicines in the legal supply chain.

Learnings obtained from various procurement agency, KEMSA offers a strong indicator of the benefits that are eventually realized by the adoption and implementation of Global Healthcare Standards to an institution. The concern about the quality of drugs is as old as time immemorial. The dangers of counterfeit and falsified products were registered in writings that date back many years ago. In 2014, KEMSA initiated a process with the support of GS1 Kenya to implement the use of global standards in their warehouses. The work strategy developed was anchored on the surveillance of the movement of global health commodities from the central medical stores all the way to the county warehouses and eventually to the hospitals and pharmacies.

The introduction of new technologies such as barcode scanners, Data matrix code and interoperability in public health supply chain, have allowed achievements that years ago were unthinkable. Therefore, since the first phase implementation of the Global Healthcare Standards barcoding requirement in 2014, the traceability of drugs in KEMSA has harnessed the capability of the public health supply chain both from the upstream and downstream perspective. Its

implementation led to the optimization of the public health supply chain and eventually leading to end-to-end visibility of pharmaceutical products.

This new system created a foundation where different supply chain stakeholders started exchanging basic product data from a batch number perspective. Where different actors across the supply chain were able to easily interact through the exchange of product data. This was largely from the manufacturer through the distributors and eventually to the hospitals or health facilities where products were to be dispensed to the patients. The results clearly illustrates that there is need for the adoption and implementation of Global standards in all county public health procurement facilities.

1.2 Statement of the Problem

Kenyans deserve a right to access free and quality healthcare. The Government of Kenya, through the Ministry of Health, is committed to pursuing the realization of this right for every Kenyan citizen. In recent past, there has been a surge of criminal organizations who thrive in the business of manufacturing and distribution of substandard pharmaceutical products. The surge of the supply chain ecosystem with substandard and counterfeit medicines is on the rise globally. However, global regulators are in the view that developing an integrated robust world wide web, can minimize the issue drastically. This has led to various debates on how such a system will be free from exploitation and how best the government and private sector can work together to maintain trust and openness.

Various parts of the world has experienced counterfeit challenges. In total, the pharmaceutical crime rate has span to approximately 128 countries(O'Hagan & Garlington, 2018). The saying goes, "No Product, No Program", unfortunately, our system is plagued with challenges that have

impeded progress in making life saving medicines and supplies available. The inability of the Ministry of Health to trace medicines and supplies as they enter our supply chain, passing through various locations and finally to the patient(2), has become an issue of grave concern to the Government of Kenya.

This challenge has created further barriers to transparency, accountability, visibility and ensuring low quality of medicines and medical supplies leading to massive gaps in the supply chain. It is against this that the Kenya Medical Supplies Agency has embraced the implementation of Global Standards vision to ensure all pharmaceuticals can be traced from the manufacturers to the patient and back. Our willingness to support the implementation of this standard is backed by the strategy that charts a course for all stakeholders in the pharmaceutical sector and prescribes interventions that will ensure compliance for regulation and procurement.

We recognize that the road ahead is a long one; however, with the support of our partners and the commitment of the pharmaceutical sector, we are confident that full traceability of medicines and medical supplies will become a reality for our public health sector.`

1.3 Purpose of the Study

To establish the influence of Global Standards implementation on the performance of public health procurement agency.

1.4 Objectives of the Study

This study will be guided by the following objectives;

I. To determine the influence of Product identification implementation on the performance of public health procurement agency in Kenya.

II. To establish the influence of product Product capture implementation on the performance of public health procurement agency.

III. To examine the influence of Product data sharing implementation on the performance of health procurement agency.

1.5 Research Questions

The study aims to answer the following research questions;

I. To what extent does the Global standards product data sharing implementation have on the performance of public health procurement agency?

II. To what extent does the Global standards product identification implementation have on the performance of public health procurement agency?

III. To what extent does the Global standards product capture implementation have on the performance of public health procurement agency?

1.6 Significance of the Study

Lack of supply chain regulatory framework, product master data registry and lack of public health digital framework are some of the key factors that have contributed to the counterfeit medicines entering the legal supply chain in Kenya. The ministry of health recognizes that the actual financial and economic burden as a result of inefficiencies in the public health agency remains unknown but could be high if the data from the developed countries is anything to go by (Ministry of Medical Services., 2010).

With the growing concerns of counterfeit medicines and increasing cases of unethical practices in the public health sector, this study highlights the gaps in within the public health procurement agency in Kenya.

1.6.1 Significance to Policy Makers

Findings from this study will act as a point of reference for policy makers on developing an in country policy on supply chain security and efficiency related to public health supply chains. This will enhance strengthening of the pharmaceutical supply chains especially on matters related to theft, diversion and counterfeits of pharmaceutical products. The policy maker in this case is the national medicines regulatory body, the Pharmacy and Poisons Board.

1.6.2 Significance to Supply chain partners

A traceability process running from end to end would be very helpful, especially when substandard or falsified medicines are detected. The development of an interoperability layer that guarantees end-to-end visibility is priceless for medico-legal investigations. Reverse engineering is therefore critical to ensure that medicines that harm patient can be traced back to the manufacturer (Pan et al., 2021).

Research and Development opportunities in the area of clinical research, would be highly beneficial as countries ramp up their monitoring and evaluation of their ecosystem. (Trautman et al., 2008).

1.6.3 Significance to Academicians

Findings from this research will provide literature on factors specific to Kenya Medical Supplies Agency supply chain traceability framework, which can be utilized as background information by researchers wishing to explore this area further.

1.7 Limitations of the Study

The result of this study will eventually seek some information which may be adopted for policy implementation by the both the public and private procurement health agency dealing with procurement of pharmaceutical products. The study however, may encounter various governance and private challenges that may hinder access to that information. The respondents might have that fear that the information they are required to provide might be sensitive keeping in mind that majority will be government agency. Therefore, the researcher must obtain a letter.

1.8 Delimitations of the Study

This will seek clarity on the influence of Global Healthcare Standards implementation in the performance of public health procurement agency. The study will specifically focus on Global standards in general, Global standards identification, Global standards capture and Global standards product data sharing. The study will collect data from the operational procurement managers in healthcare aligned procurement agency, government regulators and private organizations aligned towards standards in Kenya. The study timelines will be approximately eight to twelve weeks.

1.9 Basic Assumptions of the Study

These banks on the fact that there were no substantial changes within the organization during that time, and largely there will be staff who were involved in that implementation process. The study also relies on this assumption; that the selected respondents will be cooperative in providing honest and objective. The study finally assumes that the University and the authorities will give permission to the researcher for the data to be collected form the institutions.

Table 1.0 Definition of Significant Terms

Global Healthcare Standards	This standard provides the ecosystems for organizations to be able to interact with each other in a way they easily understands, creates uniformity within the business ecosystem and eventually saves cost in the entire manufacturing ecosystem.
Product Identification	This standard provides an opportunity for marketing authorization holders to uniquely identify an individual product using a global trade identification number during the production process.
Product Capture	This standard provides an opportunity where barcodes such as the linear or data matrix codes are used to carry data that link the physical item to an electronic database.
Product Share	This standard provides the opportunity for trading partners in the supply chain to share information between each other related to the products moving throughout the supply chain.
Product Verification:	Ensuring that the product confirms to the laid out requirements or specifications.
Performance of public health procurement agency	This is the measure of the organization that shows how well an organization is attaining its internal deliverables and outcomes based on various internal improvement factors.

1.11 Organization of the Study

Chapter one will focus on the high-level introduction of the subject. A foundational concept of the influence of Global standards implementation on the performance of public health procurement agency are discussed from a global, regional and local perspective. The research problem is presented and objectives that eventually guides the study are shown .Significance of

the study to stakeholders both for policy and for management are highlighted in this section. Chapter two presents the literature review as analyzed by other scholars in the same area. Theories underpinning the study are presented as well as a conceptual diagram showing the linkage of variables. Chapter three explores areas on research methodology that eventually shows how the needed data will be collected and analyzed. Chapter four presents the data analysis, presentation and interpretation as well as discussion of the findings. Will capture the outcomes of the study that will have been captured in the field and Chapter five will concludes with the summary of the study, conclusion the achieved outcomes and the recommendations, and suggested areas for further research will summarize the study and highlight key recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature discussed summarizes various research findings that have been done which highlights the theoretical foundation of the study. This section is importance since it lays bare the relationship that exists between the past, present and future study.

It is of importance to note that substandard and falsified medicines pose an ever-increasing threat to global public health, and ironically, there has not been a comprehensive plan on how this can be tackled in a global stage. The current data by WHO indicate that all types of medications have been targeted(Journal, n.d.). These medicines' have led to eventual death of some patients and consequently some having long time disease effects to deal with.

2.2 Performance of Public Health Procurement Agency

Any country needs a stable and efficient pharmaceutical product to guarantee efficient management of health. For example, shortage of drugs in a public facility in Narok country referral hospital caused a major strain in the administration of healthcare. (Muhia et al., 2017). The patients are forced to buy prescription drugs from private facilities that is costly to the majority of the population. The availability of drugs is crucial in the functioning of any hospital. An efficient procurement process will therefore guarantee that medicinal products arrive through the public health network in all corners' of our country. Procurement is basically acquisition of commodities at a sustainable cost ensuring that quality is maintained in the process, (Cousins & Spekman, 2003). Pharmaceutical drugs are a great aid in the administration of healthcare in the country as whenever one is sick doctors always prescribe drugs. This makes pharmaceutical

industry one of the most illustrious industry globally with it taking the largest portion of the healthcare expenditure. (Vermeulen et al., 2016). The availability of drugs is thus crucial in the functioning of any hospital. For there to be sustainability in the flow of pharmaceutical products, various objectives such as quality, price, speed and ethics are to be considered. If correct processes are followed, it will eventually eliminate vices such as stock out or over stocking in our healthcare facilities.(WHO, 2002).

Procurement is crucial in that it ensures availability of global health commodities and therefore facilitates their accessibility. Furthermore, the World Health Organization has determined that there is a low availability crucial medicine in under developed economies. Furthermore, research has shown that there exist different national supply chain models across developing countries, the procurement, eventual distribution of public health commodities remains largely controlled by the ministry of health, and central medical stores and they mostly rely on the public money, international funding mechanism and donors funding.

Mostly, various ministry of health organizations usually lack the technical experience and capabilities to oversee a successful procurement process. Factors such as inefficiency in planning, bureaucratic procurement technics and unstructured tendering processes contribute to lengthy procurement turnaround times eventually leading to stock outs and irregular procurement practices. Indeed, a casing point is the World Health organization regions, where there is low availability of public health commodities in the public sector than in the private sector.

An outcome of the Paris Declaration clearly focusses on empowering and strengthening country procurement systems, as well as support from various donor agency to focus on the use of country systems and procedures. In the past ten years, many regions globally have witnessed the

emergence of in-kind donations gradually being replaced by direct budgetary support to governments.

2.3 Global Standards - overview

"Standardization is a term used to depict the process of developing a global acceptable standard that can be applied across different geographical and political boundaries. Therefore, standards are voluntary agreements that structures activities.

Standards in global supply chain are a crucial parameter which largely helps to ensure sustainability and operational compatibility (Group, 2015)

2.4 Global standards of identification and the performance of public health procurement agency

Many supply chain leaders have discussed broadly the challenge of supply chain visibility. The fundamentals of end to end visibility are basically data sharing, IT implementation, and relationships between governments, private sector and the donor community; (Semianiaka & Silina, 2012).

2.5 Global Standards key identifiers

If we talk about the key identifiers, the majorly used ones are the Global trade item number, Global location number, and the Serial shipping container code. (Figure 2.0)

The Global trade item number is used to uniquely identify trade items. It is uniquely assigned for every product (for example juice in one-liter package and two liters package has different one). A Global trade item number is a crucial parameter to supply chain partners for it is used to

reference items in a database at any point of supply chain process in order to get item's price, record its sale, confirm its delivery or identify its order

The Global location number is used to identify locations and legal entities. Global Location Number provides a standardized way to identify locations and legal entities. Location is always referenced to mean a manufacturing facility, a warehouse, a plant, a hospital, or a pharmacy. Legal entity can be a company or its division.

The Serial shipping container code popularly known as is usually assigned for logistics units (cartons, pallets, trucks). It function is to enable logistics units' to be tracked individually. Serial shipping container code usually consists of 18 digits which allows more items to be coded such as the pallet number and manufacturing number.

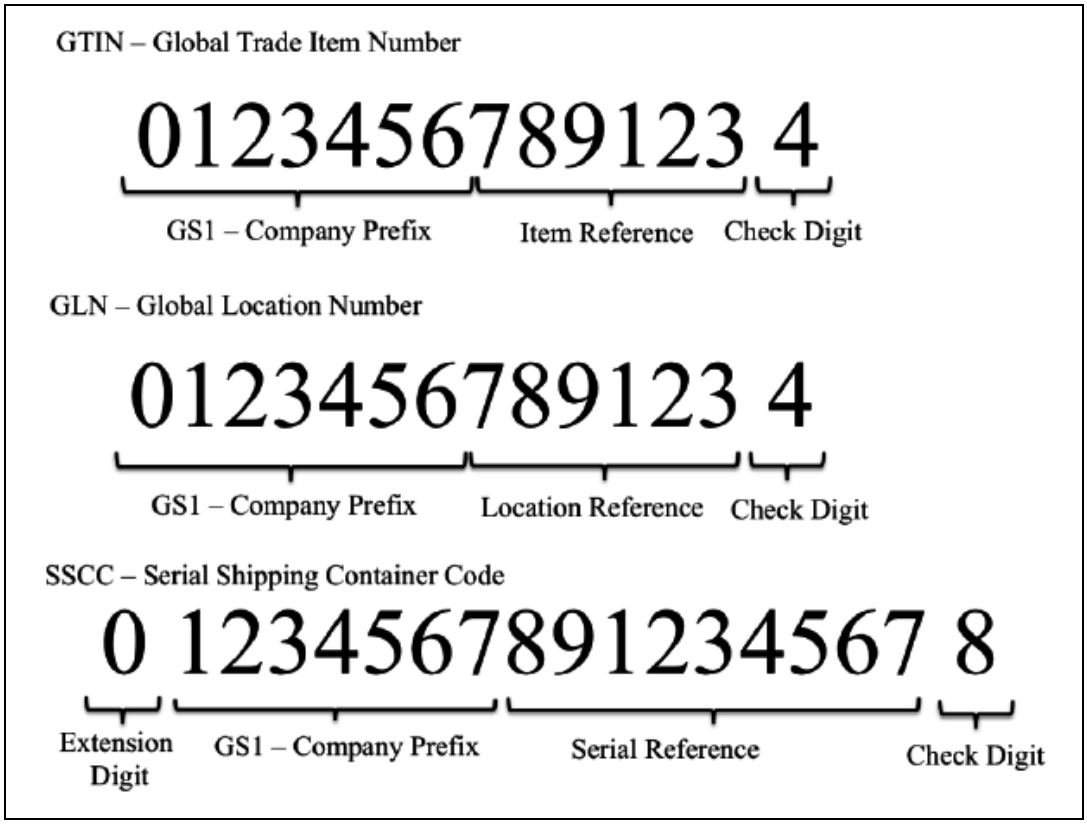


Fig 2.0 Global standards of identification

When we talk about product identification, we always make reference to two parameters namely the company prefix and identifier. The organization GS1 is responsible for allocating the company prefixes to the marketing authorization holders.

The first step towards implementing Global Standards begins with the marketing authorization holders or manufacturers assigning a unique ID to every product that comes out of their manufacturing facilities. This initiative is supported by a product registry that aligns with unique identifiers based on their product attributes (Jayaraman et al., 2015).

Since the healthcare industry is global in nature, it would be beneficial if different countries will use a global common standard for product identification which will eventually help in the realization of interoperability (Hinrichs et al., 2014).

Today, almost every big player in the global health eco system namely the marketing authorization holders, private entities, governments and donors, are airing their voices in line with the adoption of Global standards issued by the not-for-profit organization GS1.

This begins during the production process when the manufacturer assigns a unique identifier popularly known as a GTIN to every item. The unique identification number is furthermore included into a barcode, which can be either a linear barcode or a data matrix code.

Many marketing authorization holders are able to invest on a one-time fee that will be used to align their production lines to produce products that have compiled with global standards (J., 2005). However, looking at manufacturers located in under developed countries, the cost could be more burdensome because of the high cost involved with re-structuring their production lines. Given the risk, that such manufacturers can be faced out of the market due to regulatory requirements mandating the implementation of Global standards, there has been a lot of push

from the world health organizations and other donor agency to ensure that the local manufacturers in developing countries will not be dis advantaged.

2.6 Global standards of capture and the performance of public health procurement agency

The next steps when it comes to global standards is the encoding of key identifiers i.e. barcodes or RFID tags. A bar code represents carrier of information that identifies a product. It is the widely used technology for product identification. Other technologies like the Radio Frequency Identification Device are quite expensive.

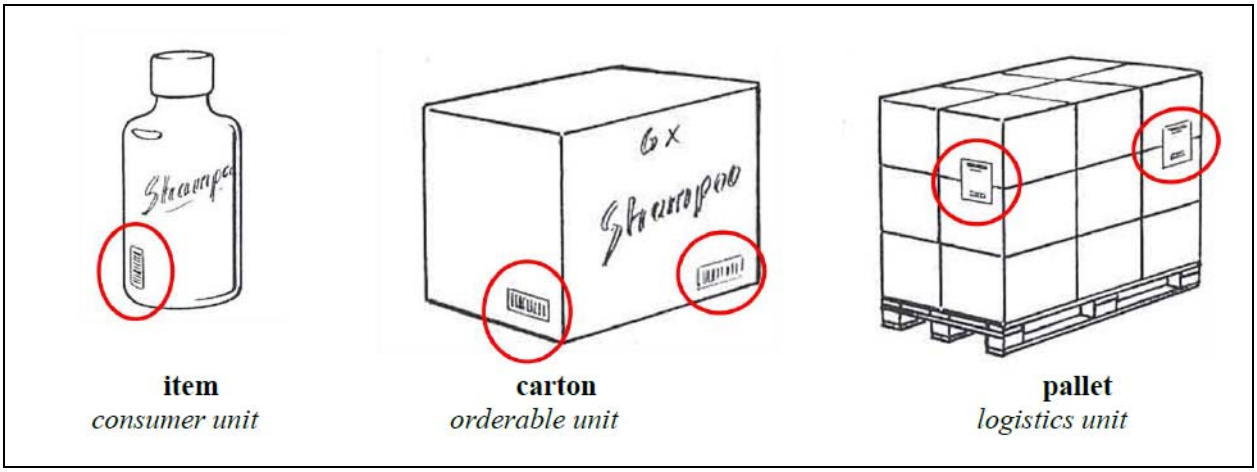


Fig 2.1 Global standards of capture

Barcodes that are usually used for retailing purposes in both the primary, secondary and the tertiary packaging from an individual blister to a pallet.

At the primary packaging level, barcodes will be handy to ensure faster identification of products at a primary packaging level are used to automate faster checkouts and optimize shelf planning. Secondly, barcodes found at the secondary packaging level usually optimize warehousing processes. Finally, at the tertiary level, the barcodes optimize order quantities and find a suitable storage location.

Main Global Standards Data carriers

Table 2.0

Global standards data carrier

Data carrier	Encoded information	Level of implementation	Description
 EAN-13	GTIN	item, carton	*EAN-13* is used to identify the FMCG at the cashiers (point of sale – POS) and in logistics processes. EAN-13 contains 13 digits and can be reduced in size to EAN-8 in order to fit onto a smaller package
 ITF-14	GTIN	carton	*ITF-14* barcode (GS1's interpretation of interleaved two of five barcode) contains 14 digits and is mainly used on a carton level and cannot be used at the POS
 GS1 Databar	GTIN, serial numbers, lot numbers of expiry dates	item	*GS1-DataBar* is a smaller 14 numeric barcode, which is used at the POS on a smaller items
 GS1 Datamatrix	GTIN, batch and serial numbers, expiration date	item	*GS1 DataMatrix* is a two-dimensional barcode, which can include up to 3116 digits of capacity. It can be placed on small space and on the metal surface. It requires the camera-based scanner for data capturing, and that is not intended to be used at the POS
 GS1-128	all GS1 identification keys (GTIN, GLN, SSCC, etc.) best-before date, etc.	pallet	*GS1-128* is implemented at pallet level for logistics processes and consequently includes more information (up to 48 alphanumeric digits). GS1-128 cannot be used to identify items at the POS
 RFID/EPC	EPC (Electronic Product Code) which contains all GS1 identification keys	item, carton, pallet	*RFID tag* is a microchip that stores much larger amount of data comparing to barcode and provides significant time-saving advantage since it does not require manual scanning

Once a Track and Trace systems to assign and maintain unique identifiers is in position, the next step is to guarantee that procurement agency can scan a barcode and subsequently capture the data linked to each product (Pisa & McCurdy, 2019). The use of smart phones in under developed countries has drastically reduced price of data capture.

In under developed countries, the data capture procedure usually paper based which consequently results in integrity issues when it comes to data capture at the primary levels of the supply chain. Unless there is a strong conviction from the local health workers of the importance of products scanning, there will be inconsistency in the last mile in terms of data capture, undermining the benefit of GS1 standards implementation.

Global standards through traceability can help procurement agency verify the origin of the pharmaceutical products that are brought in the country for the ultimate use by their population. This is extremely valuable in a country where there is a grave concern about counterfeit and falsified medicines (Lehlou et al., 2011).

2.7 Global standards of data sharing and the performance of public health procurement agency.

Supply chain partners usually benefit from the use of global standards by being able to share master data, transactional data and event data. If we talk about Master Data, we mean data that is constant focusing on the products, location, contracts (prices) etc. Master data can be accessed through barcode scanning by the global data synchronization network.

Accessibility to Global Data Synchronization Network, you need to be a corporate member of GS1. This gives an opportunity for consumers and suppliers to easily do business as long as they use the same network.

There are standards that enables smooth exchange of transactional information between companies(Kaipia & Hartiala, 2006).

EPCIS is a communication standard intended for the global global solution and it is an analog to the Global Data Synchronization Network for barcodes(Mangina & Vlachos, 2005). When partners a supply chain events and find out the current and past status of things, EPCIS always come in handy.

As information is captured from one supply chain partner to the next, it enables the authentication and verification of a commodity throughout its supply chain journey. Having said that, the outright challenge of internet penetration in some under developed countries could hinder their ability of implementing such standards. Although internet connectivity is improving in low and middle income countries, it remains the greatest impediment in many rural and remote areas (Paul et al., 1999). In line with Global standards, the data architecture plays a critical role and strategically defines how product data is identified, captured and shared between various supply chain partners. In a Global, standard centralized model, supply chain partners are obligated to upload data to a centralized repository that is always controlled by the central government. In a distributed model, the supply chain partners usually have data stored in their own databases where they share it with each other even as products move along the supply chain.

Using Track and Trace technology to determine a products movement and visibility throughout the supply chain, makes it faster to conduct recalls in case of medicine adverse effect to the patient population. This is extremely important for health commodities that have a short shelf life.

The main reason for using Global standards in health procurement agency rests squarely on its ability to help in guaranteeing supply chain security, a common challenge in under developed countries. Tracing a product during its movement across the supply chain ecosystem, can help partners confirm that a product is genuine and originated from the right source. Furthermore, tracing commodities from an end to end perspective makes it easier to detect diversion activities away from its intended destination (Naughton et al., 2016).

A casing point is the process of automated goods receipt, which clearly shows how product and data are managed with the help of a serial shipping container code.

2.8 Theoretical Framework

A Theory summarizes explanations. Speculations are methodical processes for for comprehension, clarifying, and making expectations about a topic. A hypothesis can be formal when it is syntactic and important .A formal hypothesis is syntactic and important for example, it captures the realities and connections of the real recorded world as it is unfurling (Kennedy et al., 2011). This study depended on partner hypothesis and modernization hypothesis.

2.8.1 Stakeholder Theory

This theory borrows greatly from capitalism (Vijayanand, 2013) that build on the interconnected relationships between a customer and the business involved, employers, technocrats, investors, communities, employees, investors, communities and others who have a stake in the organization Matesehe (2013). The theory has a strong bearing and deeper insights that a firm should create value for all stakeholders, not just shareholders for are the defacto owners of the company (Gilbert & Rasche, 2012).

2.8.2 Strategic Leadership Theory

This theory is inclined in one direction in that it gives random theories are the explanations of how and why certain people become leaders House and Baetz (1979). Mostly, the points of focus are usually the traits and behaviors that people can adopt to increase their leadership capabilities Hambrick and Cannella (2009). Furthermore, the top traits that are depicted as vital to good leadership include strong ethics and high moral standards Bradley and Barrick (2008).

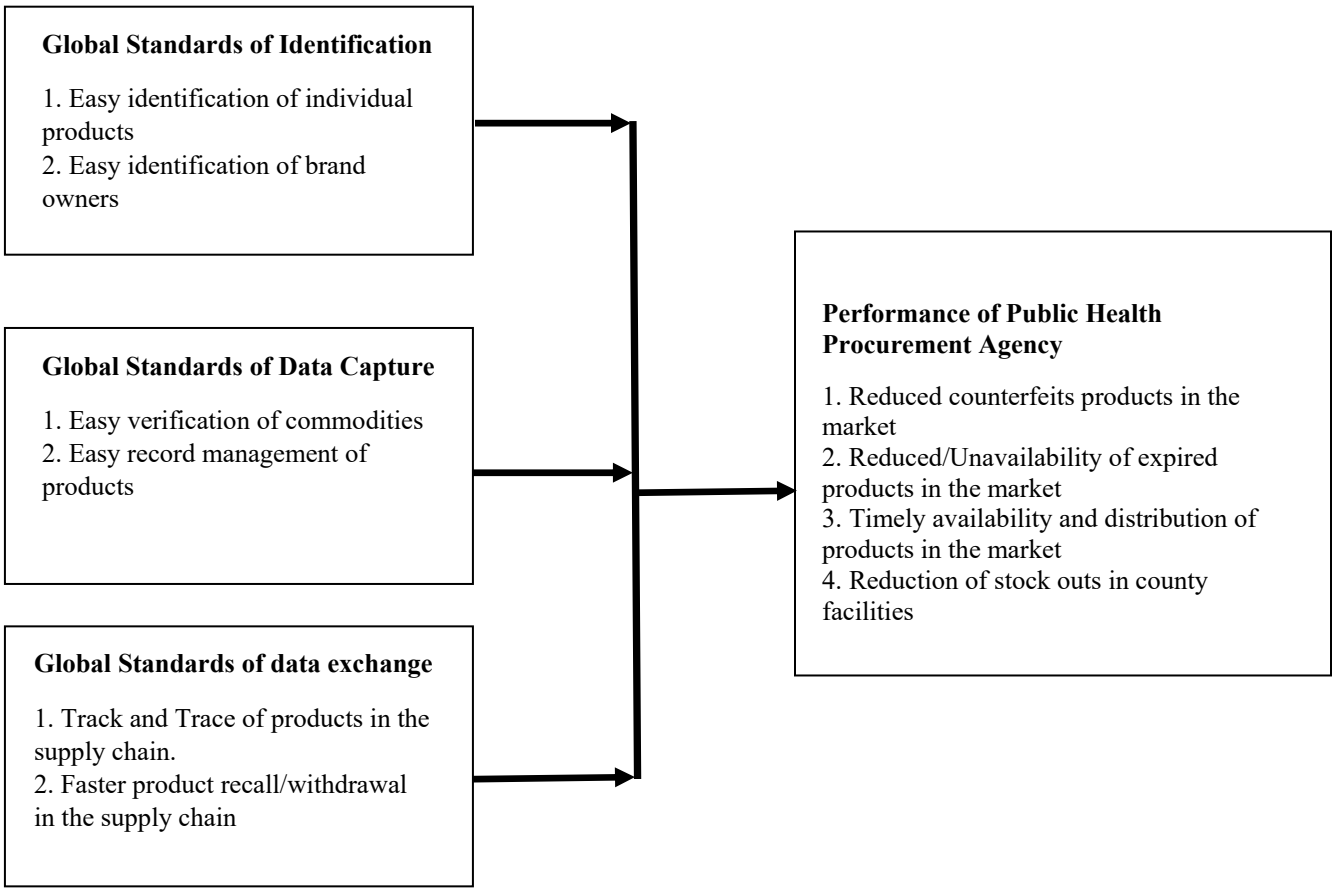
The theory has a great bearing on the study by reiterating the importance of sound leadership involving public health procurement agency and the focus of capacity building in relation to global standards awareness and implementation for the future sustainability of the organization

2.8.3 Theory of Change (TOC)

It illustrates broadly how changes might occur; the area of focus is to to understand how change may happen through the implementation of Global standards in public health procurement agency. The adoption of this theory helps governments due to the fact that it is a conscious and visualization exercise. They are highly relevant and authentic when addressing issues like supply chain efficiencies and end-to-end products visibility. It eventually illustrates on how implementation of Global standards in public health procurement agency can bring about positive transformation in the processes that contribute in the efficient running of this agency.

2.9 Conceptual Framework

This illustrates the relationship between the dependent variable and the independent variable. For this study, the dependent variable is Performance of Public Health Procurement agency while the independent variables include; Global standards of Identification, Global Standards of Capture and Global Standards of Data Exchange.



Presence of identification specification in products was measured by easy identification of individual products, easy identification of product brand owners. Presence of data capture specification in products was measured by easy verification of genuineness of a commodity, easy record management of products. Presence of data exchange specification was measured by traceability of pharmaceutical commodities in the public health supply chain network. Efficiency in product recall in the supply chain. Performance of procurement agency was measured by reduced counterfeit products in the market, Reduced/unavailability of expired products in the market, timely availability & distribution of products in the market, reduction of stock outs in country government facilities.

2.10. Summary of Literature Review

The major areas of discussion has been the Global standards implementation and their effect on the performance of public health procurement agency. Global standards has been instrumental in revolutionizing how the healthcare supply chain functions or operates. Through its ability to ensure that pharmaceutical products are uniquely identified, data is correctly captured and shared, cases of falsification of pharmaceutical products have drastically reduced. Furthermore, it has also helped in ensuring that procurement agency can be able to uniquely trace the movement of movement of commodities all the way from the manufacturers to their warehouse and to the facilities that receive the consignments.

Moreover, the performance of public procurement agency has greatly improved with the implementation of Global standards by ensuring that minimization of cases of diversion of products has been addressed, timely distribution of products and ensuring that incase of adverse effect of a medicinal product, and timely recalls can be initiated removing the product from circulation faster. This shift from the traditional procurement process has led to more operational efficiency in the procurement agency process leading to more productivity and better supply chain outcomes.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter focusses on the research methodology of the thesis. It will broadly cover the research method involved, the approach to research selected, the preferred research method, the data collection methods, the sample selection criteria, the data analysis followed, the ethical consideration involved and finally the summary of the project.

3.2 Research Design

It illustrates in depth the investigative structure and plan as to obtain answers to research questions. The plan that has been laid out fits within the overall scheme of the the research (Robson, 2002). It by and large embraced s descriptive survey design featuring both the qualitative and quantitative characteristics. According to Kothari (2004) describing facts and characteristics falls under a descriptive survey when it targets individuals, group or situations To affirm it more, Lokesh (1984) made an assertion highlighting that descriptive studies are designed to obtain precise and pertinent information in line with the status of phenomena and whenever general conclusions from the facts discovered can be drawn.

3.3 Target Population

Putting into focus Kombo and Tromp (2006), when we are focusing on population, we depict it as the aggregate accumulation of components about which we wish to make deductions. To ensure a high outcome is obtained, the scoped population will comprise of various technical, operational and management staff working in public health procurement agency and health regulatory agency allied to procurement operations in Kenya.

3.4 Sample Size and Sampling Technique

The best method that was selected was purposive sampling which was appropriate in developing the research sample to be interrogated and discussed. This method which forms part of the non-probability sampling techniques (Dull & Reinhardt, 2014), the members were selected putting emphasis on their knowledge, relationships and expertise regarding the topic of Global standards and their experience in its implementation in the public health procurement agency.

The study determined the sample from the population by applying Sekeran (2003) sample determination table .For a population of 75 people, based on the pre calculation done from the table by Sekaran, the sample size was 62 respondents. Following that line of thought, the researcher then selected 103 respondents from the various partner organizations. The result obtained to justify the criteria of selection was such that those staff who have been involved in public heath procurement engagements were eligible.

3.6 Research Instruments

Use of questionnaire for survey research has been marked as the best instrument for data collection (Bowling, 1997), because the information is always collected at a natural setting.

To achieve maximum output based on information and experiences, the questions were designed based on stakeholder experiences in public health supply chain and procurement projects. The selection of the tool was guided by certain parameters such as data to be collected, easily accessible of such data, as well as the objective of the study. The justification of use of the questionnaires was mainly due to variables that could not be easily viewed. The questionnaire had three section. Section A is on background information, section B touches on the variables, section C is on General reflection on procurement operations.

3.7 Validity of the Instruments

This represents the phenomena under study based on the degree to which results are obtained (Mugenda&Mugenda, 2003). Through the use of Content Validity Index (CVI), the data validity was tested. This was achieved by ensuring that the questionnaire is distributed to the field experts and the supervisors. Their output was` to rate the relevant items/questions in relation to the research objectives.

If the CVI is not more than or equal to 0.7 then the research instrument will be qualified as valid. The calculated of the CVI results returned to 0.76 meaning the instrument captures what it was initially intended for.

3.8 Reliability of the Instruments

How consistent a research procedure might be is depicted by reliability Kasomo (2006). The split-half technique purpose is to evaluate the internal consistency of a test, looking at both the psychometric tests and questionnaires. There, it measures the extent to which all parts of the test contribute equally, to what is being measured.

3.9 Data Collection Procedures

The researcher sought permit from the National Committee of Science, Technology and innovation, a letter of transmittal was also be obtained from the University of Nairobi. Upon visiting each location of implementation and organizations, the respondents was identified, introduction about the study was done and their informed consent to participate in the study was sought. All the instructions on how to complete the questionnaire was made clear to the respondents.

3.10 Data Analysis

Once data is collected, it will as checked for completeness, edited and cleaned. This involved making call backs for the questionnaires not filled in correctly. Quantitative data from the questionnaires was coded and then entered into the Statistical Product and Service Solutions (SPSS) software for analysis. Quantitative data was analyzed using frequencies, percentages and cross-tabulation. Chi-square p-value was used to test the significance of relationships between the independent and the dependent. The Spearman rank correlation co-efficient was used to test the direction and the magnitude of the relationships, this is because the researcher is using ordinal scale of measurement; the Likert Scale. The findings was presented in tables and narrations. Qualitative data from the open-ended items was analyzed through content analysis; organizing based on the emerging themes.

3.11 Ethical Considerations

Permission for the study was obtained from the following institutions, University of Nairobi, Ministry of higher education Permission to conduct the study was obtained from the University of Nairobi and the Ministry of Higher Education through NACOSTI. Furthermore, everyone will

be broadly engaged and given an opportunity to report their findings (Verdinelli & Scagnoli, 2013). Additionally, an advisory opinion will be given for the members to sign both a debriefing and withdrawal letter. These two letters are just an assurance to the participants that their involvement is voluntary. Of important to note is that a debriefing will be done before hand to educate the participants on the objectives of the study, and further assurance will be made to them that the findings will be used purely for the intention of research and education.

3.12 Operationalization of Variables

Table 3.1

Operationalization of variable

Variable	**Category**	**Indicators**	**Measurement Scale**	**Data collection tool**	**Type of Analysis**
Identification specification	Independent	-Easy identification of individual products -Easy identification of product brand owners	Likert scale	Questionnaire	-Simple grid -Simple coding system
Data Capture Specification	Independent	-Easy verification of genuine of a commodity -Easy record management of products	Likert scale	Questionnaire	-Simple grid -Simple coding system
Data Exchange	Independent	-Track and Trace of products in the supply chain -Speed of product recall	Likert scale	Questionnaire	-Simple grid -Simple coding system
Performance of public health procurement	Dependent	-Reduced counterfeit products in the market -Reduced/Unavailability of expired products in the market	Likert scale	Questionnaire	-Simple grid -Simple coding system

agency		-Timely availability and distribution of products in the market			

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

It involves data analysis and presentation of the findings obtained through the study. Data was analyzed in an attempt to establish the influence of Global standards implementation in the performance of public health procurement agency. Questionnaire was the main source of data collection.

4.2 Questionnaire Return Rate

Questionnaire return is the proportion of the questionnaires returned after they have been issued to the respondents. Out of the 75 local community members and local leaders sampled in the study, 62 members returned the questionnaires, which were deemed sufficient for data analysis.

Table 4.1:

Return Rate

Sample size	Respondents interviewed	Percent
75	**62**	**82.67**

A response rate of 82.67% was represented from 62 respondents reached and interviewed out of the targeted 75 stakeholders targeted in the study. This was considered very well for analysis. The high response rate was attributed to the good working relationship the researcher had with

the stakeholders. A response rate of 50% was considered adequate for analysis and reporting, 60% is good and that of 70% and above is very good (Mugenda &Mugenda, 2003).

4.3 Demographic characteristics of the respondents

This section analyses, presents and interprets the findings on the respondent's area of specialization, which is critical for the type of results that would be later obtained.

Table 4.2:

Specialization Distribution

Area of Work	Respondents Interviewed	Rate (%)
Information communication	**11**	**17.7**
Procurement	**7**	**11.3**
Supply Chain & Logistics	**18**	**29**
Engineering	**4**	**6.5**
Healthcare Transformation	**2**	**3.2**
Government Relations	**1**	**1.5**
Healthcare	**1**	**1.6**
Regulatory	**1**	**1.6**
International Standard	**1**	**1.6**
Others	**20**	
Total	**62**	**100**

From the findings, it is evident that the correspondents are working in various departments that are involved in supply chain and procurement operations. This means that their experience or interaction with the subject matter will help us obtain a realistic view of the influence of Global standards implementation on the performance of public health procurement agency.

The disciplines represented cut across various expert groups namely; information communication & technology (17.7%), Procurement (11.3%), Supply chain & logistics (29%), Engineering

(6.5%), Government relations (1.5%), Healthcare (3.2%), Regulatory (3.2%) and International Standard Organization (3.2%).

This section further analyzed the years of professional experience of the individuals who were practically involved in the survey.

Table 4.3:

Years of experience of members

Years of experience	Respondents Interviewed	Rate (%)
0-5	**37**	**60.65**
5-7	**12**	**19.7**
7-10	**12**	**19.7**
	61	**100**

The targeted respondents had the relevant experience that was important in helping them give a relevant response in line with the subject matter concerned. Of importance to note is that the majority of respondents around 60.7 % fall within the 0-5 years working experience, around 19.7 % of respondents fall within the 5-7 years working experience, and finally the remaining 19.7 % of respondents fall with the 7-10 years'.

The level of work experience of the respondent is in line with Global standards and the operations of public health procurement agency so that they can be able to give feedback that resonates well with the available subject matter.

4.4 Influence of Product identification implementation on the performance of health procurement agency in Kenya.

The intention was to task the respondents with establishing whether product identifiers results in easy identification of individual products in the procurement agency

Table 4.4:

Impact of Global standards identification on individual products identification

Impact of GS1	Respondents Interviewed	Rate (%)
Greatest Impact	**30**	**48.38**
Great Impact	**24**	**38.7**
Moderate Impact	**7**	**11.2**
Low Impact	**1**	**1.6**
Total	**62**	**100**

Looking at Global standards of identification impact on individual products, it was evident that they have seen how easier it is to identify individual products within their warehouses. This means that commodities that come the central warehouse can now be easily identified leading to a faster inventory process and eventually efficiency in the general procurement process. This affirms the idea that Global standards will eventually improve efficiency in the public health procurement process. The score was distributed as follows; greatest impact (30), great impact (24), moderate impact (7), and low impact (1).

The respondents were tasked with establishing whether product identifiers results in easy identification of brand owners in the procurement agency

Table 4.5:

Influence of Global standards of identification on verification of brand owners.

Influence of GS1	Respondents Interviewed	Rate (%)
Greatest extent	**22**	**36.67**
Great extent	**23**	**38.33**
Moderate extent	**12**	**20**
Low extent	**3**	**5**
Total	**60**	**100**

Consequently, looking at Global standards of identification implementation impact on identification of brand owners, it was evident the respondents have been able to see how best to identify the brand owners who supply the pharmaceutical commodities and match the individual products to the organizations that manufacture them. This makes it easier to single out a product and its manufacturer in case of adverse effects of a particular medicine to the population. This eventually affirms the concept that Global standards implementation will improve efficiency in the public health procurement process. The score was distributed as follows; greatest extent (22), Great extent (23), Moderate extent (12), Low extent (3).

The research sought to establish how Global standards identification implementation has a direct impact on the performance of public health procurement agency both from a product perspective and from a stakeholder perspective.

4.5 Influence of product capture implementation on the performance of public health procurement agency

The respondents were tasked with establishing whether Global data capture results in easy product verification in the procurement agency

Table 4.6:

Influence of Global standards of data capture resulting in easy product verification

Measure of Value	Respondents Interviewed	Rate (%)
Greatest extent	**32**	**51.61**
Great extent	**23**	**37.09**
Moderate extent	**5**	**8.06**
Low extent	**2**	**3.22**
Total	**62**	**100**

From the findings, it was evident that Global standards data capture implementation has influence on the performance of public health procurement agency focusing on how to easily verify health care products in the public health supply chain and how easier it is to manage inventory in the entire public health supply chain. Looking at impact on the faster verification of products, it was evident that the process of verification of commodities was faster and more efficient hence general process of inventory management becomes a less pain point to the organization. The score was distributed as follows; greatest impact (32), great impact (23), moderate impact (5) low impact (2).

The respondents were tasked with establishing the effect easy record management has on procurement agency.

The respondents were tasked with establishing whether Global data capture results in easy record management in the procurement agency

Table 4.7:

Influence of Global standards of data capture resulting in easy record management

Measure of Value	Respondents Interviewed	Rate (%)
Greatest extent	**30**	**50.84**
Great extent	**24**	**40.67**
Moderate extent	**5**	**8.5**
Total	**59**	**100**

Consequently, looking at Global standards data capture implementation impact on easier record management of products in the public health supply chain, many respondents affirmed that the automated process of capturing data in a software enabled inventory process creates orderliness in the process of order and reconciliation, reducing manual interventions and making the process easier to manage from a process perspective. This eventually leads to the improvement of performance of procurement agency. In a scale of 0 to 8. The score was distributed as follows; greatest impact (30), great impact (24), moderate impact (5).

The research sought to establish how Global standards data capture has influence on the performance of public health procurement agency.

4.6 Influence of Product data exchange implementation on the performance of public health procurement agency

The respondents were tasked with establishing whether global data exchange results in easier verification of products in the procurement agency

Table 4.8:

Influence of Global data exchange on easy verification of products

Measure of Value	Respondents Interviewed	Rate (%)
Greatest extent	**27**	**45**
Great extent	**27**	**45**
Moderate extent	**6**	**10**
Low extent	**60**	**100**

From the findings, it was evident that Global standards data exchange implementation has influence on the performance of public health procurement agency focusing on how to easily verify health care products in the public health supply chain and how easier it is to manage inventory in the entire public health supply chain. Looking at impact on the faster verification of products, it was evident that by elimination of redundant manual processes, the process of verification of products became faster and more efficient. This leads to high productivity within the procurement agency. The score was distributed as follows; greatest extent (27), great extent (26), moderate extent (8) and low extent (1).

The respondents were tasked with establishing whether global data exchange results in easy record management in the procurement agency

Table 4.9:

Influence of Global data exchange on easy record management

Measure of Value	Respondents Interviewed	Rate (%)
Greatest extent	**27**	**43.55**
Great extent	**26**	**41.94**
Moderate extent	**8**	**12.9**
Low extent	**1**	**1.61**
Total	**62**	**100**

Therefore, looking at Global standards data exchange implementation on easier record management of products in the public health supply chain, it was evident that through digitalization of processes and systems, management of records became easier. This led to reduction of errors in inventory, lack of stock outs and faster identification of expired commodities in the public health supply chain. The score was distributed as follows; greatest extent (27), great extent (19), and moderate extent (6).

The research sought to establish how Global standards data exchange implementation has influence on the performance of public health procurement agency.

4.7 Discussions of the findings

From the findings, it was evident that the implementation and adoption of Global standards has a positive impact on the performance of public health procurement agency

Firstly, a look at the influence of Global standards implementation, there was a general feeling that there was reduction of counterfeit medication that have been detected in the public health procurement agency.

Table 4.10:

Rate of Reduction of counterfeit medication

Measure of Value	Respondents Interviewed	Rate (%)
Greatest Improved	**17**	**28.33**
Improved	**26**	**43.33**
Constant	**13**	**21.67**
Decreased	**3**	**5**
Greatly decreased	**1**	**1.67**
Total	**60**	**100**

This means that the procurement agency will focus their efforts on process improvements rather than on risk mitigation eventually leading to an increase in performance of the procurement agency. This was captured as follows; greatest improved (17), improved (26), constant (13), decreased (3), greatly decreased (1).

Secondly, there was a general feeling of the reduced expired products in the public health supply chain.

Table 4.11:

Rate of reduction of expired products

Measure of Value	Respondents Interviewed	Rate (%)
Greatest Improved	**13**	**21.67**
Improved	**28**	**46.67**
Constant	**14**	**23.33**
Decreased	**3**	**5**
Greatly decreased	**2**	**3.33**
Total	**60**	**100**

This means that there will be a lot of money that will be saved that can be diverted towards optimization of process and leading to efficiency and a higher performance on the procurement agency operations. This was captured as follows; greatly improved (9), improved (19), Constant (12), decreased (2), greatly decreased. Thirdly, there was also a general feeling of the timely products distribution in the public health supply chain.

Table 4.12

Rate of timely products distribution

Measure of Value	Respondents Interviewed	Rate (%)
Greatest Improved	**10**	**16.67**
Improved	**30**	**50**
Constant	**14**	**23.33**
Decreased	**5**	**8.33**
Greatly decreased	**1**	**1.67**
Total	**60**	**100**

This means that the introduction of global standards will contribute to the supply chain process being efficient by reducing manual and cumbersome process with efficient automated processes leading to a higher performance on the procurement agency operations. This was captured as follows; greatly improved (10), improved (30), Constant (14), decreased (5), greatly decreased (1).

Finally, there was also a general reduction of stock outs in the public health facilities due to the overall efficiency of the public health procurement agency.

Table 4.13:

Rate of general reduction of stock outs

Measure of Value	Respondents Interviewed	Rate (%)
Greatest Improved	**13**	**22.03**
Improved	**23**	**38.98**
Constant	**16**	**27.11**
Decreased	**6**	**10.16**
Greatly decreased	**1**	**1.69**
Total	**59**	**100**

As the introduction of global standards ensures that products will reach the facilities n time eliminating any distribution challenges and roadblocks. This was captured as follows; greatly improved (13), improved (23), constant (16), decreased (6) and greatly decreased (1).

From the findings, it was evident that the performance of procurement agency was relatively low before the implementation of Global standards

Table 4.14:

Performance before global standards implementation

Respondents Interviewed	Rate (%)
28	**48.3**
11	**19**
12	**20.7**
4	**6.9**
3	**5.2**
58	**100**

This was clearly captured in the response that came in from different stakeholders. The distribution of the responses was evident of the confidence that various stakeholders have in the use of global standards s approximately 40% of the respondents said the performance was low and approximately 50% of the respondents said the performance was high.

The introduction of Global standards has let to performance increase in public health procurement agency.

Table 4.15:

Performance after global standards implementation

Respondents	Rate (%)
39	**68.4**
12	**21.1**
5	**8.8**
1	**1.8**
57	**100**

Looking at the responses, around 20% respondents indicated that the performance was low with the introduction of Global standards while alternatively 80% of respondents were confident that there was some positive change on the introduction of Global standards implementation.

The research sought to establish how impactful the introduction of Global standard requirement has on the performance of a public health procurement agency.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The summary of findings presented in chapter four are further summarized here so that specific findings are obtained clearly in relation to the research objective. The findings are presented, interpreted and conclusions drawn based on the findings in order to answer the research objectives. Furthermore, recommendations are made on what needs to be done to improve the sustainability of the project.

5.2 Summary of findings

It established the importance of Global standards implementation in procurement agency and further highlighted the positive outcome of its implementation. It further established that efficiency of procurement systems increased in the end and there was effective inventory management of procurement commodities. Furthermore, there was also a reduction of stock-outs in the public health supply chain and finally it led to the faster detection and elimination of counterfeit commodities from the legal supply chain process.

5.2.1 Influence of Global standards product identification implementation on the performance of public health procurement agency.

Influence of product identification implementation on the performance of public health procurement agency findings, it was evident that Global standards identification has influence on the performance of public health procurement agency focusing on how easier it is to identify both individual products in the supply chain ecosystem and the subsequent brand owners.

Looking at Global standards of identification impact on individual products, it was evident that they have seen how easier it is to identify individual products within their warehouses. This means that commodities that come the central warehouse can now be easily identified leading to a faster inventory process and eventually efficiency in the general procurement process. This affirms the idea that Global standards will eventually improve efficiency in the public health procurement process. The score was distributed as follows; greatest impact (22), great impact (23), moderate impact (12), and low impact (3). Consequently, looking at Global standards of identification impact on identification of brand owners, it was evident the respondents have been able to see how best to identify the brand owners who supply the pharmaceutical commodities and match the individual products to the organizations that manufacture them. This makes it easier to single out a product and its manufacturer in case of adverse effects of a particular medicine to the population. This eventually affirms the concept that Global standards implementation will improve efficiency in the public health procurement process. The score was distributed as follows; greatest impact (15), Great extent (14), Moderate extent (9), Low extent (3).

The research concluded that Global standards identification implementation has a direct impact on the performance of public health procurement agency both from a product perspective and from a stakeholder perspective.

5.2.2 Influence of Global standards data capture implementation on the performance of public health procurement agency.

Influence of product data capture on the performance of public health procurement agency, it was evident that Global standards data capture has influence on the performance of public health procurement agency. This focusses on how to easily verify health care products in the public

health supply chain and how easy it is to manage inventory in the entire public health supply chain. It was evident that the process of verification of commodities was faster and more efficient hence the general process of inventory management becomes a less pain point to the organization. The score was distributed as follows; greatest impact (32), great impact (23), moderate impact (5) low impact (2). Consequently, looking at Global standards data capture impact on easier record management of products in the public health supply chain, many respondents affirmed that the automated process of capturing data in a software enabled inventory process creates orderliness in the process of order and reconciliation, reducing manual interventions and making the process easier to manage from a process perspective. This eventually leads to the improvement of performance of procurement agency. In a scale of 0 to 8. The score was distributed as follows; greatest impact (26), great impact (26), moderate impact (8).

The research concluded that Global standards data capture has influence on the performance of public health procurement agency.

5.2.3 Influence of Global standards data exchange implementation on the performance of public health procurement agency.

Influence of product data exchange on the performance of public health procurement agency. Looking at Global standards data exchange impact on the faster verification of products in the public health supply chain, it was evident that by elimination of redundant manual processes, the process of verification of products became faster and more efficient. This leads to high productivity within the procurement agency. The score is distributed as follows; greatest impact (27), great impact (26), moderate extent (8) and low impact (1). Consequently, looking at Global standards data exchange impact on easier record management of products in the public health

supply chain, it was evident that through digitalization of processes and systems, management of records became easier. This led to reduction of errors in inventory, lack of stock outs and faster identification of expired commodities in the public health supply chain. The score was distributed as follows; greatest impact (26), great impact (26), and moderate impact (5).

The research concluded that Global standards data exchange has influence on the performance of public health procurement agency.

5.3 Conclusion of the study

Global standards implementation is key in ensuring that we will have safe, secure and reliable supply chains. Global standards implementation is achieved through product identification, Data capture and Data exchange which has an influence on the performance of public health procurement agency. This study has clearly shown existence of positive and significant outcomes on the adoption of global standards on procurement agency

5.4 Recommendation

The study recommends the following:

1. All medical products manufactured locally or internationally and comes in through the public health ecosystem should have unique identifiers at the primary secondary and tertiary packaging levels. This will be in the form of Global trade item number, Serial number and the Serial shipping container code.

2. All medicinal products manufactured locally or internationally and comes in through the public health ecosystem should have data capturing elements in the form of either Linear

Barcode or 2-D data matrix code and this should be principally captured in both the Primary, Secondary and Tertiary packaging.

3. All public health procurement agency put in place a digital procurement/logistic management system in the form of Logistic Management Information Systems and creating an Interoperability ecosystem that will facilitate supply chain systems digitally communicating with each other. This will facilitate data exchange across supply chain partners throughout the public health procurement system.

5.5 Suggestions for further Research

The study established that the implementation of Global standards has a greater influence on procurement agency across various industries and not necessarily the medical industry alone. Hence, there is need to investigate the economic value of adoption of global standards in all public procurement agency in Kenya

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APPENDICES

Appendix I: Letter of Transmittal

Dear Sir/ Madam,

Re: Request for Participation in Questionnaire Responses

I am a Master of Arts student at University of Nairobi pursuing Project Planning and Management; In line with my final year requirement, my research study will focus on **INFLUENCE OF GLOBAL STANDARDS IMPLEMENTATION ON PERFORMANCE OF PUBLIC HEALTH PROCUREMENT AGENCY. A CASE STUDY OF KEMSA.**

After careful consideration, you have been identified as one of the people with the relevant qualification and experience, who will help me to digress the research topic further and come up with tangible output. Moreover, your role will be to fill in the questionnaire that will be made available to you. For confidentiality purposes, you will be treated anonymously and the information provided will strictly be used for academic purposes.

Please give the information as accurate as possible. Thank you very much.

Yours faithfully,

Collins Obiero Agoro

L50/33743/2019

Appendix II: Research Questionnaire

This questionnaire below is for collecting data that is purely for academic purposes. The study seeks to investigate ***Influence of global standards implementation on performance of public health procurement agency: a case study of KEMSA***. The information given will be treated with strict confidence. Of importance to note is that there should be no name or identification on this questionnaire.

Answer all questions as indicated by either filling in the blank or ticking the option that applies.

INFLUENCE OF GLOBAL STANDARDS IMPLEMENTATION ON PERFORMANCE OF PUBLIC HEALTH PROCUREMENT AGENCY: A CASE STUDY OF KEMSA

SECTION A: BACKGROUND INFORMATION

1. Please indicate the name of your organization

   _____

2. Please indicate your job title during GS1 implementation project.

   _____

3. Which department have you been working in?

   Mark only one oval.

   - ◯ Procurement
   - ◯
   - ◯

Information, Communication & Technology

Supply Chain & Logistics

4. What kind of products that are handled by this procurement agency gall within the GS1 implementation scope?

Check all that apply.

- [ ] Pharmaceuticals
- [ ] Medical devices

Both

5. How many years have you worked with the organization?

Check all that apply.

- [ ] 0 - 5 years
- [ ] 5 - 7 years

7 - 10 years

SECTION B: VARIABLES

6. To what extent does the following aspects of the presence of identification specification have on the performance of public health procurement agency?

Mark only one oval per row.

	Low Extent	Moderate Extent	Great Extent	Very great Extent
Identification of individual Products	◯	◯	◯	◯
Identification of brand owners	◯	◯	◯	◯

7. To what extent does the presence of data capture have on the performance of public health procurement agency?

Mark only one oval per row.

	Low Extent	Moderate extent	Great extent	Very great extent
Easy verification	◯	◯	◯	◯
Easy record Management	◯	◯	◯	◯

8. To what extent does the following aspects of the presence of data exchange have on the performance of public health procurement agency?

Mark only one oval per row.

	Low Extent	Moderate extent	Great extent	Very great extent
Easy verification	◯	◯	◯	◯
Easy record Management	◯	◯	◯	◯

9. What is the trend of the following aspects of project performance in enhancing performance of public health procurement agency for the last 5 years? Where, 5 = greatly improved, 4= improved, 3= constant, 2= decreased, 1 = greatly decreased

Mark only one oval per row.

	1	2	3	4	5
Reduced counterfeit products	◯	◯	◯	◯	◯
Reduced expired products	◯	◯	◯	◯	◯
Timely products distribution	◯	◯	◯	◯	◯
Reduction in stock outs	◯	◯	◯	◯	◯

SECTION C: GENERAL REFLECTION

10. What was the performance of the procurement agency before the GS1 standards implementation project?

Poor	◯	◯	◯	◯	◯	Excellent

11. What was the performance of the procurement agency after the coming into force of the GS1 standards implementation project?

Mark only one oval.

	1	2	3	4	5	
Poor	◯	◯	◯	◯	◯	Excellent

12. Do you think theGS1 project implementation should be implemented in all the county governments Central Medical Stores?

Mark only one oval.

◯ ☐ Yes
◯ ☐

THANKS FOR YOUR COOPERATION

Appendix IV Sample Determination Table

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

Sekaran (2003)